THE USE OF CLOUD COMPUTING AND ITS EFFECT ON ORGANISATIONAL PERFORMANCE IN THE PUBLIC SECTOR

Wesley Naidoo

Student number: 2518786

Student email: 2518786@students.wits.ac.za

This research report was submitted to the Faculty of Commerce, Law, and Management at the University of the Witwatersrand, fulfilling the academic requirements for the Master of Management degree, specialising in Digital Business.

Supervisor Dr Norman Mudau

Johannesburg, 2024

ABSTRACT

Cloud computing is changing how public sectors work, making things faster and better. This paper looks at how cloud computing affects how well public organisations do their jobs, considering both money-related and other benefits. Cloud computing is essential for public services because it can make them work better and give better services to people. Nevertheless, understanding how it helps is difficult, especially with the public sector's unique rules and challenges. Cloud computing is one of the new technologies that has gained prominence in recent years. Even though the value associated with this technology has been widely researched, especially for large enterprises, the rate at which public sector entities use cloud computing remains low. This research sought to explore and describe the use of cloud computing and its effect on organisational performance in the public sector. To understand the problems, factors influencing the use of cloud computing and its use on organisational performance were investigated, considering both financial and non-financial factors.

The study utilised the extended Technology Organisation Environment (TOE) and Resource-based view (RBV) framework (Gangwar,2017) as the theoretical lens to understand the cloud computing phenomenon. Methodologically, this study employed online surveys administered through the Qualtrics online survey platform to gather data. These surveys sought to extract invaluable insights into the use of cloud computing and its effect on organisational performance in the public sector. The main factors identified as necessary in using cloud computing are human resources, business resources, technology resources, change management, leadership, policy and regulation, customer performance, operational performance, and financial performance. The model was tested through a cross-sectional design using data collected from a sample (N=400) of individuals employed in the public sector in South Africa using matched data collected over a period of approximately 16 weeks apart. Structural equation modelling with AMOS was used for all model testing. This study applied a complex approach to data analysis using descriptive statistics, correlation analysis, confirmatory factor analysis, and multiple regression through structural equation modelling to provide an analysis of the various variables identified. The research showed significant relationships between cloud computing use and leadership, policy and regulation, human resources, technology and business resources. This confirmed the first objective of understanding the factors that influence the use of cloud computing in the public sector in South Africa. The following significant result showed that this is a new contribution, as previous studies measured non-financial performance as a single item instead of expanding it to include customer, operational, and financial performance. The testing of the model thus contributes to developing a theory that explains the mechanisms through which cloud computing influences organisational performance and extends our understanding of the organisational conditions under which cloud computing usage is most important to performance. The empirical results confirm that cloud computing use is vital to affect organisational performance in the public sector. The study further contributes much-needed evidence of the relationships addressed by the influence of cloud computing on a holistic perspective of organisational performance, encompassing operational, customer, and financial aspects. This study aims to provide industry practitioners with practical insights and actionable strategies to justify investments in cloud computing systems and to improve how cloud systems are used.

KEYWORDS

Cloud Computing,

Organisational performance,

Technology,

Organisational environmental framework,

Resource-based view

DECLARATION

I, Wesley Naidoo, affirm that this research report represents my original work, with any contributions from external sources duly credited in the references and acknowledgements sections. This report is part of the fulfilment criteria for the degree of Master of Management in Digital Business at the esteemed University of the Witwatersrand, Johannesburg. I confirm that this work has not previously been submitted for evaluation or accreditation in any academic institution.

Name:Wesley Naidoo Signature: W Naidoo

Signed in Johannesburg, South Africa

On the 27th day of February 2024

ACKNOWLEDGEMENTS

I sincerely thank Dr. Norman Mudau for his invaluable assistance and unwavering patience throughout my academic journey. His expertise and guidance have been a beacon of light, guiding me through challenging research endeavours with wisdom and encouragement. Dr. Mudau's dedication to my development as a scholar and willingness to share his profound knowledge significantly contributed to my growth and success. I am sincerely thankful for his generous support, insightful feedback, and the inspiring example he sets as an educator and mentor. Thank you, Dr. Mudau, for everything. Your impact on my academic career will always be appreciated.

I want to express my heartfelt gratitude to my dear family and friends for your unwavering support and patience throughout my master's journey. Your encouragement and understanding were the pillars that sustained me through the challenges and triumphs of this academic endeavour. Without your constant presence, endless encouragement, and invaluable assistance, achieving this milestone would not have been possible. The sacrifices you have made and the faith you have shown in me have driven my success. I am deeply grateful to each of you for being my strength and inspiration. Thank you for making this journey possible.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AVE - Average Variance Extracted

BR – Business resources.

CCU - Cloud Computing Use

CFA – Confirmatory Factor Analysis

CIO – Chief Information Officer

CM – Change management

CP – Customer performance

CR - Composite reliability

CSR – Corporate Social Responsibility

CTO – Chief Technology Officer

EFA - Exploratory Factor Analysis

ESG – Environmental, Social, and Governance

FP – Financial performance

HR – Human Resources

IT – Information technology

KMO - Kaiser-Meyer-Olkin

LD – Leadership

NIST – National Institute of Standards and Technology

OP – Operational performance

PaaS - Platform as a Service

PCA - Principal Component Analysis

PFMA - Public Financial Management Act

PR – Policy and regulation

RBV - Resource-Based View

SaaS – Software as a Service

SEM - Structured Equation Modelling

SEM - Structured equation modelling

TOE - Technology, Organisation, and Environment

TR – Technology Resources

CHAPTER 1. INTRODUCTION

1.1 Statement of purpose

This study aimed to examine the use of cloud computing and its effect on organisational financial and non-financial performance in the public sector. Furthermore, the study investigated the organisational factors influencing cloud computing use.

In realising the purpose of the study, this study proposed an integrated, multidimensional model based on the Technology-Organisation-Environment (TOE) framework (Tornatzky et al., 1990) and Resource-Based View (RBV) model developed by (Birger Wernerfelt, 1984; Barney, 1991). The TOE framework explained how the process of adopting technological innovation was influenced by technological, organisational, and environmental contexts (Tornatzky et al., 1990). Notably, the RBV model recognised technology, human, environmental and business dimensions of information system (IS) capabilities for improved organisational performance (Barney, 1991; Wernerfelt, 1984). Cloud computing has transformed the use and development of software for millions of users, rather than on individual computers, irrespective of the type of organisation. There was a need to re-look at the use of cloud computing on organisational performance to ensure that organisations obtained value from the use of cloud computing (Zhu and Kraemer,2005). This is intended to fill a research gap in post-adoption studies, contrary to the existing literature on pre-adoption and adoption stages.

This study focused on factors that influence cloud computing use on organisational performance. The study recognised technological resources, human resources, business resources, change management, and regulatory support as enabling technological capabilities (Barney, 1991). The enabling capabilities might have influenced cloud computing use to influence operational, customer, and financial performance (Kaplan and Norton, 1992). An integrated model incorporating RBV and TOE was developed by (Zhu and Kraemer, 2005);

however, the focus was on e-business. In addition, (Gangwar, 2017) extended the (Zhu and Kraemer, 2005) model to the cloud computing environment. However, the extended model ignored leadership, policy, and regulation as factors. Including these factors may have explained organisations' use of cloud computing.

Furthermore, (Gangwar, 2017) focused on financial performance as an organisational impact and ignored non-financial performance (operations and customer performance). Investigating the impact of use on a balanced view of organisational performance may have explained the impact of cloud computing use on non-financial performance and, consequently, the impact of non-financial performance on financial performance (Aydiner et al., 2019). The conceptual framework of this study is shown below in Figure 1.

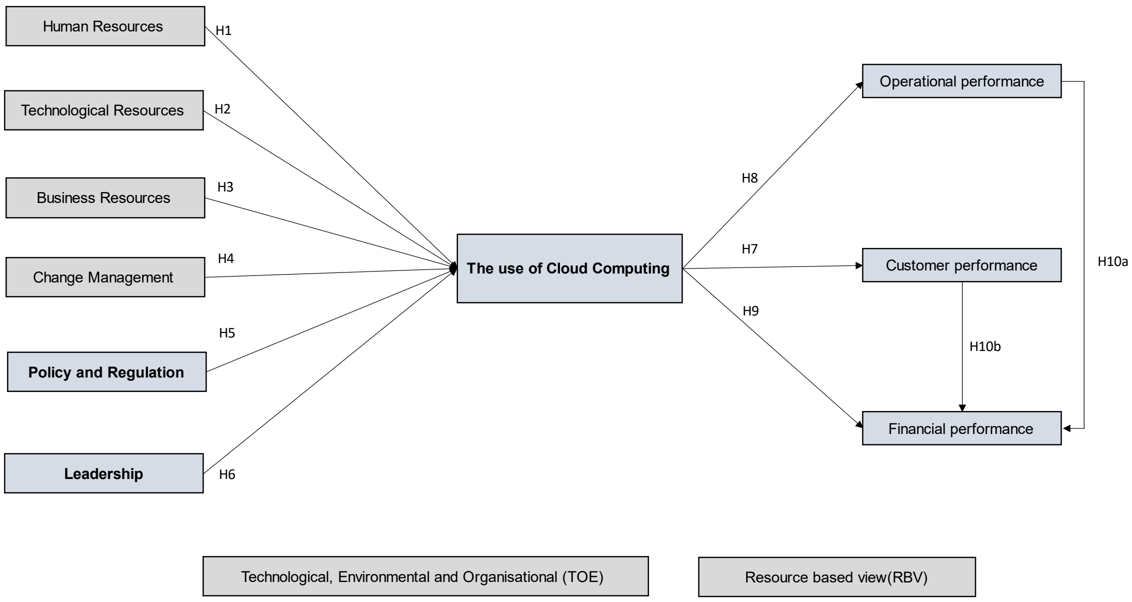


Figure 1 Conceptual framework

Source: Researcher's Own Elaboration.

1.2 Background of the study

Cloud computing represents a fundamental shift in information technology infrastructure and delivery, increasingly used across industries, academia, and by individual users due to its accessibility, convenience, and cost-effectiveness (Choubey et al., 2011). Defined by the National Institute of Standards and Technology (NIST, 2009) as a model for enabling on-demand network access to a configurable pool of computing resources, cloud computing promotes operational flexibility and rapid resource provisioning with minimal management effort. Its benefits, including scalability, cost reduction, enhanced data analytics, and security, position it as a significant driver of innovation and efficiency (Mell & Grance, 2011). However, despite its growing acceptance, research into the comprehensive effects of cloud computing on financial and non-financial organisational performance, particularly in the context of implementation and usage, remains underexplored (Al Hadwer et al., 2021).

Cloud computing has revolutionised how IT services are developed, deployed, and maintained, offering substantial economic advantages and reshaping IT resource management (Marston et al., 2011). Its service models—Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS)—along with various deployment models, offer diverse solutions tailored to organisational needs (Mell & Grance, 2011; Velte et al., 2009). Despite these advancements, security concerns, service availability, and integration complexities persist, necessitating a deeper investigation into the factors influencing cloud computing adoption and its broader implications (Feuerlicht et al., 2011; Géczy et al., 2012).

Addressing this gap, this study explores the influence of cloud computing on organizational performance in South Africa, considering both financial and non-financial factors. It explores how technology, human and business resources, change management, policy and regulation, security, and leadership influence cloud computing adoption and utilisation. By integrating the Technology-Organisation-Environment (TOE) framework (Tornatzky et al., 1990) and the Resource-Based View (RBV) (Wernerfelt, 1984; Barney, 1991), the study aims to offer a thorough understanding of cloud computing's role in enhancing organisational performance.

Despite the focus on sectors like SMEs and education in previous studies (Behrend et al., 2011; Gupta et al., 2013), the need for a broader investigation across various organisational types is evident. As mentioned previously, this research addresses the gap by assessing the impact of cloud computing beyond financial performance to include non-financial metrics such as customer and operational performance, as Kaplan and Norton (1996) proposed. Such an approach offers a more holistic view of organisational performance, emphasising the importance of incorporating non-financial indicators into performance evaluation (Eccles et al., 2014a).

The study stresses the importance of a thorough knowledge of cloud computing's impact on organisational success, highlighting the crucial significance of internal and external elements. By providing evidence-based insights into the multilayered influences of cloud computing, it aims to guide strategic decision-making for organisations contemplating the usage or expansion of cloud computing technologies, highlighting the importance of factors such as policy and regulation and leadership in negotiating the complexities of cloud computing and optimisation.

1.3 Research problem

This study examines two main problems:

The first problem of the study is to investigate “factors that influence the use of cloud computing by organisations in the public sector in South Africa”. The factors that influence cloud computing were not fully understood such as leadership and policy and regulation. The investigation seeks to solve the factors driving cloud computing usage, highlighting a gap in existing research that often emphasises financial over non-financial performance impacts. The extended Technology, Organisation and Environment model (TOE) and Resource Based View (RBV) (Gangwar,2017) identified factors such as human resources, technology resources, and business resources but ignored leadership and policy and regulation. Notably, prior investigations have yielded mixed results regarding factors that influence cloud computing use, with some studies suggesting positive outcomes (Queiroz et al., 2019; Sultan, 2018; Albar et al., 2014) and others indicating negligible or insignificant benefits (Benlian et al., 2011; Wang et al., 2018; Zhao et al., 2020). This discrepancy emphasises the need for a deeper understanding of the factors that influence cloud computing usage, particularly in the public sector, where regulatory compliance and data security are paramount (Misra et al., 2011; Almarabeh et al., 2019). Understanding factors influencing the use of cloud computing remains a research problem that needs investigation (Hou, 2012). Because of these varied results, the relationship between factors and the influence of cloud computing use must be better understood. Addressing whether the factors that influence of cloud computing use is necessary may explain discrepancies in past findings. The public sector in the South African context provides a fascinating setting within which to investigate this question. This is because, although investments in cloud computing are often used for their potential to reduce costs and increase efficiency, the financial benefits may not always be immediate or direct. The initial investment and ongoing costs must be considered against the expected financial and non-financial benefits. Exploring these factors is vital for clarifying the role of cloud computing in enhancing organisational effectiveness and addressing the inconsistencies found in previous research.

The second issue under investigation is the "*impact of cloud computing use on organisational performance, taking into account both financial and non-financial factors"*, alongside a balanced set of measures to assess organisational performance. Organisational performance is a set of financial and non-financial performance indicators (Neely, Gregory and Platts, 2005; Božic and Dimovski, 2019). Prior studies investigating the impact of cloud computing on organisational performance were focused on evaluating performance as financial performance, such as profitability (e.g., return on assets, net profit, sales turnover, and assets turnover), but ignored non-financial performance (O'Brien and Kok, 2006; William and Williams, 2007; Narayanan and Boyce, 2019). The sole focus on financial performance does not provide a balanced view of organisational performance. Financial performance is only one aspect of a more balanced view of performance measurement (Lönnqvist and Pirttimäki, 2006). Other prior studies (Alshamaila et al., 2013); Gangwar et al., 2015); Low et al., 2011); Sultan, 2011) that examined the impacts of cloud computing use on non-financial performance only focused on benefiting small and medium-sized enterprises by enhancing their non-financial performance, including scalability, collaboration efficiency, and customer satisfaction. They ignored other aspects, such as customer, operational, and financial performance. Consequently, the role of cloud computing in improving financial and non-financial organisational performance requires further attention. Examining this relationship will aid management in justifying the decisions that they have made in investing in cloud computing.

The research objectives are outlined in Section 1.4.

1.4 Research objectives OR research questions

Given the research problems discussed above, this study has two objectives:

RO1.To examine the factors that influence the use of cloud computing in the public sector.

RO2. To investigate the extent to which cloud computing computing use influences a balanced view of organisational performance (non-financial and financial).

1.5 Rationale

This study aims to make an original contribution in four ways: theoretical, contextual, and practical.

First, a theoretical contribution is made by drawing on and extending the (Gangwar, 2017) model to develop a cloud computing model focused on use. The construct of use has not been sufficiently explored. Moreover, the model has been extended by including factors reflecting individual user characteristics. By testing the model, the study determines the utility of the underlying theories in explaining the use of cloud computing and establishing use as a prerequisite for organisational performance. Further, the longitudinal design integrates human resources, technological resources and business resources from the theoretical framework of the (Gangwar, 2017) model to develop a dynamic model. Using the RBV approach, further theoretical contributions are made by hypothesising the impact of cloud computing use at the organisational level on financial and non-performance (Chen et al., 2014). The non-financial and financial performance constructs in a cloud computing environment have not been sufficiently explored. The testing of the model explains the impact that cloud computing has at the organisational level on financial and non-financial performance. The literature does not sufficiently theorise cloud computing use in improving organisational performance. The study also considers the potential impact of organisation size, strategy, technology, structure, culture, and environment on the links between cloud computing usage and organisational performance. The testing of the model thus contributes to developing a theory that explains the mechanisms through which cloud computing influences organisational performance and extends our understanding of the organisational conditions under which cloud computing usage is most important to performance.

Second, the study makes a contextual contribution by examining cloud computing use at organisational levels in the context of the public sector in South Africa. The study makes an extensive contribution to information systems by evaluating whether cloud computing use has impacted organisational performance.

Third, the results of this study can assist organisations in improving decisions on how they invest in and deploy cloud computing, as well as the types of interventions that may be needed to achieve usage by individuals. For example, the balanced performance measurement approach will assist organisations with concrete indicators to measure the benefits and success of their cloud computing use. Further, by identifying the determinants of use, organisations will be better positioned to implement necessary interventions to promote cloud computing and develop strategies for migrating these users from other systems (Gutierrez, Boukrami, and Lumsden, 2015).

This chapter reviews the existing literature that is significant for the current study. First, the process followed to carry out the review is presented. Next, cloud computing is defined and described. After that, the evolution, attributes, and benefits of cloud computing are discussed in detail. The literature review then focuses on the shortcomings of the existing literature on the use and impact of cloud computing. The chapter highlights the potential role of cloud computing in the public sector and explores its potential impacts on organisational performance (non-financial and financial) and the balanced scorecard.

1.6 Delimitations of the study

The following delimitations will be considered in this study:

Cloud Computing Service Models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS) are all examples of cloud computing services (Mell and Grance, 2011). This study mainly focused on the impact of cloud computing use on organisational performance without differentiating between these specific service models.

Organisational size and industry: The impact of cloud technology on organisational performance may vary depending on the size of the organisation and the industry in which it operates. This study did not focus on the size of the organisation or the industry sector but aimed to provide general information applicable to various organisations (Low et al., 2011).

Geographic location: The adoption and impact of cloud technology may differ depending on the geographic location of an organisation, as factors such as internet connectivity, local regulations, and cultural factors can influence the use of cloud technology (Misra and Mondal, 2011). This study focused on South African public sector organisations, with the aim of providing relevant information to a global audience.

Long-term impact: This study primarily focused on cloud computing's immediate and short-term impact. This research did not focus on the long-term implications of use, including the potential for strategic transformation or disruption.

Technological advancements: As cloud technology rapidly evolves, new technologies and advancements are continually emerging (Sultan, 2011). This study was based on the current state of technology and did not attempt to predict or analyse the impact of future technological developments on organisational performance.

1.7 Assumptions

The underlying ideas or circumstances the researcher accepts as true without direct proof are known as assumptions. In this study, the following assumptions were considered:

- **Generalising the findings**: This study assumed that, regardless of an organisation's size, industry, or location, the conclusions on the effect of cloud computing on organisational performance may be applied to a wide range of businesses (Marston et al., 2011).
- **Technical knowledge:** This study assumed that the companies involved had the essential technical ability and that the requisite resources and infrastructure were available to adopt and execute cloud computing services (Mell and Grance, 2011).
- **Willingness to adopt cloud computing:** This study assumed that companies were eager to learn more about the possible advantages and difficulties (Low et al., 2011).
- **Measurement of organisational performance:** This study assumed that various factors, including operational effectiveness, competitive advantage, agility, innovation, collaboration, and customer satisfaction, may be used to assess the performance of an organisation (Lin and Chen, 2012; Sultan, 2011). It was also assumed that adopting cloud technology services may influence these aspects.
- **Data accuracy, reliability, and validity:** This study assumed that the information gathered from participants through surveys would yield precise, reliable, and correct details on the effect of cloud computing on organisational performance (Misra and Mondal, 2011).

1.8 Chapter outline

The thesis structure is as shown on the following figure:

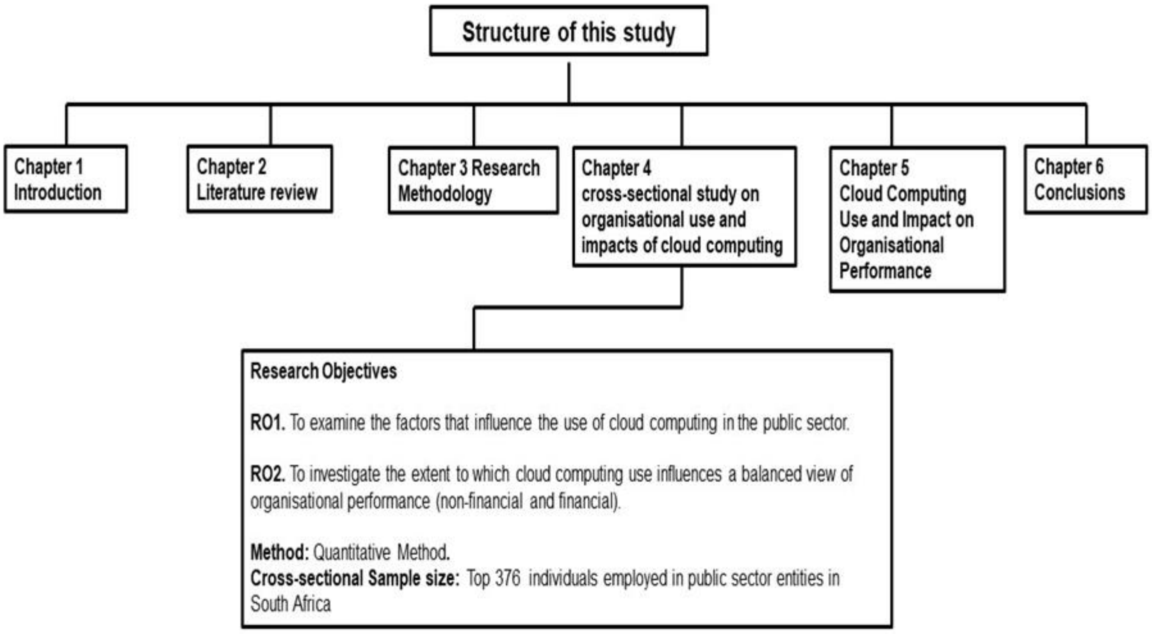


Figure 2 Structure of the study

This thesis has six chapters, including Chapter 1, which introduces the problem of cloud computing use and impacts; Chapter 2, which reviews the literature on cloud computing; and Chapter 3, which details and discusses the research methodology and design followed in conducting the research. Chapter 4 presents the results of a cross-sectional study on organisational use and the impacts of cloud computing in order to answer RO1 and RO2. Chapter 5 Use of cloud computing and impact on Organisational Performance. Chapter 6 concludes the study.

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter reviews the existing literature that is significant for the current study. First, the process followed to carry out the review is presented. Next, cloud computing is defined and described. After that, the evolution, attributes, and benefits of cloud computing are discussed in detail. The literature review then focuses on the shortcomings of the existing literature on the use and impact of cloud computing. The chapter highlights the potential role of cloud computing in the public sector and explores its potential impacts on organisational performance (non-financial and financial) and the balanced scorecard.

2.2 Approach to the literature review

Chapter 1 laid the groundwork for this research by introducing the topic and the associated problems. This chapter delved deeper by scrutinising the pertinent literature surrounding the study. The process of conducting this review of the literature was initially described, followed by a definition and description of cloud computing. Subsequently, the evolution, attributes, and benefits of cloud computing were discussed in detail. The attention was then shifted towards the shortcomings in the existing literature on the utilisation and impact of cloud computing. The chapter highlighted the potential influence of cloud computing on organisational performance, exploring its possible effects on financial and non-financial aspects, thus offering a balanced viewpoint.

The literature review process extensively used several resources, including the Google Scholar search engine, Science Direct, ResearchGate, Emerald, and other online academic databases. Key topics used to create search queries for the review included usage, impact, security, performance, policy and regulation, privacy, cloud computing, the technology, organisation, and environment (TOE) model, and the resource-based view (RBV) models.

This chapter sought to navigate the vast expanse of research available in numerous research databases and libraries, focusing on the use of cloud computing in organisational performance. The goal was to provide a comprehensive overview of the relevant literature and extract essential information about technology from the reviewed resources. Thus, it builds on the foundational cloud computing background supplied in Chapter 1.

The subsections provided arguments for organisations to adopt this technology and how it affected organisational performance by outlining its advantages and disadvantages. Additionally, similar papers and those that did not address the subject or were unrelated to the overall study were carefully selected.

Multiple peer-reviewed journal articles were shortlisted for examination to compile this section. All selected articles concentrated on cloud computing use and the factors influencing its organisational performance. To understand its impact on organisational performance, a comprehensive approach was employed to assess the literature on cloud computing and the factors in its use.

The articles were grouped into the following subcategories.

What is Cloud Computing and its Adoption?

- Advantages and Disadvantages of Technology
- How does technology affect organisational performance?
- Technology Adoption Framework

2.3 The role of information technology in organisations

Information technology (IT) plays a vital role in modern organisations, influencing many factors of their operations and strategy (Bharadwaj et al., 2013). This overview addressed the roles of information technology in organisations, focusing on communication and collaboration, data management and decision making, business process automation and efficiency, innovation and product development, customer engagement and experience, IT infrastructure and security, and organisational strategy and competitive advantage.

It transformed communication and collaboration, allowing employees to connect and work in real time, regardless of location (Leonardi et al., 2013). Electronic mail, instant messaging, video conferencing, and collaboration platforms facilitated faster and more efficient communication and collaboration among employees and external stakeholders (Dery et al., 2017).

IT systems improve data management and decision making by allowing organisations to collect, store, analyse and manage large amounts of data (Chen and Tseng, 2012). Business intelligence and analytical tools provide insights into patterns and trends, helping organisations optimise operations, identify opportunities, and make data-driven decisions (Lavalle et al., 2011).

Information technology (IT) has played a fundamental role in enhancing the efficiency and automation of corporate processes, as elucidated by (Rai et al., 2012). This technological advancement has substantially streamlined organisational workflows and curtailed the necessity for manual operations, thereby optimising operational procedures. Implementing various IT systems, such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM), as well as other business applications, has been instrumental for managing their resources with greater efficacy. Adopting these systems contributes significantly to the augmentation of productivity, reduction of errors, and overall improvement of business processes (Shang and (Seddon, 2002). Integrating IT solutions into corporate strategies and operations underscores a transformative shift in how organisations optimise and manage their functional and strategic endeavours, leveraging technology for enhanced operational performance and competitive advantage.

IT systems improve data management and decision making by allowing organisations to collect, store, analyse and manage large amounts of data (Chen and Tseng, 2012). Business intelligence and analytics tools provide insights into patterns and trends, helping organisations optimise operations, identify opportunities, and make data-driven decisions (Lavalle et al., 2011).

IT significantly improved the efficiency and automation of corporate processes, streamlined workflows, and reduced the number of manual operations (Rai et al., 2012). Organisations could manage their resources more effectively, increase productivity, and reduce errors with the use of enterprise resource planning (ERP) systems, customer relationship management (CRM) systems, and other business applications (Shang and Seddon, 2002).

The IT infrastructure, including hardware, software and networks, was essential for organisations to support their operations and enable the flow of information between various systems (Neirotti et al., 2014). IT was crucial in ensuring the security of an organisation's digital assets, data, and infrastructure, protecting them from cyber threats and data breaches (Tunggal et al., 2023).

Finally, IT has been a competitive advantage for organisations, enabling them to innovate, differentiate themselves, and enhance their value proposition (Mithas et al., 2011). Strategic alignment between IT and organisational goals was essential to leverage IT capabilities effectively and drive growth (Gerow et al., 2014).

IT strengthened communication and collaboration, reinforced data management and decision making, facilitated process automation and efficiency, promoted innovation and product development, improved customer engagement and experience, provided IT infrastructure and security, and helped establish organisational strategy and competitive advantage (A. Bharadwaj et al., 2013; Chen and Tseng, 2012; Leonardi et al., 2013; Mithas et al., 2011; Nambisan et al., 2019; Neirotti et al., 2014; Trainor et al., 2014). By utilising IT effectively, organisations achieved increased efficiency, innovation, and growth.

2.3.1 What is cloud computing?

Cloud computing has developed as a revolutionary technology that enables organisations to store, manage, and process data virtually, using computers connected to the Internet rather than on-premises hardware and software (Mell and Grance, 2011). By offering scalable services, the technology effectively used computing power, storage, and networking resources (Buyya et al., 2009a).

The National Institute of Standards and Technology (NIST) has defined cloud computing as an approach providing universal, practical, on-demand network access to a pool of shared configurable computing resources that could be rapidly provisioned and distributed with little to no management or service provider interaction (Mell and Grance, 2011). The five essential components of the approach were on-demand self-service, widespread network access, resource sharing, rapid adaptability, and measured service (Hashem et al., 2015).

Cloud computing could be divided into three primary service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) (Gupta, 2017). IaaS offered virtualised computing resources, PaaS provided a development platform, and SaaS-delivered fully functional applications over the Internet (Mell and Grance, 2011).

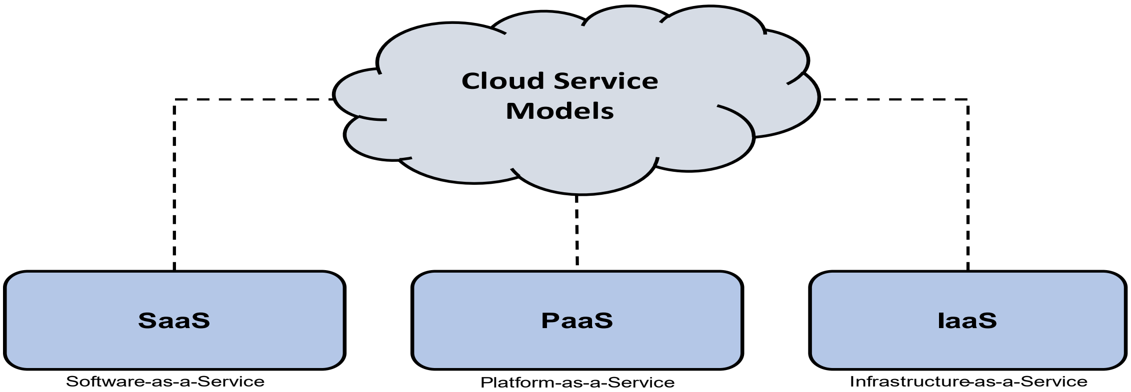


Figure 2: Cloud computing: Three Categories of a Generic Model- Source: Researcher's Own Elaboration

Cloud computing has transformed how organisations access and manage computing resources by offering a range of service models. These models enabled users to access and use services based on their specific requirements and allowed them to focus on their core business functions (Mell and Grance, 2011). The primary service models for cloud computing were Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) (Gupta, 2017).

Infrastructure as a Service (IaaS) is a cloud computing model that offers virtualised computing resources over the internet, such as storage, servers, and networking components (Mell and Grance, 2011). IaaS enables organisations to scale resources up or down according to their needs, avoiding the capital expenditure of maintaining physical hardware (Jadeja and Modi, 2012). Popular IaaS providers include Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP) (Buyya et al., 2009a).

Platform as a Service (PaaS) allows developers with a cloud-based platform to create, test, and deploy applications without concern about the underlying hardware and software (Chauhan and Babar, 2012). Developers can create applications more rapidly and effectively with the help of PaaS, which offers development tools, middleware, and runtime environments (Varghese and Buyya, 2018). In the article by (Hashem et al.,2015), a few instances of PaaS providers are Google App Engine, Microsoft Azure App Service, and Heroku**.**

Software as a Service (SaaS) is a service model that delivers fully functional applications over the Internet (Gupta, 2017). SaaS applications run on the provider's infrastructure, and users access them through a web browser, eliminating organisations' need to install and maintain software on their devices (Mell and Grance, 2011). SaaS offers advantages such as reduced cost, more accessible updates, and enhanced collaboration (Ochei et al., 2016a). Notable SaaS providers include Salesforce, Microsoft Office 365, and Adobe Creative Cloud (Arce, 2020).

In addition to these primary service models, some researchers have also proposed other service models such as Data as a Service (DaaS), Security as a Service (SecaaS), and Communications as a Service (CaaS) (Mell and Grance, 2011). These models extend the concept of cloud computing to include additional services that cater to specific industry needs (Mell and Grance, 2011). The service models in cloud computing enable organisations to access and use computing resources according to their specific requirements. By understanding the different service models, organisations can make informed decisions about which model best suits their needs and optimises their organisational performance (Hashem et al., 2015).

The cloud computing deployment models are public, private, hybrid, and community clouds (Mell and Grance, 2011). Third-party providers own and operate public clouds that provide services to the public. Private clouds are only accessible to a single organisation and managed internally or by a third party. Community clouds serve a variety of organisations with similar requirements, while hybrid clouds contain factors from both public and private clouds (Arce, 2020).

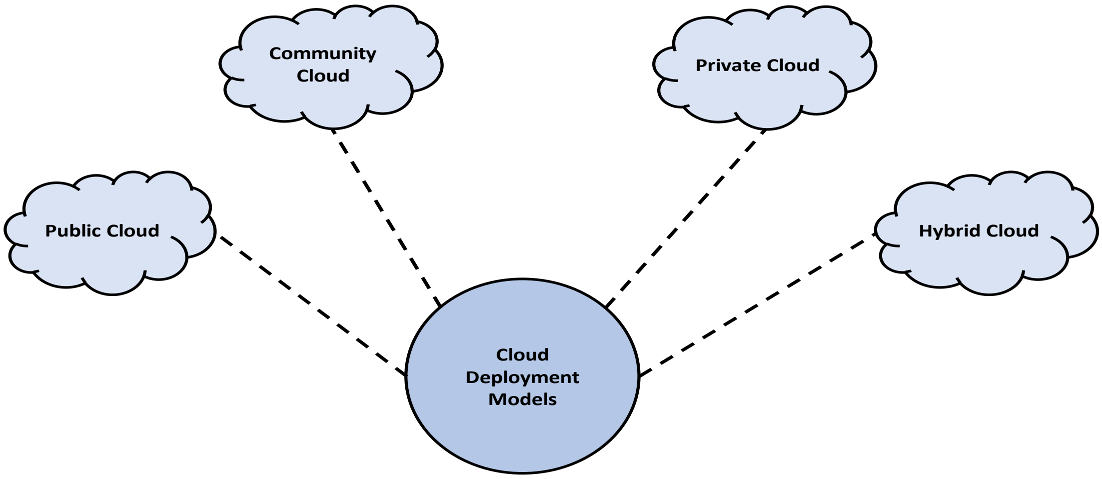


Figure 3: Generic Cloud Deployment Models- Source: Researcher's Own Elaboration

2.3.2 *Cloud deployment models*

1. **Public Cloud:** In a community cloud model, computing resources and services are provided by third-party providers over the Internet, and they are accessible to anyone who needs to use or purchase them (Mell and Grance, 2011). Public clouds offer cost efficiency, scalability, and flexibility, making them suitable for organisations with fluctuating workloads or limited IT resources (Hashem et al., 2015). Examples of public cloud providers include Amazon Web Services (AWS), Microsoft Azure, and Google's Cloud Platform (GCP) (Buyya et al., 2009b).
2. **Private Cloud:** Private clouds are dedicated to a single organisation and may be managed internally or by a third-party provider (Mell and Grance,

2011). Private clouds offer unlimited control over data, security, and compliance, making them ideal for organisations with strict regulatory requirements or sensitive data (Ali and Osmanaj, 2020). Examples of private cloud solutions include VMware vSphere and Microsoft Azure Stack (Arce, 2020; Gupta, 2017).

3. **Community Cloud:** Community clouds cater to organisations with similar requirements and shared goals (Mell and Grance, 2011). They may be managed by the organisations themselves or by a third-party provider and offer a balance between the benefits of public and private clouds (Marston et al., 2011). Examples of community clouds include the Research and Education Network (REANNZ) cloud and the Government Community Cloud (GCC) (Chauhan and Babar, 2012).
4. **Hybrid cloud:** Hybrid clouds combine the features of public and private clouds by integrating the infrastructure on-premises with public cloud resources (Gupta, 2017). This model allows organisations to choose where to deploy their applications and data based on security, performance, and cost requirements (Varghese and Buyya, 2018). Unique hybrid cloud solutions include AWS Outposts and Google Anthos (Jadeja and Modi, 2012).

Adopting cloud computing has many advantages, including cost savings, scalability, flexibility, and faster application deployment (Ochei et al., 2016a). Furthermore, technology promotes collaboration, improves security, and reduces the environmental impact of IT operations (Carcary et al., 2014).

However, challenges regarding the use of cloud computing persist, including security, privacy, data ownership, and regulatory compliance (Ali and Osmanaj, 2020). Furthermore, potential vendor lock-in, network dependency, and performance challenges could impede mainstream cloud computing adoption (Gupta, 2017).

2.3.3 *Advantages and disadvantages of cloud technology*

Advantages:

1. **Cost Savings:** Cloud computing allows organisations to reduce capital expenditure on hardware, software, and infrastructure, as they only pay for the resources they use (Mell and Grance, 2011). Operational expenses are also lower as the service provider manages maintenance and upgrades (Marston et al., 2011).
2. **Scalability and Flexibility:** Cloud computing enables organisations to scale their computing resources instantly according to their needs (Gupta, 2017). This allows efficient resource allocation and the ability to respond to changing business requirements (Hashem et al., 2015).
3. **Easy Access and Collaboration:** With cloud computing, employees can access their work and collaborate on projects from anywhere with an internet connection (Varghese and Buyya, 2018). This promotes remote work, improves productivity, and allows organisations to recruit into a global talent pool (Jadeja and Modi, 2012).

Automatic Updates and Maintenance: In a cloud computing environment, software updates and maintenance are handled by the service provider, freeing organisations from the burden of managing these tasks (Mell and Grance, 2011). This ensures that the systems are always up-to-date and secure (Ali and Osmanaj, 2020).

Disadvantages:

1. **Security and Privacy:** Storing data on the cloud may expose organisations to security risks, as they must rely on the service provider's security measures to protect their data (Arce, 2020). Data breaches and cyberattacks can compromise sensitive information and impact the reputation of the organisation (Chauhan and Babar, 2012).
2. **Downtime and availability:** Cloud service providers may experience outages or downtime, impacting the availability of an organisation's data and applications (Varghese and Buyya, 2018). Organisations must

consider the reliability of their chosen provider and have contingency plans for potential downtime (Gupta, 2017).

3. **Limited Control and Customisation:** Organisations may have limited control over their cloud infrastructure and software, as these are managed by the service provider (Hashem et al., 2015). This may limit the customisation of applications and may not always align with an organisation's specific needs (Varghese and Buyya, 2018).
4. **Data Transfer and Bandwidth Costs:** Transferring large amounts of data to and from the cloud can be time-consuming and incur significant bandwidth costs (Mell and Grance, 2011). Organisations must consider these costs and potential bottlenecks when evaluating cloud computing solutions (Ochei et al., 2016b).

Cloud computing is a revolutionary innovation that transforms organisations' management and access to computing resources. Cloud computing offers more than a few advantages, including cost savings, scalability, and flexibility, while presenting disadvantages, such as security and privacy concerns, downtime and availability issues, limited control and customisation, and data transfer and bandwidth costs (Mell and Grance, 2011). Organisations must weigh these advantages and disadvantages when adopting cloud computing solutions to ensure optimal performance and alignment with their needs. It is important to continue investigating its benefits and challenges because it can improve organisational performance (Hashem et al., 2015).

2.4 What is organisational performance?

Organisational performance, an essential concept in business studies and management, represents how an organisation achieves its goals across different categories. The Balanced Scorecard approach developed by (Kaplan and Norton,1996) indicates a shift in perspective towards a more holistic interpretation of performance, integrating financial and non-financial factors to present a broader and comprehensive viewpoint.

Organisational performance has usually been compared to financial performance. Profit margins, return on investment (ROI), and sales performed as the main success factors that provided stakeholders with a measurable measure of the financial health of an organisation (Richard et al., 2009).

A complicated concept with origins in business and management studies, organisational performance represents an entity's success in achieving its objectives across various variables. The conventional viewpoint was that financial metrics were vital factors influencing organisational effectiveness. The literature of recent years, however, encourages various points and approaches. To provide a complete assessment of an organisation's effectiveness, an integrated view combines financial and non-financial criteria and customer and operational performance measurements (Kaplan and Norton, 1996).

Financial performance, measured by profit, sales and return on investment (ROI), once functioned as the leading indicator of organisational success. This financial viewpoint offered measurable criteria for assessing an organisation's financial health (Richard et al., 2009). However, focusing solely on financial performance can limit and ignore important non-financial factors that considerably impact an organisation's performance.

Non-financial performance, by definition, incorporates metrics unrelated to direct financial outcomes but is still crucial to an organisation's overall success. These elements include employee satisfaction, innovation, corporate social responsibility (CSR) and organisational culture. Employee satisfaction is associated with higher productivity and employee retention (Pfeffer and Veiga, 1999), while CSR activities can improve reputation and customer loyalty (Luo and Bhattacharya, 2009). Fostering an innovative environment is instrumental in maintaining a competitive edge and driving organisational growth (Damanpour and Evan, 1984).

Non-financial success includes measures. The third dimension of organisational performance, customer performance, measures the efficiency in meeting or exceeding customer expectations. According to (Reichheld and Sasser's, 1990) research, customer happiness is crucial since customer retention has more of an effect on profitability than on market share. The ability to provide outstanding client experiences has become increasingly important with the arrival of the digital era and the emergence of customer-centric company models (Pine and Gilmore, 1998).

Customer lifetime value (CLV), customer satisfaction, and loyalty are essential performance indicators. According to the customer-centric model, improved levels of customer satisfaction result in more loyal clients, higher rates of repurchase, more favourable word of mouth, and increased revenue (Zeithaml et al., 1996). Therefore, an effective customer performance plan can improve organisational growth and performance.

Operational performance, an important factor in organisational performance, includes indicators such as the effectiveness of processes and quality. It examines how well a company regulates its internal procedures and activities (Schmenner and Swink, 1998). To improve total organisational performance, improved operational performance can save costs, speed processes, improve the quality of products and services, accelerate delivery, and increase flexibility (Slack et al., 2004).

Operational performance can be significantly improved by successfully implementing strategies like Lean Six Sigma, which improves process effectiveness and reduces waste (George, 2003). Organisations can reduce costs, minimise errors, and improve customer satisfaction by decreasing variability and increasing process capability (Pyzdek and Keller, 2003).

In summary, organisational performance is multifaceted beyond the simple view of financial results. It includes non-financial assessments of the organisation's internal environment management and innovation capacity. Integrated into organisational performance is customer performance, which examines an organisation's capacity to fulfil and exceed clients' expectations. Finally, it integrates operational performance, showing the effectiveness and efficiency of internal operations (Kaplan and Norton,1992; Teece, 2007; Neely, Gregory, and Platts, 2005).

Managers must look beyond traditional financial indicators to assess organisational performance. Managers may better understand organisational performance by accounting for accurate measurements of non-financial, customer, and operational performance. This comprehensive view facilitates the identification of strengths and weaknesses, supporting informed decision-making while possibly improving the organisation's performance (Ittner, Larcker, 2003; Kaplan and Norton,2004; Bourne, Kennerley, and Franco-Santos,2005).

Taking this into account, the case for a broad and all-encompassing view of organisational success is compelling. The success of an organisation may be distorted if all focus is paid to financial performance. It is crucial to comprehensively understand organisational performance to consider non-financial, customer, and operational performance factors. Recognising these factors and their integration into performance evaluation systems is vital to overall organisational success (Epstein and Wisner, 2001; Davis and Albright,2004; Lipe and Salterio, 2000).

Financial factors, including profitability, revenue growth, and market share, have traditionally been used to measure organisational performance (Kaplan and Norton, 1992). However, recent research has highlighted the significance of non-financial aspects in gauging an organisation's performance, which offers an in-depth understanding of the variables affecting long-term success (Eccles et al., 2014a). Security, policy and regulation, and leadership are the three non-financial elements that are the subject of this study, which were ignored in previous studies and may provide a balanced view of organisational performance.

2.5 The attributes of cloud computing use

2.5.1 *Cloud computing use*

Cloud computing represents a transformative shift in the way organisations access, manage, and deploy IT resources, offering scalable and flexible solutions through internet-based computing services. Its use spans various applications, including data storage, server access, software development, and application hosting, which collectively enhance operational efficiency and reduce infrastructure costs. (Mell and Grance, 2011) characterise cloud computing as a paradigm that facilitates convenient, on-demand access to a collective reservoir of configurable computing assets (such as networks, storage, servers, applications, and services), which can be quickly allocated and relinquished with minimal administrative effort or engagement with service providers.

The value of cloud computing for organisations is multifaceted. First, it allows for significant cost savings by lowering the need for large upfront capital investments in hardware and software, shifting to a more predictable operating expense model (Armbrust et al., 2010). Second, the scalability and elasticity of cloud services enable organisations to adjust resources to meet fluctuating demand, improving responsiveness and operational flexibility quickly (Vaquero et al., 2008).

Moreover, cloud computing is increasingly recognised as a vital non-financial performance measure, directly impacting an organisation's agility, innovation capacity, and competitive advantage. By facilitating the faster deployment of new applications and services, cloud computing enables organisations to respond swiftly to market changes and customer needs, enhancing their innovation ability (Iyer & Henderson, 2012). Furthermore, the use of cloud computing has been linked to improved collaboration and communication within and between organisations, fostering a more dynamic and interconnected work environment (Marston et al., 2011).

In summary, the strategic utilisation of cloud computing provides operational and cost efficiencies. It is crucial in enhancing non-financial performance measures such as organisational agility, innovation, and competitiveness, thereby becoming an indispensable asset in the digital age (KPMG, 2012).

2.5.2 *Policy and regulation*

Policy and regulation compliance is a crucial non-financial performance measure because it significantly impacts an organisation's reputation, operational efficiency, and long-term success (Arora and Ceccagnoli, 2006). Adherence to relevant policies and regulations helps organisations avoid fines, legal issues, and reputational damage (Gunningham et al., 2004). This academic write-up will highlight the importance of policy and regulation as a non-financial performance measure using relevant literature.

Compliance with environmental, social, and governance (ESG) regulations has become increasingly important as organisations face pressure from stakeholders to act ethically and sustainably (Porter and Kramer, 2011). Meeting ESG requirements may contribute to an organisation's long-term sustainability, improve its attractiveness to investors, and enhance relationships with customers, suppliers, and regulators (Carroll and Shabana, 2010). Furthermore, compliance with such regulations may improve overall performance, signalling an organisation's commitment to ethical and responsible business practices (Eccles et al., 2014).

In addition to ESG regulations, organisations must comply with industry-specific policies and regulations, such as data protection and privacy laws (Schwartz and Solove, 2011). Compliance with these regulations may help organisations protect sensitive customer information, maintain customer trust, and prevent costly data breaches and security incidents (Gordon et al., 2011). Moreover, compliance with industry-specific regulations may improve an organisation's competitive position by demonstrating its commitment to best practices and high-quality standards (Kaplan and Norton, 1996).

Organisations that invest in robust policy and regulatory compliance programs may also benefit from increased operational efficiency and reduced risk exposure(Gunningham et al., 2004). By proactively recognising and addressing potential compliance issues, organisations can minimise the likelihood of costly fines, legal challenges, and operational disruptions (Arora and Ceccagnoli, 2006). Furthermore, a robust compliance program can help organisations adapt more effectively to changes in the regulatory environment, ensuring that they remain agile and responsive to evolving market conditions (Weil et al., 2006).

Finally, compliance with policy and regulation can also shape organisational culture and promote ethical behaviour among employees (Trevio et al., 2006). Organisations that emphasize the importance of compliance may nurture a culture of accountability and responsibility, encouraging employees to adhere to internal policies and external regulations in their daily work (Tyler, 2006). This shared sense of responsibility can lead to improved decision making, reduced risk exposure, and improved overall performance (Paine, 1994).

Policy and regulation compliance is a vital non-financial performance measure because it directly impacts an organisation's reputation, operational efficiency, and long-term success (Arora and Ceccagnoli, 2006). Organisations could demonstrate their commitment to responsible and ethical business operations, safeguard assets, and maintain a competitive edge in the marketplace by prioritising compliance with policy and regulations (Gunningham et al., 2004).

2.5.3 *Leadership*

Leadership is a crucial non-financial performance measure because it drives an organisation's vision, strategy, and execution (Kotter, 1990). Influential leaders may motivate and inspire their staff members, establishing a favourable workplace atmosphere and improving employee engagement and productivity (Bass and Avolio, 1994). This academic write-up will highlight the importance of leadership as a non-financial performance measure using relevant literature.

Effective leadership may improve decision making, facilitate innovation, and enable organisations to adapt to changing market conditions (Judge et al., 2002). Strong leaders can analyse complex situations, identify growth opportunities, and implement strategies that align with organisational goals and objectives (Yukl, 2012). Moreover, leaders are critical in identifying and mitigating risks, ensuring their organisations' long-term sustainability and success (Bennis and Thomas, 2002).

Leadership also influences organisational culture, affecting employee behaviour and overall performance (Schein, 2010). By modelling ethical behaviour and demonstrating a commitment to the organisation's values and goals, leaders may shape a positive culture that promotes trust, collaboration, and shared accountability (Trevio et al., 2006). A healthy organisational culture may improve employee satisfaction, retention, and productivity, leading to better financial and non-financial outcomes (Fondas and Denison, 1991).

Another critical aspect of leadership is the building and retention of relationships with internal and external stakeholders, such as employees, customers, suppliers, and regulators (Caldwell and Taylor, 2005). Influential leaders may manage these relationships to enhance the organisation's reputation, secure resources, and navigate complex regulatory environments (Mintzberg, 2009). Strong stakeholder relationships can help organisations identify new opportunities, mitigate risks, and achieve long-term growth (Parmar et al., 2010).

Leadership development is essential for organisations to remain competitive and adaptive in today's dynamic business environment (Day, 2001). By investing in leadership development programs, organisations could build a pipeline of capable leaders who can drive strategic initiatives, manage change, and overcome challenges (Carson, 1998). Furthermore, effective leadership development may contribute to the organisation's overall performance by fostering a culture of continuous learning and improvement (Conger and Benjamin, 1999).

Leadership is a vital non-financial performance measure because it directly impacts an organisation's vision, strategy, execution, and long-term success(Kotter, 1990). By focusing on effective leadership, organisations could improve decision-making, foster innovation, and maintain strong stakeholder relationships, positioning themselves for success in the competitive marketplace (Judge et al., 2002).

Organisations integrating non-financial performance measures, such as security, policy and regulation compliance, and leadership, into their evaluation frameworks may better understand their operations and long-term prospects (Ittner and Larcker, 1998). By focusing on these non-financial indicators, organisations could better align their strategies, goals, and actions to achieve sustainable success (Kaplan and Norton, 2008).

2.5.4 *Conclusion*

This chapter examined the evolution of cloud computing from prior information and decision support systems and several use cases for cloud computing to support operational, tactical, and strategic decision making. The possible advantages of cloud computing and numerous challenges and shortcomings were addressed. The study noted that the benefit of the implementation was likely dependent on cloud computing use and that benefits might be difficult to quantify. Furthermore, the chapter addressed the usage of cloud computing, specifically in "organisational performance." The connection between cloud computing and the non-financial performance factors that influence organisational performance was unclear. Non-financial organisational performance measures, including security, policy and regulation compliance, and leadership, were crucial for understanding an organisation's overall health and long-term prospects. Organisations could improve their strategic decision-making by focusing on these factors and better position themselves for sustained success (Kaplan and Norton, 1996). It was essential to understand how factors interacted with cloud computing.

Furthermore, the complexity of organisational performance objectives may have enhanced the type of use and satisfaction of the system. The use of cloud computing features and company performance may have improved. Finally, the TOE and RBV as financial and non-financial performance combinations were discussed. Cloud computing may impact financial and non-financial data; at this point, past research concentrated only on financial performance and overlooked non-financial performance. The relationship between cloud computing usage and company performance was also unclear.

Thus, the literature review helped encourage this research study's importance in enabling organisations to rationalise their investment in cloud computing. The study also highlighted the factors that influence cloud computing use and organisational performance. The conceptual model investigated the impact of a balanced view on organisational performance, which may explain the impact of cloud computing use on non-financial performance and financial performance, and the hypothesis is to be tested as outlined in the following chapter.

2.6 ANALYTICAL FRAMEWORK

2.6.1 *Technology-organisation-environment (TOE) framework and the resource-based view (RBV) model*

The model presented in the study (Gangwar,2017) on the impact of cloud computing usage on organisational performance is supported by a comprehensive and integrative research framework that links environmental, organisational, and technological capability constructs. This model is designed to assess the effect of cloud computing on both financial and non-financial aspects of organisational performance, particularly in the post-adoption stages, such as actual usage and value creation. (Tornatzky and Fleischer, 1990); haradwaj ,2000; Salwani et al. ,2009). The study uses the technology-organisation-environment (TOE) framework and the resource-based view (RBV) theory to construct its model. As described by Tornatzky and Fleischer (1990), the TOE framework argues that technological, organisational, and environmental contexts determine the adoption and implementation of technological innovations. This framework has been widely used in information technology adoption research and adapted by (Gangwar,2017) to explore cloud computing usage within organisations (Zhu and Kraemer, 2005). Additionally, the RBV theory provides a theoretical base for linking cloud computing use with business value, emphasising the importance of organisational factors in leveraging information technology to improve performance. According to the (Gangwar, 2017) model, variables such as Technology, Human, and business resources are essential attributes to assess the effect of cloud computing on both financial and non-financial aspects of organisational performance, particularly in the post-adoption stages. The use of the extended Ganwar model has been supported (Bharadwaj, 2000); Chen et al., 2007; Wade et al., 2004; Zhang et al., 2011); however, it has not yet been adequately adapted to underpin research into cloud computing use. This work, therefore, contributes by adapting and extending the model to develop the study’s research model and hypotheses through which research questions (RO1 and RO2) are addressed. Later, the (Ganwar, 2017) model was criticised (Bharadwaj, 2000; Priem et al., 2001) due to the emergence of new technologies and new ways of utilising technologies within organisations (Chen and Cheng, 2009; Aldholay et al., 2018). Thus, the need arose to rethink the determinants of use and performance and adopt a broader conceptualisation of impacts.

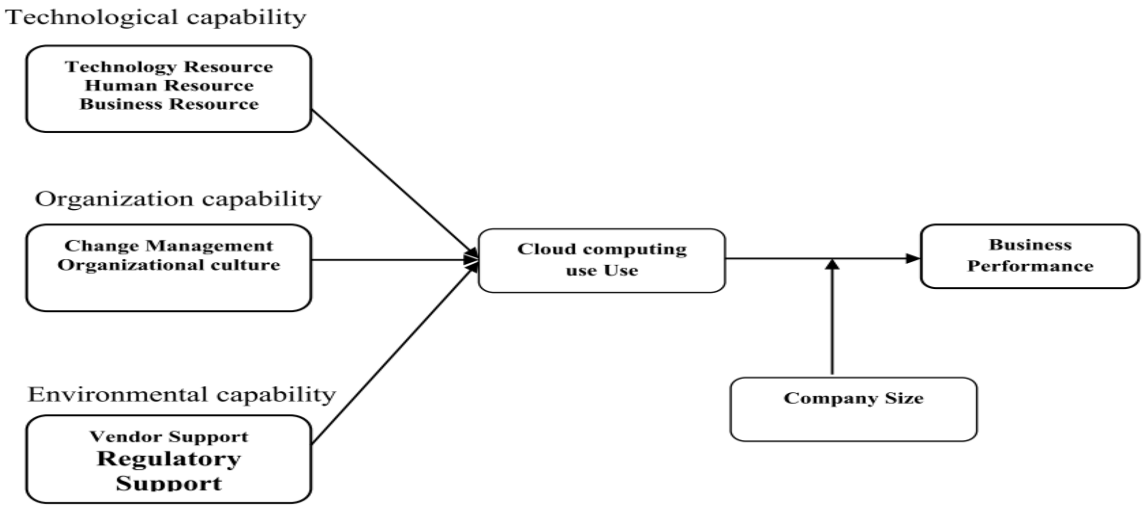
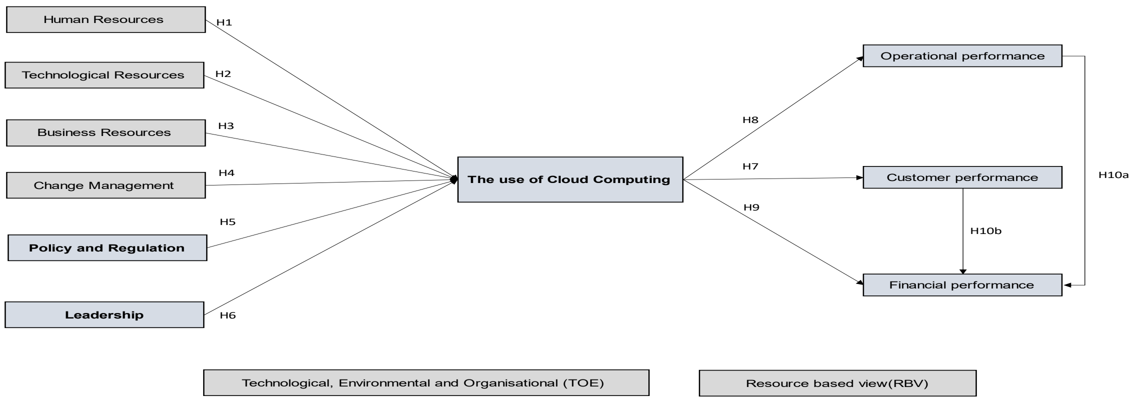


Figure 4 Source: Gangwar, 2017 conceptual model

However, even this updated technology-organisation-environment (TOE) framework and the resource-based view (RBV) model has been considered limited as it does not take into account non-financial factors such as leadership, policy and regulation, customer, operational and financial performance (Gangwar et al., 2015). While some users may use cloud computing routinely, e.g., accessing only essential functions, others may use the system more innovatively, e.g., using more advanced or customised features (Saavedra and Bach, 2017). Thus, further extending the technology-organisation-environment (TOE) framework and the resource-based view (RBV) model may be necessary. Including leadership, policy and regulation, customer, operational and financial performance within the extended model may better explain the usage behaviours that are more likely to indicate the direct use of cloud computing and its outcomes (Gangwar et al., 2015). The impact of cloud computing on organisational performance is notably significant. Therefore, it is imperative that cloud computing is managed strategically, considering both external environmental factors and internal organisational factors, to enhance organisational performance and competitiveness. This framework should be systematically presented, as exemplified in the conceptual framework figure in section 2.5.2, offering a clear and structured guide for the research methodology.

2.6.2 *Conceptual Framework*



Source: Researcher's Own Work

Technological resource is conceptualised as an organisation's competence in efficaciously employing, adapting, and innovating technology to further its operational and strategic goals, as articulated by (Kim,1997). This encompasses an organisation's adeptness in applying existing technologies, fostering technological innovation, managing technology-centric projects, and seamlessly incorporating emerging market technologies into their fundamental operations and strategic frameworks. This multifaceted factor signifies the organisation's readiness and agility in navigating the evolving technological landscape, aligning technology with business objectives, and leveraging it as a catalyst for sustained growth and competitive differentiation.

Such factors are not confined to tangible technological resources such as machinery and software but also encompass the organisation's intangible skills, knowledge, and aptitudes, including technical proficiency, understanding of technological trends, and adaptability to technological changes (Lall, 1992).

Organisations with robust technological capabilities gain a competitive advantage because they may innovate, streamline operations, and enhance product or service quality more efficiently (Bell and Pavitt, 1993). However, it is critical to understand that technological capabilities are shaped by both internal (organisational culture, strategies, and structures) and external factors (market trends, competition, and technological advancements) (Winter, 1984).

The conceptual framework of an organisation's technological resource may be categorised into three primary components: operational ability, adaptability, and innovation. Operational ability refers to the skills and knowledge required to exploit existing technologies effectively. Adaptability signifies the capacity to modify and optimise technologies to meet the organisation's needs. Innovation reflects the capability to create new technologies or conceive applications for existing technologies, requiring a deep understanding of the organisation's needs, market dynamics, and emerging trends (Bell and Pavitt, 1993).

The interrelationships and mutual reinforcement of operation, adaptation, and innovation have been established. Establishing effective operation is a fundamental basis for the change process, providing a framework for developing originality. Thus, an organisation that demonstrates outstanding capabilities in innovation is more positively situated to improve its operational efficiency and adaptability (Kim, 1997). Therefore, an organisation's technological capability is not merely possessing the latest gadgets or software. It involves strategically leveraging technology to drive the organisation forward.

The term "technology resources" applies to an organisation's physical and non-physical resources, assets, and capabilities to facilitate operations, enhance efficiency, foster innovation, and sustain its competitive edge in the market. (A. S. Bharadwaj, 2000). These resources may include hardware, software, networks, databases, human skills, knowledge, and expertise in technology-related fields (Melville et al., 2004).

Human resources refers to the individuals within an organisation who contribute their skills, knowledge, talents, and experiences to fulfil the company's goals and objectives (Armstrong, 2014). The term also represents the department that manages and administers the organisation's policies related to employee recruitment, retention, training, compensation, and development (Boxall and Purcell, 2000). Human resources are fundamental to any organisation, influencing its culture, decision-making, innovation, and overall productivity (Becker and Gerhart, 1996). They are critical for strategic planning, implementing organisational changes, and driving the company's competitive advantage

(Huselid, 1995). Moreover, human resources drive the successful amalgamation of technology into business operations (Batt, 2002).

In the digital age, where cloud computing has become a key component of business operations, the role of human resources is more critical than ever (Mell and Grance, 2011). From selecting the right cloud service providers to ensuring a smooth transition to the cloud, training employees to use cloud-based applications, and ensuring the security and privacy of data in the cloud, human resources play a vital role (Low et al., 2011).

Hypothesis 1 (H1): ***Perception of human resources will have a positive impact on cloud computing usage.***

This hypothesis hypothesises that employees' knowledge, skills, and attitudes significantly influence cloud computing use and effective utilisation (Sultan, 2013). Indeed, organisations that invest in training their employees about cloud computing and have a culture of openness towards technological advancements are more likely to integrate cloud computing into their operations effectively (Marston et al., 2011). Furthermore, through effective change management practices, human resources may reduce resistance to cloud computing use and ensure a smoother transition to this new technology (Gangwar et al., 2015). Hence, the effective management and development of human resources are paramount to successfully leveraging the benefits of cloud computing (Armbrust et al., 2010).

Technology resources serve as a vital component in an organisation's infrastructure. They facilitate the efficient execution of day-to-day activities, strategic decision-making processes, and providing goods and services to customers (Piccoli and Ives, 2005). Furthermore, they are essential in the company's strategic alignment, where business and technology strategies are interconnected to enhance its overall performance (Henderson and Venkatraman, 1993).

The advancement of technology has significantly expanded the spectrum of technology resources. Today, organisations depend not merely on physical information technology (IT) infrastructure but also on cloud computing services, which provide scalable, on-demand resources over the Internet (Mell and Grance, 2011). Cloud computing services have proven to be a cost-effective, flexible, and efficient solution for businesses of all sizes, providing access to the latest technologies without substantial upfront capital investment (Berman et al., 2012).

Hypothesis 2 (H2)**: *****Perception of technology resources will have a positive effect on cloud computing usage.***

In the context of this hypothesis, technology resources, especially intangible ones, play a significant role in enabling the usage of cloud computing within an organisation (Low et al., 2011). These resources, particularly the organisation's technological expertise and skills, may influence how it can adopt, integrate, and exploit cloud computing technology to achieve its business objectives (Gangwar et al., 2015). Therefore, investment in technological resources, specific skill development and knowledge acquisition may significantly enhance an organisation's readiness to adopt and effectively utilise cloud computing services (Armbrust et al., 2010).

Business resources encompass all the tangible and intangible assets an organisation employs to operate and compete in its market (Barney, 1991). These resources can be divided into several categories, including financial resources (like capital and cash flow), physical resources (such as equipment and infrastructure), human resources (staff skills and experience), and intellectual resources (such as patents, trademarks, business models, and trade secrets) (Grant, 1991).

These resources enable an organisation to execute its business strategy, engage in productive processes, provide customer value, and achieve a competitive advantage (Barney, 1991). They are critical in determining an organisation's potential and capacity to innovate, grow, and adapt to changes in the business environment (Hitt et al., 2001).

In today's digital economy, business resources extend to technological assets, including software, hardware, and digital platforms, and the skills and capabilities to leverage them effectively (Bharadwaj, 2013). One such technological asset that has become increasingly pivotal is cloud computing, which offers flexible, scalable, and cost-effective IT resources (Mell and Grance, 2011).

Hypothesis 3 (H3): Perception of business resources will have a positive effect on cloud computing usage.

The hypothesis assumes that the extent and effectiveness of cloud computing usage within an organisation are significantly influenced by its business resources (Low et al., 2011). Financial resources, for instance, may determine the organisation's ability to invest in advanced cloud services and data security measures (Berman et al., 2012). Human capital - particularly employees' skills and knowledge - could influence the organisation's capacity to integrate and effectively use cloud services (Sultan, 2011).

Furthermore, organisations with established intellectual resources, such as data management strategies and policies, are more likely to benefit from the data analytics capabilities offered by cloud computing (Marston et al., 2011). Physical resources, such as an organisation's existing IT infrastructure, may also affect the ease and speed of transitioning to cloud services (Armbrust et al., 2010). Therefore, the relationship between business resources and cloud computing usage is multifaceted and may significantly impact the organisation's cloud computing experience and outcomes (Gangwar et al., 2015).

Change management is an organisation's systematic approach when transitioning from a current state to a new one (Kotter, 1995). It involves managing resistance, building commitment, and ensuring effective communication to facilitate smooth transitions and ensure all organisation members adapt to the new situation (Hiatt and Hiatt, 2006). Change management aims to drive organisational outcomes and return on investment from these changes while reducing the associated risks and disruptions (Burnes, 2004).

In the context of technological advancements, particularly in the era of cloud computing, change management is paramount (Low et al., 2011). It is crucial to address the challenges of resistance, lack of understanding, or fear when implementing new technologies (Sultan, 2011).

Hypothesis 4 (H4): Perception of effective change management will have a positive effect on cloud computing usage.

This hypothesis suggests that organisational resistance to change may hinder implementing and using cloud computing (Marston et al., 2011). Resistance may be manifested in several ways, including employees' reluctance to adopt new practices, lack of understanding about the benefits of the new technology, or fear of job security (Berman et al., 2012). Such resistance may delay the process, reduce the practical usage of cloud services, and limit the potential benefits that the organisation may obtain from cloud computing (Gangwar et al., 2015).

Effective change management may help to reduce resistance by engaging employees in the change process, providing them with the necessary training, and communicating the benefits of the new technology (Cameron and Green, 2015). This, in turn, may lead to increased acceptance and practical usage of cloud computing, enabling the organisation to leverage its benefits fully (Gangwar et al., 2015).

Policy and regulation in an organisation refer to the set of rules, guidelines, and standards that govern the organisation's and its stakeholders' conduct (Fischer et al., 2012). These include operational policies, data privacy and security regulations, environmental policies, employee conduct guidelines, and legal compliance requirements (Adams et al., 2021). They ensure ethical behaviour, protect stakeholder interests, mitigate risks, and ensure legal and regulatory compliance (Salamon, 2002).

These policies and regulations also extend to technology usage within the organisation, including cloud computing (Armbrust et al., 2010). When using cloud services, organisations must establish clear policies regarding data governance, security, access control, and privacy protection (Sultan, 2011).

These policies may help manage potential risks and ensure that cloud computing uses align with the organisation's strategic objectives and compliance requirements (Marston et al., 2011).

Hypothesis 5 (H5): Perception of favourable policies and regulations will have a positive effect on cloud computing usage.

This hypothesis suggests that stringent organisational policies and regulations may inhibit the usage of cloud computing (Berman et al., 2012). Data privacy, security, and compliance regulations may make it more challenging for organisations to migrate to the cloud due to the intricacies of managing data in a cloud environment (Gangwar et al., 2015). These challenges might limit the extent to which organisations may leverage the flexibility, scalability, and cost benefits cloud computing offers (Low et al., 2011).

However, it is also worth noting that well-designed and effectively implemented policies may support successful cloud computing usage by providing clear guidelines on data management, security, and compliance in the cloud (Cameron and Green, 2015). In this context, the relationship between policy, regulation, and cloud usage is complex and dependent on how these policies are formulated and implemented (Weinhardt et al., 2009).

Leadership in an organisation refers to the ability of an individual or a group to influence and guide others towards achieving the organisation's goals (Northouse, 2016). Leadership may be manifested in various styles, such as transformational, transactional, or servant leadership, and is a critical determinant of organisational performance and success (Bass and Riggio, 2006).

Leaders are pivotal in driving strategic initiatives, shaping organisational culture, and promoting innovation and change, including using new technologies such as cloud computing (Yukl, 2012). Leaders set the vision and create an environment encouraging and supporting technological advancements (Bass and Riggio, 2006).

Hypothesis 6 (H6): perception of effective leadership will have a positive effect on cloud computing usage.

This hypothesis suggests that leadership may have both facilitating and inhibiting effects on cloud computing usage. On the one hand, effective leadership may promote cloud computing use by fostering a culture of innovation, providing strategic direction, and facilitating change management (Herold and Beaver, 2014). Leaders may also ensure the availability of necessary resources and capabilities for practical cloud usage (Low et al., 2011).

On the other hand, leadership may also inhibit cloud computing usage. For instance, leaders lacking an understanding or appreciation of the benefits of cloud computing might not prioritise its use (Marston et al., 2011). Similarly, leaders with a risk-averse attitude may resist moving critical business functions to the cloud due to potential security and privacy concerns (Gangwar et al., 2015). Thus, the impact of leadership on cloud computing usage may be positive and negative, depending on the leadership style, knowledge, and attitudes towards technological change (Bass and Riggio, 2006).

Cloud computing on customer performance refers to using cloud-based solutions to enhance customer experiences and satisfaction (Sultan, 2011). Customer performance encompasses the organisation's ability to retain and satisfy customers, deliver superior customer service, and build strong customer relationships (Reichheld and W.E. Sasser, 1990). Cloud computing may significantly improve customer performance by providing improved service delivery, personalised customer interactions, and enhanced responsiveness (Armbrust et al., 2010).

Hypothesis 7 (H7): Perception of the use of cloud computing will have a positive impact on customer performance.

This hypothesis suggests that as an organisation increases its usage of cloud computing, it will see an enhancement in customer performance (Marston et al., 2011). Cloud computing facilitates better customer performance in numerous ways. Firstly, it enables organisations to offer personalised services to their customers based on insights derived from analysing large amounts of customer data (Low et al., 2011). Secondly, it allows organisations to be more responsive to customer needs by leveraging the scalability and flexibility of the cloud to quickly adjust their service offerings (Mell and Grance, 2011).

Thirdly, cloud computing may enhance customer service by supplying employees with easy access to customer information, making them more effective in responding to customer inquiries (Berman et al., 2012). Cloud computing may also enhance customer engagement and loyalty by enabling organisations to deliver seamless and consistent customer experiences across various channels (Kumar and Bala Nayar, 2014).

These improvements in customer performance could boost client loyalty, increase client lifetime value, and boost corporate performance., thereby providing organisations with a competitive advantage in the marketplace (Gupta et al., 2004b).

The use of cloud computing on operational performance pertains to how organisations leverage cloud technologies to boost their operational capabilities. Operational performance evaluates the efficiency and effectiveness of an organisation's operations and includes factors such as process efficiency, productivity, and quality of services (Schmenner, 2004). Cloud computing may significantly enhance operational performance with its scalable resources, on-demand services, and flexibility (Armbrust et al., 2010).

Hypothesis 8 (H8): Perception of the use of cloud computing will have a positive impact on operational performance.

This hypothesis implies that increased use of cloud computing may significantly improve an organisation's operational performance (Low et al., 2011). Cloud computing may contribute to operational performance in several ways. Firstly, it may provide scalability, enabling businesses to quickly adjust their information technology (IT) resources in response to fluctuating demand and enhancing operational agility (Mell and Grance, 2011). Secondly, it allows for cost efficiencies as businesses may convert capital expenses into operational expenses and only pay for the resources they use (Sultan, 2011).

Thirdly, cloud computing may facilitate better collaboration and information sharing across different departments or geographical locations, enhancing overall productivity (Gruman and Knorr, 2008). Lastly, cloud services often come with robust disaster recovery and backup solutions, which may ensure business continuity and improve the quality and reliability of services (Marston et al., 2011).

From a strategic standpoint, improving operational performance through cloud computing may also provide a competitive advantage by enabling faster time-to-market for innovative products and services and allowing businesses to focus more on their core competencies than information technology (IT) management (Gupta et al., 2013).

The use of cloud computing on financial performance pertains to how organisations may utilise cloud technology to improve their financial results. The financial performance of an organisation includes factors such as revenues, profits, return on investment (ROI), and cost efficiency (Gupta et al., 2004a). Cloud computing may significantly impact these parameters by reducing IT costs, improving operational efficiency, enabling business innovation, and creating new revenue opportunities (Berman et al., 2012).

Hypothesis 9 (H9): Perception of the use of cloud computing will have a positive impact on financial performance.

This hypothesis suggests that as an organisation increases its usage of cloud computing, it may expect a corresponding improvement in its financial performance (Low et al., 2011). The impact of cloud computing on an organisation's financial performance may be multifaceted. Firstly, the cloud model's pay-as-you-go nature may result in significant cost savings as organisations only need to pay for the IT resources they use, thereby reducing capital expenditures and operational costs (Sultan, 2011). Secondly, the scalability and flexibility offered by the cloud may lead to improved operational efficiency, thus driving profitability (Mell and Grance, 2011).

Thirdly, cloud computing may boost corporate innovation by giving companies the technical tools they need to produce new goods and services and create new income streams (Marston et al., 2011). Fourthly, the cloud's agility may result in faster time-to-market for these products and services, thereby driving revenue growth (Gruman and Knorr, 2008).

In addition, the ability of cloud computing to enhance other performance areas, such as customer and operational performance, may indirectly contribute to financial performance. Improved customer satisfaction may increase customer retention and loyalty, driving revenue growth (Reichheld and Sasser, 1990). Similarly, enhanced operational efficiency may lead to cost savings and improved profitability (Schmenner, 2004).

Financial performance, operational performance, and customer performance: This pertains to how leveraging cloud technologies may enhance operational efficiencies, leading to better financial and non-financial outcomes. Financial performance includes profits, revenues, and ROI (Gupta et al., 2004a), while non-financial performance often involves operational efficiency, flexibility, and innovation (Kaplan and Norton, 1992).

***Hypothesis 10 (H10): Perception of financial performance will positively correlate with operational and customer performance*.**

This hypothesis suggests that increased usage of cloud computing will enhance operational and customer performance, positively affecting financial and non-financial performance, thus providing a balanced view of an organisation's performance (Low et al., 2011).

Cloud computing may facilitate operational efficiency by automating various processes, reducing operational costs, and improving service delivery times (Marston et al., 2011). Improved operational efficiency is a crucial non-financial performance indicator that may contribute to financial performance by reducing costs and enhancing profitability (Schmenner, 2004).

Through cloud computing, organisations may gain flexibility and scalability to adjust their operations quickly to meet changing market demands (Armbrust et al., 2010). Such flexibility is a key non-financial performance indicator that may influence financial performance by driving revenue growth (Zhang et al., 2010).

Another way that cloud computing encourages innovation is by offering a platform that allows for evaluation and rapid service implementation (Berman et al., 2012). Innovation, a vital non-financial performance measure, may contribute to financial performance by providing a competitive advantage and fostering growth (Teece, 2007).

Furthermore, cloud computing allows organisations to focus their resources on core competencies rather than IT infrastructure maintenance (Mell and Grance, 2011). This strategic focus is a key non-financial indicator that may influence financial performance by boosting productivity and profitability (Porter, 1985).

In addition, the use of cloud computing may improve business continuity by providing reliable and secure access to business systems, thereby reducing operational disruptions (Subashini and Kavitha, 2011). Business continuity is another key non-financial performance indicator that may influence financial performance by minimising loss of revenue and customer trust during disruptive events (Herbane, 2010).

Finally, cloud computing may enhance collaboration and communication within and across organisations by providing shared access to data and applications (Wang et al., 2011). This collaboration is a crucial non-financial performance indicator that may positively impact financial performance by fostering knowledge sharing and innovation (Nonaka, 1994).

In summary, synthesising these academic concepts leads us to propose that effective cloud security measures may encourage trust, competitive advantage, uptime, risk mitigation, and efficiency, enhancing organisational performance. On the other hand, ineffective security measures may result in monetary losses, reputational harm, legal troubles, operational disruptions, data leaks, and reduced stakeholder confidence, all of which may negatively impact performance.

Considering the above, the concept of cloud computing security is not one-dimensional; rather, it encompasses a range of factors, from operational effectiveness to regulatory compliance. The importance of cloud security as a determinant of organisational performance will continue to be investigated and changed in response to new developments and threats as the business world navigates the changing conditions of digital transformation (Mather, Kumaraswamy, and Latif, 2009; Pearson and Benameur,2010; Subashini and Kavitha, 2011).

2.7 Conclusion of literature review

In conclusion, adopting and integrating cloud computing into organisational processes and systems is undeniably transformative, offering benefits such as expense savings, improved efficiency, and increased agility in responding to market changes. These advantages align with the Technological, Organisational, and Environmental (TOE) framework and the Resource-Based View (RBV) model, which both suggest that technology, such as cloud computing, can lead to superior performance when properly managed (Baker, 2012; Zhu and Kraemer, 2005).

However, understanding cloud computing's impact on organisational performance requires a nuanced perspective. For example, security, an environmental factor in the TOE framework, is critical. Superior cloud security enhances organisational performance by fostering trust and reliability (Almorsy et al., 2011) and provides a unique and inimitable advantage over competitors (Hsu et al., 2014). On the contrary, security breaches can lead to significant financial losses and reputational damage (Kshetri, 2013), highlighting the balance needed to maximize the benefits and mitigate the risks associated with cloud computing.

Similarly, external factors, such as policies and regulations, play a crucial role in adopting cloud computing. While well-established policies and regulations may foster a secure and stable environment for cloud computing (Armbrust et al., 2010), overly stringent or poorly crafted regulations may hinder organisational performance (Breaux and Antón, 2008).

Leadership also significantly impacts cloud computing. As noted by (Palvia et al., 2008), leaders influence the decision to adopt cloud computing, its pace of utilisation, and how well it integrates into existing processes. Effective leadership, therefore, could drive successful cloud migration, improve organisational efficiency, and improve business performance (Carcary et al., 2014).

In summary, cloud computing could significantly enhance organisational performance when properly managed. However, this requires a robust security framework, well-designed policies and regulations, and effective leadership. As such, the TOE framework and the RBV model may guide organisations in effectively integrating cloud computing into their operations to improve performance.

This organisation-level research on cloud computing offers a theoretical contribution by identifying financial and non-financial performance outcomes and investigating the relationship between cloud computing use and financial and non-financial organisational performance.

This will lead to a deeper understanding of accurately assessing how cloud computing will affect organisational performance. The research approach used to test the research models and hypotheses created in Chapters 1 and 2 and to address the two research objectives of the study are detailed in Chapter 3.

CHAPTER 3. RESEARCH METHODOLOGY

This study's research models and hypotheses have been introduced in chapters 1 and 2. The chapter specified the data collection and analysis methodologies used to test the research models and meet the objectives. It outlined the research methodology, considering the research focus, approach, survey strategy, data collection method, ethical considerations, research instruments, data analysis, and considerations for reliability, validity, limitations, and threats. The primary purpose of the chapter was to investigate how the use of cloud computing affected organisational performance while considering financial and non-financial factors. The study investigated the key elements that drove organisations and the wider public to utilise cloud computing technologies. A conceptual framework was employed to shape the research methodology for the study. This chapter delved into the steps followed during the research, evaluating the adopted methodology and framework. It further explained how the data was gathered, including the methods for its analysis and interpretation, the tools used for the research, and the sampling techniques applied. This chapter also considered the ethical standards that had been adhered to throughout the research process.

3.1 Research design and approach

The study design served as a roadmap for the research project and was a crucial navigation tool for the present investigation. This study was based on a positivist philosophical tradition, supported by the assumption that causal relationships could describe an objective reality and that the collected data could be quantified with dependability and reliability (Cohen et al., 2007). This approach represented the foundation of positivist philosophy, where the primary focus was establishing an empirical theory tested to develop generalisations (Evans, 2010).

Furthermore, positivist philosophy provided specific indicators identifying aspects of reality that captured the investigator's interest in authentically understanding physical and social reality (Cohen et al., 2007). As (Neuman, 2000) explained, positivist philosophical principles implied that social reality could be investigated as analogous to the natural world. Regarding positivist researchers, it was the investigator's responsibility to identify this specific type of reality (Mertens and McLaughlin, 2004). To generalise to the larger population, statistical techniques were applied to the combined data, primarily collected from surveys or research (Saunders et al., 2009).

In keeping with positivist principles, this research study employed an approach based on deductive reasoning, illustrating validity from theoretical frameworks to establish a hypothesis and eliminate various explanations for the observed occurrence, hence establishing the inference of causality. Deductive research sets the stage for developing theoretical and conceptual frameworks that could be tested by empirical observation (Bryman and Bell, 2015). When an abundance of literature could add to the theoretical framework and make the extraction of the hypothesis simpler, the importance of the deductive approach was particularly evident (Evans, 2010). This method involved collecting established information using the fundamental hypothesis and required the investigator to proceed from theory to data to confirm the framework (Collis and Hussey, 2014).

The decision between qualitative and quantitative approaches was essential in the research methodology. The two approaches provided supporting information rather than being incompatible with each other, as (Creswell, 2013) pointed out. On numerous occasions, the use of quantitative methods could be justified by drawing out connections between the nature of social and natural occurrences and suggesting that each could be studied using similar approaches. Furthermore, advocates of restricting researchers to quantitative or qualitative approaches included (Ponterotto, 2005). Instead, they proposed a practical assessment of the benefits of each approach in considering its distinctive characteristics and agreeing with the objectives of the study. This argument stresses the importance of flexibility and pragmatism in choosing the best approach to achieve the study goals.

This study relied primarily on a quantitative approach that involved statistical, mathematical, or numerical analysis of the collected data, aligning with the positivist research perspective. Furthermore, the quantitative research approach was characterised by objective measurement, hypothesis testing, causality, and reproducibility (Collis and Hussey, 2014). The quantitative methods allowed the data collected in this study to undergo various statistical analyses. The numerical data were analysed quantitatively to generalise the opinions of the groups of people studied to provide further insight into the phenomenon under study (Ponterotto, 2005).

This study investigated the following:

- The influence of cloud computing usage on organisational performance.
- The impact of cloud computing usage and a balanced view of financial and non-financial performance on organisational performance.

The study aimed to establish relationships between variables, which led to it being termed "explanatory research" (Saunders et al., 2009). Explanatory research measured causal relationships between independent and dependent variables. It explained how one variable could influence another (Petty et al., 2012a). The research necessitated defining the measures, instruments, and sampling, along with the method of analysis, before initiating data collection (Gong et al., 2004); as outlined in the upcoming section of data collection, a small exploratory, qualitative study was conducted to understand and develop the construct of innovative cloud computing usage. Exploratory research aims to formulate problems more precisely, gain insight, gather explanations, clarify concepts, eliminate impractical ideas, and form hypotheses (Evans, 2010). Aside from the limited application of exploratory methods to gain insight into cloud computing usage, this work was primarily deductive, quantitative and explanatory.

3.2 Data collection methods

Sample or census surveys were used when conducting a survey (Evans, 2010). Data were collected using a sample that was demonstrably representative of the overall population. On the other hand, all the population's data was collected during census surveys (Salkind, 2010). The technique used to decide which members of the population should be researched was sampling. There were two main approaches to sampling: "probability and nonprobability sampling." Probability sampling ensured that each representative of the population had an equivalent chance of being sampled using a random sample (Evans, 2010). Results that accurately represent the population could be obtained by applying probability sampling techniques such as random, systematic, stratified, or cluster sampling.

On the other hand, nonprobability sampling was an approach that selected the sample by personal preference compared to random selection (Salkind, 2010). Convenience, viewpoints, and snowball sampling all fell under nonprobability samples. One had to focus mainly on the people or organisations using the specific technology while considering the sampling approach (Amoako-Gyampah and Salam, 2004).

The survey method, which facilitated effective and economic data collection (Cohen et al., 2007), was chosen for this research. Survey methods were known to accommodate larger sample sizes and produce meaningful results when they adhered to well-structured procedures (Collis and Hussey, 2014). The current study collected data at the organisational level, with an initial focus on sampling.

The primary data collection tool for this study was a structured survey using a quantitative approach. This approach helped collect numerical data for statistical analysis and decipher patterns or relationships among various factors (Creswell, 2013). The survey was intended to gather data on the use of cloud computing and essential performance metrics within the organisations surveyed. This method allowed for the accumulation of objective and accurate measures that could be extrapolated to a larger population (Babbie, 2012).

The survey comprised closed-ended and open-ended questions. Closed-ended queries, quantifiable in nature, involved Likert scales, multiple-choice questions, and ranking systems, offering precise numerical data ideal for coding and analysis (Artino, 2012). On the contrary, open-ended questions provided qualitative data, offering contextual understanding and nuances to the quantitative data collected (Denzin and Lincoln, 2008).

The survey was distributed digitally to various organisations, ensuring broad geographic reach, convenience, and cost-effectiveness. Organisations represented various sizes, industries, and stages of cloud computing usage to ensure representativeness of the data collected. Upon data collection, coding, and feeding the data into a statistical software package for analysis followed, with rigorous data cleanup to rectify any missing or inconsistent data, outliers, or other anomalies (Punch, 2005).

It was crucial to bear in mind the potential drawbacks of this approach, such as oversimplification of complex phenomena such as organisational success and the risk of response bias (Nederhof, 1985). However, maintaining transparency in the research process and encouraging participants to respond honestly may have mitigated these issues. Additionally, enriching the quantitative data with qualitative insights could present a more holistic view of the phenomena under study.

Throughout the data collection process, strict data privacy and confidentiality measures were implemented, respecting the privacy rights of participating organisations. Therefore, despite potential limitations, meticulous survey design, administration, and analysis provided robust and generalizable insights into the use of cloud computing in organisational performance.

In addressing RO1 and RQ2, data were collected using a sample survey of selected organisation CFOs, CIOs, and subject matter experts. Therefore, data collection was restricted to CFOs, CIOs, and subject matter experts who used cloud computing as part of their work. This required sampling CFOs, CIOs, and subject matter experts from South African organisations that already implement cloud computing for active use (Liu et al., 2016).

The selection of these organisations was based on judgement and the following rationale. Organisations are currently using five large cloud providers in South Africa.

#	Cloud Service Provider	Regions	Availability Zones
1	Amazon Web Services (AWS)	26	84
2	Microsoft Azure	60	116
3	Google Cloud Platform (GCP)	34	103
4	Alibaba Cloud	27	84
5	Oracle Cloud	38	46

Figure 5: Top 5 Cloud Vendors

3.3 Population and sample

To accomplish research goals RO1 and RO2 on the impact of cloud computing on organisational performance, data on organisational-level cloud use and a balanced view of organisational performance factors were required. The researcher has 4000 connections/followers on LinkedIn, of which a substantial amount work or were employed in the public sector of South Africa. This serves as the population size of the study.

This strategy was justified for the following reasons:

1. **Representativeness and Diversity**: Previous studies recommended a sample size of approximately 10-20% of the population for surveys and studies (Krejcie and Morgan, 1970). In this case, the sample will be 10%, allowing for 400 individuals to form part of the population size. The sample will be 400 individuals, who will respond in their capacity. The 400-sample size will be 400 individuals employed in the public sector.

2. **Resource Allocation**: Larger public entities (i.e., those with a larger asset basis) often had more resources to invest in technology and innovation (Bharadwaj, 2000). Therefore, they were more likely to have adopted cloud computing, making them relevant to the study.
3. **Technological Capabilities**: Entities with larger asset bases will likely have the technological capability to adopt and efficiently use cloud computing (Ray, Muhanna, and Barney, 2005).

4. **Manageable Scope**: While capturing the experiences of a larger number of entities would theoretically provide a broader perspective, practical limitations like time and resources make a smaller sample size more feasible (Devaraj and Kohli, 2003).
5. **Previous Studies**: Research on IT adoption in organisations has often used similar sample sizes. For example, (Zhu, Kraemer, and Xu, 2006) used a sample of 181 firms in their study on e-business innovation assimilation.

The choice to focus on individuals in the public sector provides a diverse but manageable sample size for research. First, these individuals presumably represented a significant portion of the public sector. Individuals employed in that sector offered a substantive sample (n=400) that allowed for a full investigation. Therefore, their experiences with cloud computing may have provided substantial insights into how it was being used across the sector.

The selection of individuals in public entities also provided a diverse but manageable sample size for research. A sample of this size likely included various entities, including those of different sizes, scopes, and operational contexts. This diversity enabled a more comprehensive understanding of the use of cloud computing in the public sector. At the same time, limiting the sample to 400 individuals made the study more feasible from a logistical perspective.

Finally, focusing on the individuals in public entities based on their asset base ensured that the sample included organisations with significant resources. These organisations were more likely to have the technological capabilities to use cloud computing efficiently. Their experiences, therefore, may have offered valuable insights into how organisations with significant resources were leveraging cloud computing and its impact on their operations.

Therefore, examining these individuals in public organisations likely yielded valuable data on the successful implementation and optimisation of cloud computing and provided an understanding of its impact on the efficiency and productivity of the public sector. This allowed researchers to draw meaningful conclusions that could contribute to academic discourse and practical applications.

Therefore, it was likely that these organisations had adopted cloud computing (Khanda and Doss, 2018). The research was critical to improving organisational performance in the public sector (Konstantinos et al., 2015). For these reasons, businesses from the public sector were included in the sample. When conducting organisational-level investigations using survey techniques, it was necessary to consider suitable key sources who could provide information about the organisation.

The most frequently mentioned key sources were CFOs and CIOs. However, there was debate about whether the information gathered from surveys of individual executives measured organisational view or individual perception (Gable et al., 2003). Executives inside organisations could offer organisational viewpoints on factors like performance since they directed organisational strategies and had the organisation's best interests in their decision-making process, according to Gong et al. (2004).

A strategic-level limitation was the impact of cloud computing on organisational performance. To get a relevant organisational viewpoint, top executives were chosen as informants for the 200 studied organisations (Ponterotto, 2005). The chief executive officer (CEO), head of information technology, or equivalent, and senior C-suite executives were among the executives that were chosen.

The organisation's annual report and website provided the executives' listings. The appropriate executive's office received the participation invitation directly. The research tried to include as many CEOs as possible on the invitation list. The invitation was only extended to one executive from each organisation. The researcher was conscious of their busy schedules at work. After two weeks, a reminder email was issued.

The multiple regression analysis was chosen as the quantitative technique for collecting data from all three populations. Using a quantitative approach, the study could fully understand the relationship between one dependent and several independent variables (Field, 2013). Triangulation of data from multiple populations enhanced the research's accuracy and consistency, thus bolstering the results' validity and reliability. The study will focus on the public sector industry and organisations that use cloud computing services. The banking industry was selected because it offers many opportunities to study how cloud computing affects organisational performance. Banks are excellent candidates for examining the impact of cloud computing since they frequently mix complex technological infrastructures with customer-focused services.

The study sample will consist of the following:

1. **Organisations:** The study focused on companies that had embraced cloud computing. This included significant multinational and smaller domestic companies to ensure a wide range of data and enable the evaluation of results across various sizes.
2. **IT Professionals:** IT specialists employed by these organisations participated in the study to gather specific information about the setup and maintenance of cloud computing.
3. **Management:** Managers and decision-makers shared their perspectives on the strategic and operational choices regarding adopting cloud computing and its likely performance impacts.

Sampling Method

Finding organisations that used cloud computing in their operations was the first stage in the sampling process. After size-based classification, organisations were chosen at random from each segment.

Next, each chosen organisation identified relevant participants (IT professionals and management staff involved in cloud computing). Contributors were selected based on their expertise and involvement in cloud computing within their organisation.

The sample's composition encompassed a diverse array of organisations and participants, strategically selected to yield a thorough understanding of the impact of cloud computing on organisational performance. This breadth in the sample selection was instrumental in facilitating a nuanced exploration of the multifaceted implications of cloud computing across various organisational contexts, thereby enriching the depth and applicability of the research findings in understanding the interplay between technological adoption and organisational efficacy.

The study used this sampling strategy to collect a range of viewpoints and experiences. This approach offered a deeper comprehension of how cloud computing affects the effectiveness of organisations (Bryman, 2016)

The ability to provide an in-depth understanding of the research issue, the potential to reduce bias, and the compatibility of the methodologies for the type of data all justified these choices. Using primary and secondary data sources resulted in a better understanding of the topic (Heaton, 2008). Random and purposeful sampling techniques complemented the range and depth of insights (Etikan, 2016). Given its widely recognised ability to manage various variables, multiple regression analysis suits this complex research environment (Field, 2013).

Sampling procedure:

Finding organisations that used cloud computing in their operations was the first stage in the sampling process. After size-based classification, the organisations from each segment were chosen at random.

Next, each chosen organisation identified relevant participants (IT professionals and management staff involved in cloud computing). Contributors were selected based on their expertise and participation in cloud computing within their organisation.

The composition of the sample encompassed a diverse array of organisations and participants, strategically selected to yield a thorough understanding of the impact of cloud computing on organisational performance. This breadth in the sample selection was instrumental in facilitating a nuanced exploration of the multifaceted implications of cloud computing across various organisational contexts, thus enriching the depth and applicability of the research findings in understanding the interplay between technological adoption and organisational efficacy.

The study used this sampling strategy to collect a variety of perspectives and experiences. This approach offered a deeper understanding of how cloud computing affects the effectiveness of organisations (Bryman, 2016).

The ability to provide an in-depth understanding of the research issue, the potential to reduce bias, and the compatibility of the methodologies for the type of data all justified these choices. Using primary and secondary data sources resulted in a better understanding of the topic (Heaton, 2008). Random and purposeful sampling techniques complemented the range and depth of insights (Etikan, 2016). Given its widely recognised ability to manage various variables, multiple regression analysis suits this complex research environment (Field, 2013).

3.4 Ethical considerations

The researcher needed to anticipate ethical issues before conducting the study (Gong et al., 2004). The essential "purpose of research ethics is to protect the welfare of research participants and extends further into areas such as scientific misconduct and plagiarism."

(Byrne, 2013). Prior to the commencement of data collection, ethics clearance from the "Human Research Ethics Committee (Non-Medical) office at the University of the Witwatersrand", "Johannesburg was unconditionally approved". The protocol number is WBS/DB2518786/156 (Annexure 3). The researcher agreed to abide by the "ethical clearance" issued by the "Ethics Committee" of the "University of the Witwatersrand". "This was to ensure that the researcher abided by institutional ethical guidelines about research on human respondents". "The participation of respondents in the study was completely voluntary", and "confidentiality or anonymity was guaranteed". Respondents were informed that the data collected would not be shared with any other party and would be destroyed on completion of the research project. The researcher informed the respondents that the data collected from the online electronic questionnaire and the questionnaire results would be reported in the aggregate, not as individual participants' views. The researcher instructed respondents not to fill in their personal or company details so that anonymity could be guaranteed. Participants were also informed that the information collected would only be used for the research, and the final report would be made available to the organisation on request. The safety of the respondents was also assured during the data collection process. The respondents filled in the questionnaires voluntarily and could refuse to answer specific questions or withdraw from the study at any stage.

3.5 Instrument construction for organisational study

The following procedures were taken to construct the instrument for the research of cloud computing utilisation and effect at the organisational level:

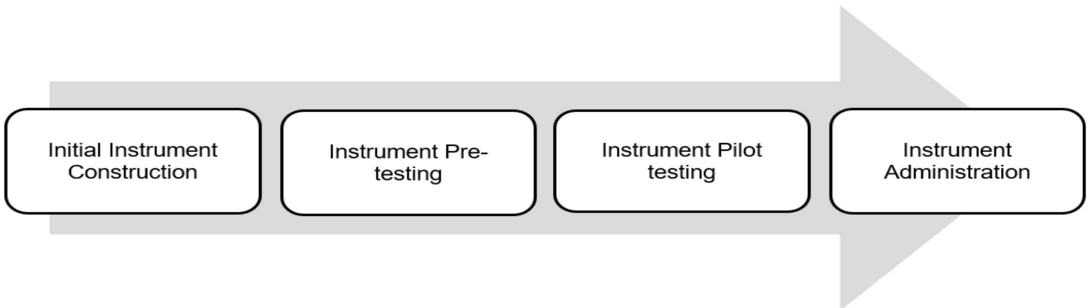


Figure 6: Instrument Construction for Organisational Study

3.6 Initial instrument construction

In addressing RO1 and RO2, the research model (Figure 1) on cloud computing uses seven core constructs: Human resources, technological resources, business resources, change management, policy and regulation, leadership, and cloud computing use. Additional variables included Customer, operational, and financial performance, among other controls. The detailed measures are listed in “Annexure 2”. Except for demographics, most constructs were measured using multi-item Likert scales (“1=strongly disagree” to “7=strongly agree”), and customer performance, operational performance and financial performance were “measured using 7-point scales” (“1= Much worse than expected” to “7=Much better than expected”), as illustrated in “Annexure 2”. The research instruments were adopted from the work of (Gangwar,2017) as well as Hou (2012), Wu (2006), Popovic et al. (2012) and Hajri et al. (2014). Three primary constructs—organisational level usage of cloud computing, non-financial performance, financial performance, and the selected contingency variables—are included in the study model (Figure 1) that hypothesise the usage and effects of adopting cloud computing on organisational performance. Table 1 and Appendix D describe the practical implementation of these notions in more depth. The study (Gangwar, 2017) was the primary foundation for assessing the organisation's performance. Each variable was measured using a 7-point multi-item Likert scale, except for data on organisational features, as shown in Appendix 2.

Table 1 Operationalisation of Constructs to Examine Organisational Use and Impact

Factors	Conceptual Definition	Example questionnaire item	Number of items	Literature source(s)
Cloud computing use	loud computing use refers to the deployment and utilisation of cloud computing services and resources by individuals, organisations, or systems	Our organisation's investment in robust infrastructure has positively influenced the adoption and usage of cloud computing.	5	Gangwar ,2017),Zhu and Kraemer (2005)
Customer performance	Customer performance refers to the measurement and assessment of how well a company or organisation meets or exceeds the expectations and needs of its customers.	The use of cloud computing in our organisation has improved customer service delivery, leading to an increased adoption of cloud-based services.	5	Aydiner et al., 2019,Low et al., 2011
Financial performance	The extent to which the organisation has succeeded financially.	The increase in operating income has been___.	5	Kaplan and Norton, 1992 Kshetri, 2013
Operational performance	Operational performance refers to the efficiency and effectiveness of an organisation's operational activities, including producing goods and services.	The use of cloud computing has positively impacted operational efficiency in our organisation, leading to increased usage of these technologies.	5	Slack et al., 2013, Heizer et al., 2021

Leadership	Leadership influences and guides individuals or groups towards achieving common goals or objectives.	Leadership's active involvement and support for cloud computing have positively impacted its adoption and usage in our organisation.	5	Northouse, 2018 Goleman et al., 2002
Policy and regulation	Policy and regulation are fundamental concepts within both public and private sectors, guiding the conduct of individuals, organisations, and governments.	Strict regulatory constraints faced by our organisation have hampered the effective use and implementation of cloud computing.	5	Baldwin et al.,2012 Jordana et al., 2004

3.7 Instrument administration

The final organisational-level study questionnaire (see Annexure 2) was administered electronically to the sample described above. The questionnaires were distributed through emails to the respondents; in other cases, they were sent to the key contact person, who then sent the instruments to the respondents with a cover letter/participant information sheet inviting them to participate. If they indicated that they would like to participate, they could click on a link to an online questionnaire. Reminder emails were sent two weeks after mailing the instruments to increase response rates. A reminder was sent to all respondents.

3.8 Data analysis strategies and interpretation

In the future stages of this research, the data analysis process required the researcher to present the results of all aspects of the research, including the questionnaire and the theoretical literature. The analysis delved into how the findings from each facet aligned, clashed, or provided complementary insights on the identical theme (Runeson and Höst, 2009). Data scrutiny involved evaluating each variable individually and discerning intervariable relationships to derive meaningful insights, with the research questions always serving as a guiding beacon. The quantitative nature of the questionnaire data required analysis using a quantitative formula or tool. Descriptive statistics and multiple regression analysis formed the crux of this analytical process, due to their alignment with the quantitative survey data and the overarching research question (Field, 2013; Gravetter and Wallnau, 2016).

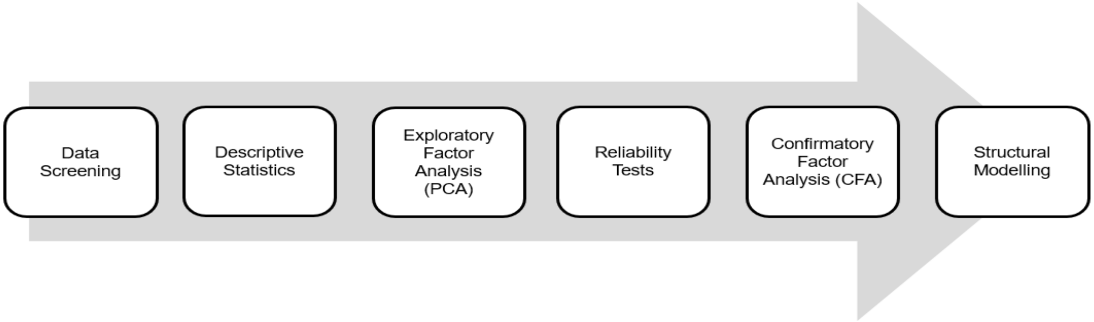


Figure 7: Steps Taken for Data Analysis

3.9 Data screening

Although circulated questionnaires were precoded to eliminate the risk of coding errors (Saunders et al., 2009), the data received from the respondents were screened to identify and eliminate errors before the data were further processed (Evans, 2010). Data coding was described in the relevant chapters reporting the results.

3.10 Descriptive statistics

The sample was described using descriptive statistics to profile and understand the shape or distribution of the collected data. Since the data for this study were collected using Likert scales, there was a question regarding whether the data analysis should be done using parametric or nonparametric tests. (Gardner and Martin, 2007) argued that the selection of the data-analysis technique impacts the conclusions drawn from the results. They contended that 'Likert data are of an ordinal or ranked nature', therefore recommending using nonparametric techniques to produce valid results (Harpe, 2015). In particular, (Norman, 2010) conducted a study using scale data and found that 'parametric tests' such as 'Covariance-Based Structural Equation Modelling (CB-SEM)' and regression analysis could be used on data collected via Likert-type scales without fear of biased conclusions. These findings were consistent with (Murray's, 2013) claims that parametric tests could be reliably performed on 'Likert scale data'. The descriptive statistics reported included means, standard deviations, skewness, and kurtosis of the scale items. Frequency counts and percentages were also used to explain sample profiles.

3.11 Principal component analysis (PCA)

Before testing the hypothesis using path modelling techniques (discussed below), it was first necessary to carry out an initial exploratory factor analysis (EFA) to uncover the underlying structure of the large set of variables (Abdi, 2010; Vonglao, 2017). This initial EFA aimed to establish the study's variables' unidimensionality and underlying factor structure (Hair et al., 2010). The EFA was carried out using the “Principal Component Analysis (PCA)”. The results obtained were presented in Chapters 4, 5, and 6. Unidimensionality assessment had to be made before testing validity and reliability. However, in the "unidimensionality step, items with low factor loading (less than 0.6) were deleted, while redundant items could either be deleted or constrained".

PCA allowed for initial testing of the convergent and discriminant validity. Items with lower loadings were deleted to confirm the convergent and discriminant validity. Validity concerns whether the findings obtained through data collection accurately represented the topic being investigated (Salkind, 2010). The validity of the instruments confirmed whether the instruments being used were measuring what the researcher intended to measure and the precision of the concept being measured (Collis and Hussey, 2014). Furthermore, (Collis and Hussey, 2009) stated that a 'valid instrument must cover the extent to which it offers satisfactory coverage of the subject under study' (Collis and Hussey, 2009). (Collis and Hussey, 2009) summarise the three types of validity as follows.

- Content validity will pertain to the scale measuring what it is supposed to measure and will be established using literature to guide the operationalisation of variables and the use of a pre-test involving academic and BI system experts (Collis and Hussey, 2014).

- Face validity will be related to the extent to which the scale is subjectively regarded as covering the concept it purports to measure. It will be established through the pilot study to identify low variation in responses and confusing items (Collis and Hussey, 2014).
- Construct validity, including equally 'convergent validity' and discriminant validity,', will be related to the degree to which the test claims to be measured and will be established initially using EFA, as discussed above. EFA will be carried out to uncover the underlying structure of the large set of variables. The objective of this initial EFA will be to establish the unidimensionality and underlying factor structure of the study variables (Hair et al., 2010). EFA will check if items load onto their expected constructs (convergent validity) and do not load onto factors (variables) they are not intended to measure (discriminant validity) (Fornell and Larcker, 1981).

3.12 Reliability tests

Reliability refers to whether the data were free of measurement error and whether the results were reputable (Collis and Hussey, 2014). The "reliable instrument" reduced "errors and bias when analysing findings (Petty et al., 2012b), offering consistent measurement across time and the various items on an instrument" (Maxwell, 2016). A common approach in surveys to establish reliability was an internal consistency measure. The study also adopted "internal consistency" as a measure of "reliability", which was confirmed using "Cronbach’s alpha" and the generally accepted cut-off point of 0.7 (Hair et al., 2010). Values less than those raised concerns about too many measurement errors. Items-to-total correlations were also reviewed from internal consistency tests, and items with low (0.70) item-to-total "correlations" were dropped. Items with lower correlations were eliminated.

3.13 Confirmatory factor analysis and structural equation modelling

"Structural Equation Modeling (SEM)" analysis using AMOS was performed. SEM provided for both a confirmatory test of the measurement model (the relationship between each latent construct and its indicators) and a test of the structural model ("relationships concerning the latent constructs themselves") (Hair et al., 2010).

3.14 Confirmatory factor analysis (CFA)

The "measurement models were verified using Confirmatory Factor Analysis (CFA)" (Hair et al., 2010). CFA tested whether the measures selected were consistent with the proposed models or theories (Lee and Ian Lings, 2008). The primary function of the CFA was to confirm if the selected variables measured the hypothesised model. The assessment of the measurement models through the CFA procedure allowed for final confirmation of unidimensionality, "validity, and reliability" of items measuring the constructs. The factor structure results provided a simultaneous assessment of item inter-correlations within the framework of "hypothesised relationships" between the "independent and dependent variables" (Lucadamo and Amenta, 2014; Russolillo, 2012). After testing for "validity and reliability", the items dropped during tests of the measurement model were not carried through into the structural model tests (Hair et al., 2010).

3.15 Structural modelling

This research aimed to establish the strength of the hypothesised path relationships between study variables using covariance-based structural equation modelling (CB-SEM). Future studies, drawing upon the works of (Gangwar et al., 2015; Zhu and Kraemer, 2005; Zhang et al., 2010; Marston et al., 2011), were influenced in their conceptualisation of research models. These studies used Likert-scale data and used SEM for statistical testing because SEM statistical techniques were used in this study.

Increasingly popular as a statistical technique for theory testing in various fields, such as information systems and management science, SEM was used in this research. SEM is a multivariate statistical procedure combining multiple regression and factor analysis to test the hypothesised model. Establish causality within latent (or constructed) and observed variables that formed part of the model (Barrett, 2007; Sangthong, 2020).

The distinctiveness of Structural Equation Modelling (SEM) lies in its capacity to discern between direct and indirect interrelations among variables and to scrutinise associations between latent variables devoid of random errors, a capability expounded by (Fan and Sivo, 2005; Russolillo, 2012). This attribute distinguishes SEM from rudimentary relational modelling methodologies, such as multiple regression analysis. Moreover, SEM's ability to concurrently test all the postulated relationships within a research model, as highlighted by Hair et al. (2011), positions it as a robust analytical tool, offering comprehensive insights into the complex interplay of variables within a theoretical framework.

If the model fits the data, the hypothesis was not rejected as the model, and the observed covariance matrices were equal (Awang, Afthanorhan, and Mamat, 2016). This was crucial in statistics as it supported the findings and hypothesis. The concern of SEM was to ensure that the hypothesised model did not contradict the observed (real-world) data (Sangthong, 2020).

According to Hoe (2008), a significant conceptual difference between SEM and regression analysis was that in a regression model, the independent variables were correlated (multicollinearity), influencing the size of the coefficients found. SEM allowed these variables' interactions to be modelled (Cheung and Rensvold, 2002).

The model comprised a structural model that indicated latent causal dependencies between endogenous and exogenous variables and a measurement model that displayed the relationships between latent variables and their indicators (Tarka, 2018). SEM facilitated the specification of the pathway in which hypothesised causal relationships between variables in the models were tested. Examining the path coefficients' significance was foundational for either corroborating or refuting the proposed hypothesis. (Mohamad et al., 2014; Vonglao, 2017).

To further support this argument, additional references were considered, including (Hair et al., 2010) for a comprehensive understanding of the SEM model and its application, (Hoyle and St, 2022) for practical SEM applications and examples, (Byrne, 2013) for an in-depth study on SEM with AMOS, (Kline,2011) for principles and practices of SEM, (Christopher Westland, 2010) for model fit and model selection in SEM, (Fornell and Larcker, 1981) for evaluating SEM models with unobservable variables and measurement error, (Schumacker and Lomax, 2010) for fundamental concepts of SEM, and (Bainter and Bollen, 2014) to refute common misconceptions about SEM and gain insights into causal analysis for social research.

These sources significantly contributed to developing and applying the covariance-based SEM model, mainly using Likert scale data and statistical tests. Each source added to the understanding of the benefits, potential pitfalls, and best practices associated with SEM, directly or indirectly influencing the conceptualisation of hypothesised path relationships between study variables.

3.16 Possible limitations and challenges of the study

There are potential limitations and challenges in all research studies and this study is no exception. Here are some of the possible limitations and challenges that could be encountered in this study.

1. **Sampling Bias:** The sample could not accurately represent the larger population of interest, despite efforts to ensure a varied and representative sample. This could result from nonresponse bias or because some organisations or people could not participate in the survey, which could restrict the generalisation of the study's findings (Bryman, 2016).
2. **Measurement Errors:** The accuracy of the results is highly dependent on the responses provided by the respondents. It is possible that respondents may not fully understand some questions or may not provide completely accurate responses, either intentionally or unintentionally (Field, 2013).

3. Response Rate: In the case of the online survey, it might be challenging to achieve a high response rate. The response rate may significantly affect the validity and reliability of the study findings.
4. **The Complexity of Multiple Regression Analysis:** While multiple regression analysis is a powerful tool for examining relationships among multiple variables, it also presents challenges. Assumptions related to linearity, homoscedasticity, and the absence of multicollinearity, among others, must be met, and violation of these assumptions may affect the validity of the results.
5. **Subjectivity in Interpretation:** Although quantitative data analysis methods are used, interpretation of the results still contains an element of subjectivity, which might result in different interpretations by different researchers (Bryman, 2016).

Despite these limitations and challenges, they were addressed by careful planning and execution of the study. For example, efforts were made to increase the response rate by sending reminder emails, ensuring anonymity and confidentiality of responses, and making the survey as user-friendly as possible.

3.16.1 *Model fit*

SEM requires examining an estimated model's fit to determine how well it models the data. Fit statistics such as “Chi-square (X^2)”, “Root Mean Square of Error Approximation (RMSEA)”, “Goodness of fit index (GFI)', 'Adjusted Goodness of fit index (AGFI)', 'Comparative Fit Index (CFI)', 'Tucker-Lewis index (TLI)', 'Normed Fit Index (NFI)' and 'Chi-square degree of freedom' were examined to confirm the factor structure and indicated whether models and theories were acceptable or not (Barrett, 2007; Fan and Sivo, 2005).

Table 2 Describes different model fit criteria and acceptable levels.

Model fit criteria	Description	Acceptable level	Source
"Goodness-of-fit (GFI)"	"The GFI is the degree of fit between the hypothesized model and the observed covariance matrix.	Less than 0.80 (No fit) Between [0.80-0.90] (acceptable) Above 0.90 (Perfect fit)	(Barrett, 2007)
"Normed fit index (NFI)"	The NFI evaluates the discrepancy between the chi-squared value of the hypothesised model and the chi-squared value of the null model.'	Less than .80 (poor) Between [0.80-0.90] (acceptable) Above 0.90 (good)	(Fan and Sivo, 2005) (Byrne, 2013)
"Comparative fit index (CFI)"	"The CFI assumes that all latent variables are uncorrelated and compares the sample covariance matrix with the null model".	Less than 0.90 (poor) Above 0.90 (good)	(Fan and Sivo, 2005)
"Incremental fit index IFI)"	"The IFI's purpose is to correct the issue of parsimony and sample size related to NFI'.	Less than 0.90 (poor) Above 0.90 (good)	(Byrne, 2013) (Hoe, 2008).
"Root mean square error of approximation (RMSEA)"	"Informs how well the model, with indefinite but optimally selected parameter estimates, would fit the population's covariance matrix'.	Less than 0.05 (good) Between [0.06-1] (acceptable) Above 1 (poor)	(Cheung and Rensvold, 2002)
"Chi-square (χ2 /DF)"	"To assess the magnitude of the discrepancy between the sample and fitted covariance matrices". The estimation process is dependent on the sample data	Less than 3 (good) Between [3-5] (acceptable) Above 5 (poor)	(Cheung and Rensvold, 2002)
"Tucker-Lewis Index **(TLI)**"	"The TLC utilises simpler models and is known to address the issue of sample size associated with NFI'.	Less than 0.80 (poor) Between [0.80-0.90] (acceptable) Above 0.90 (good)	(Hoe, 2008).
Relative Fit Index **(RFI)**"	"The RFI compares the chi-square of the hypothesised model with that of a 'null' or 'baseline' model.'	Less than 0.80 (poor) Between [.80-.90] (acceptable) Above .90 (good)	(Byrne, 2013)

This study's proposed models (i.e., the conceptual model) were tested as described above. SEM goodness-of-fit indices were used for each model test to determine whether the data's pattern of variances and covariances is consistent with each hypothesised theoretical model (Awang, Afthanorhan and Asri, 2015). The root mean square error of approximation (RMSEA) was used to evaluate the covariance structure of the model. "It reduces problems and inconsistencies commonly found in testing models with large sample sizes and has therefore become a helpful tool for guiding complex judgements about model utility" "rather than functioning as a replacement for such judgements" (Hoe, 2008). RMSEA should be less than or equal to 0.5 for a good model fit. $\chi 2$ and other goodness of fit indices will also be reported and compared to recommended acceptable values.

3.17 Quality assurance

Quality assurance was paramount in this research effort to ensure the validity, reliability, and reproducibility of the study. Below are the ways this study ensured these key aspects:

Research Design Rigor: Employing robust theoretical frameworks such as the TOE and RBV to guide the research design ensured methodological rigour and theoretical validity (Creswell, 2013). These established frameworks provided a robust basis for developing the research questions and hypotheses, ensuring the study was grounded in well-founded theory.

Sampling: Using random and purposive sampling techniques enhanced the sample's representativeness. Random sampling enhanced external validity, making findings generalisable to the broader population (Etikan, 2016).

Simultaneously, purposive sampling increased the study's internal validity by ensuring the inclusion of specific subgroups relevant to the research questions.

Data Collection: Employing a mixed-mode approach to data collection helps reduce non-response bias, increasing the validity of the findings (Dillman et al., 2016). Furthermore, maintaining the confidentiality and anonymity of responses is crucial in ensuring respondents' honesty and enhancing the data's reliability.

Validity and reliability of the method: Survey questions are grounded in the TOE and RBV constructs, enhancing the validity of the construct. Pre-testing the survey with a small group of respondents will help identify any ambiguity or misunderstanding, improving the clarity and face validity of the instrument (Creswell, 2013).

Data Analysis: Using reliable statistical software such as SPSS ensures the reliability of the data analysis process. Additionally, adhering to the assumptions of multiple regression analysis will improve the statistical validity of the study (Yin, 2018).

Replicability: Providing detailed information about the research methodology, including descriptions of the population, sample, research instrument, and data collection and analysis methods, increases the study's transparency and allows for future replication, enhancing its reliability and test-retest reliability (Lombard et al., 2002).

These quality assurance measures improve the validity and reliability of the study, ensuring that the findings are credible and trustworthy.

3.18 Conclusion

This chapter presented the research methodology followed in the study. The research method used is quantitative for organisational studies of cloud computing. The study used data to test the use and impact of cloud computing use on organisational performance, which tested the model. The models were tested using SEM. The next chapter, Chapter 6, presents the results of the data analysed to test the model.

CHAPTER 4. PRESENTATION OF RESULTS / FINDINGS

4.1 Empirical results

In Chapter 3, the research methodology was meticulously developed. This chapter focused on the analysis of data accumulated from the empirical study. Research Objective 1 (RO1), "*To examine the factors that influence the use of cloud computing in the public sector*," was carefully investigated and empirically tested. Concurrently, Research Objective 2 (RO2), "*To examine how cloud computing use affects cloud computing on a balanced view of organisational performance(non-financial and financial)*," was also thoroughly explored and empirically evaluated.

A survey was conducted by distributing questionnaires to obtain opinions from individuals employed in public sector entities in South Africa. The data collected from individuals in the public sector was used to test the hypothesised model of the influence of cloud computing use on organisational performance (non-financial and financial). The initial sections discussed the sample size, demographics of the respondents, data screening and sample outliers. In addition, the following sections present descriptive statistics, an assessment of normality and sample adequacy of the empirical data analysed. Furthermore, the principal component analysis, reliability and validity, and correlation matrix are performed before the model results are analysed. Finally, the results of the model, discussion and conclusion are presented.

4.2 Sample characteristics and demographic profiles

This study distributed a questionnaire to 400 respondents through diverse professional communication platforms: email, WhatsApp, and LinkedIn. Of the distributed questionnaires, a total of 220 were returned by the respondents. The received 220 questionnaires underwent analysis and cleaning, during which missing values were identified and rectified. In the data cleaning process, it was observed that seven responses had less than 10% missing, with these occurrences being randomly distributed across the survey. The 'median of nearby points method was employed to address the issue of missing data. This technique involves calculating the median based on the average of values proximate to the missing data point, as (Byrne, 2013) outlined. The SPSS software facilitated this process through its 'span of nearby points' option, enabling an efficient median computation. This computed median considered all available values of the items above and below the missing data point, as described by (Hair et al., 2010).

The derived median value was then used to substitute the missing data, ensuring a complete and accurate dataset. Moreover, 20 responses were found to be entirely blank and were subsequently excluded from the 220 responses received. This elimination was necessary to maintain the integrity and reliability of the dataset, which is crucial for valid and robust research findings. Following the systematic data cleaning, the resultant dataset comprised a final usable sample size of 200. Consequently, the overall response rate for the study amounted to 53.19%, a statistically meaningful proportion conducive to robust statistical analyses.

4.2.1 Demographic profile

Before testing the structural equation modelling (SEM) model using the collected data, 'descriptive statistics' are presented to provide an overview of the sample under study. The 'demographic profile of the respondents' is presented in Table 2. The 200 usable respondents provided their demographic information.

Table 3 Demographics

Demographics			
Qualification			
		Frequency	**Percent**
Grade 12 or Matric	1	19	9.5
National Diploma	2	48	24.0
Bachelor’s Degree	3	40	20.0

Demographics			
Qualification			
		Frequency	**Percent**
Honours	4	42	21.0
Masters	5	40	20.0
PhD	6	1	.5
Other (Specify)	7	10	5.0
Size			
		Frequency	**Percent**
Small (1-50 employees)	1	14	7.0
Medium (51-200 employees)	2	12	6.0
Large (201-500 employees)	3	13	6.5
Very Large (500+ employees)	4	161	80.5
Industry			
		Frequency	**Percent**
Manufacturing	2	88	44.0
Utilities and Energy	4	3	1.5
Logistics	5	2	1.0
Retail	6	2	1.0
Telecommunication	7	8	4.0
Airline	8	6	3.0
Pharmaceutical	9	7	3.5
Public Sector	10	51	25.5
Service	11	1	.5
Finance Sector	12	32	16.0
Title			
		Frequency	**Percent**
Chief Financial Officer	1	5	2.5
Management Accountant	4	4	2.0
Financial Director	5	2	1.0
Managing Director	6	2	1.0
Executive Director	7	32	16.0
Chief Technology Officer	8	5	2.5
Chief Architect	9	1	.5
Chief Information Officer	10	1	.5
Engineers	11	5	2.5
Programme Manager	12	9	4.5
Chief Digital Transformation Officer	13	5	2.5
Chief Operating Officer	14	62	31.0
Product Owner	15	67	33.5

Demographics			
Years			
		Frequency	**Percent**
<5 years	1	65	32.5
6 – 10 years	2	58	29.0
11 – 15 years	3	31	15.5
>16 years	4	46	23.0
Time			
		Frequency	**Percent**
<5 years	1	18	9.0
6 – 10 years	2	14	7.0
11 – 15 years	3	12	6.0
>16 years	4	156	78.0
revenue			
		Frequency	**Percent**
<5 years	1	10	5.0
6 – 10 years	2	12	6.0
11 – 15 years	3	42	21.0
>16 years	4	136	68.0

The first section of the questionnaire was designed to collate general information about the respondents, focusing on aspects such as their academic qualifications, current occupational status, specific roles within their organisation, and tenure in a public technological setting. The sample distribution regarding education qualification reveals a diverse representation of participants, as shown in Figure 7. The highest qualification attained by respondents varied, with Grade 12 or Matric accounting for 10.0% of the sample, a National Diploma comprising 23.5%, and a bachelor's degree constituting 19.4%. Further, participants with an Honours degree comprised 20.6% of the sample, while those with a master's degree represented 22.9%. A minimal proportion, 0.6%, possessed a PhD. Additionally, 2.9% of respondents indicated having qualifications falling under the category of 'Other,' with specifics provided by the participants. This educational diversity within the sample enhances the comprehensiveness and representativeness of the study.

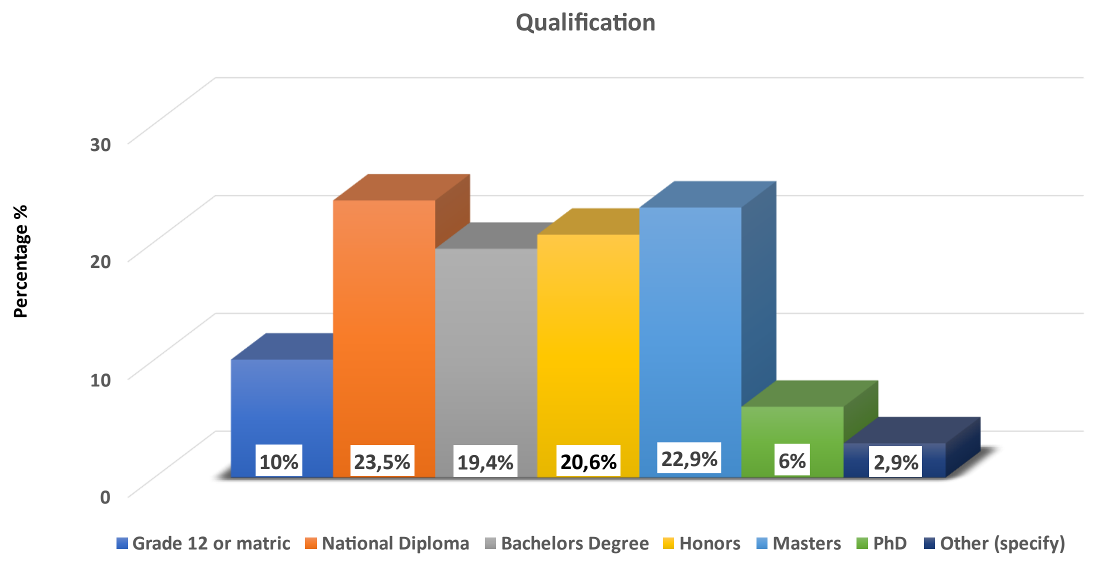


Figure 8: Respondents' qualification

Figure 8 also shows that the sample distribution based on the number of employees within the respondents' organisations indicates a predominant representation of very large organisations (81.8%). Additionally, smaller contributions are observed, with 4.7% from small organisations (1-50 employees), 7.6% from medium-sized organisations (51-200 employees), and 5.9% from large organisations (201-500 employees).

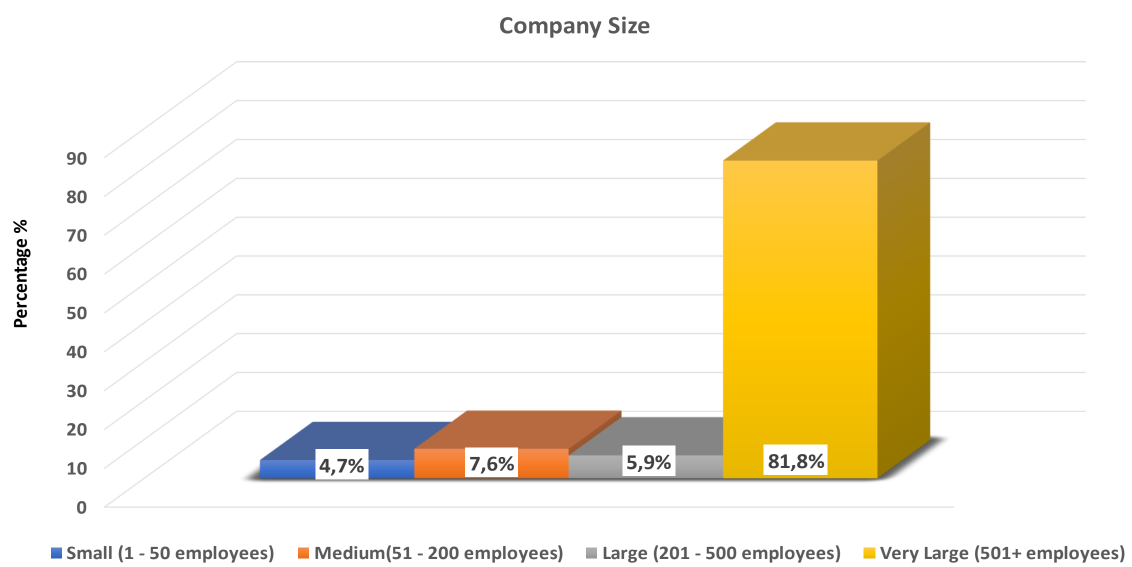


Figure 9: Number of employees

The sample distribution, shown in Figure 9, categorised by the respondents' industry, highlights a predominant representation from the financial sector, comprising 41.8% of the sample. Telecommunication follows closely with 24.1%. Other industries have a more modest representation, including the public sector (7.1%), retail (2.4%), service (2.9%), manufacturing (2.4%), mining (1.8%), and pharmaceutical (1.8%) - in addition, 0.6% of respondents identified themselves with the logistics industry. Notably, 15.3% indicated an affiliation with industries specified as 'Other,' providing additional diversity to the sample.

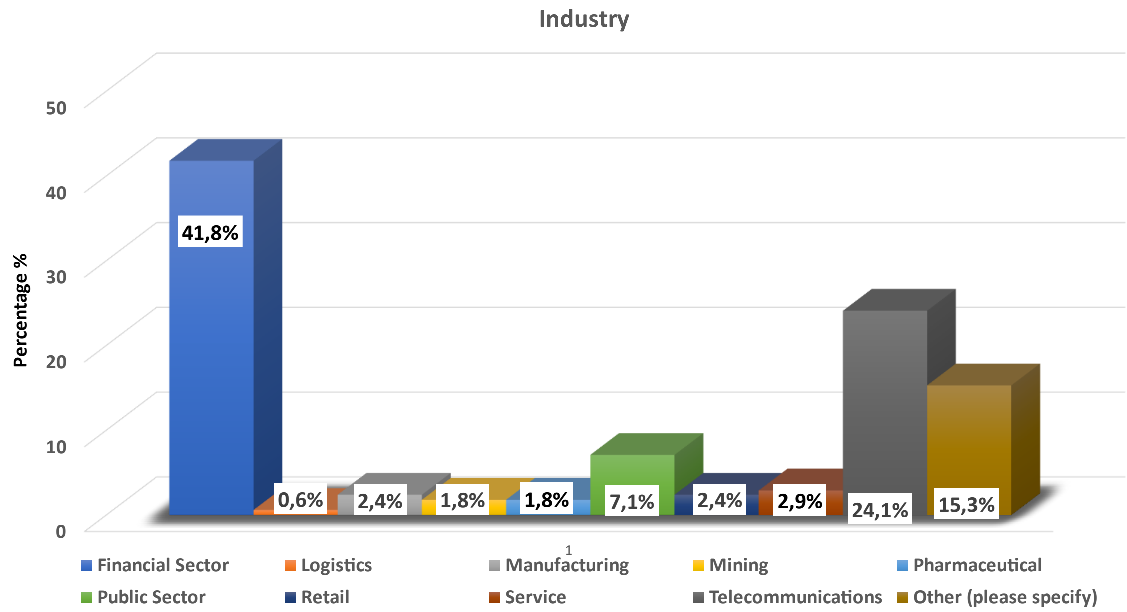


Figure 10: Respondent’s industry

The sample distribution based on the years that the respondents have worked with their current organisation, shown in Figure 10, indicates that most of the participants had over 16 years of service, comprising 77.6% of the sample. Comparatively, 9.4% reported less than five years of service, 7.6% fell within the 6-10 years category, and 5.3% had a tenure ranging from 11 to 15 years.

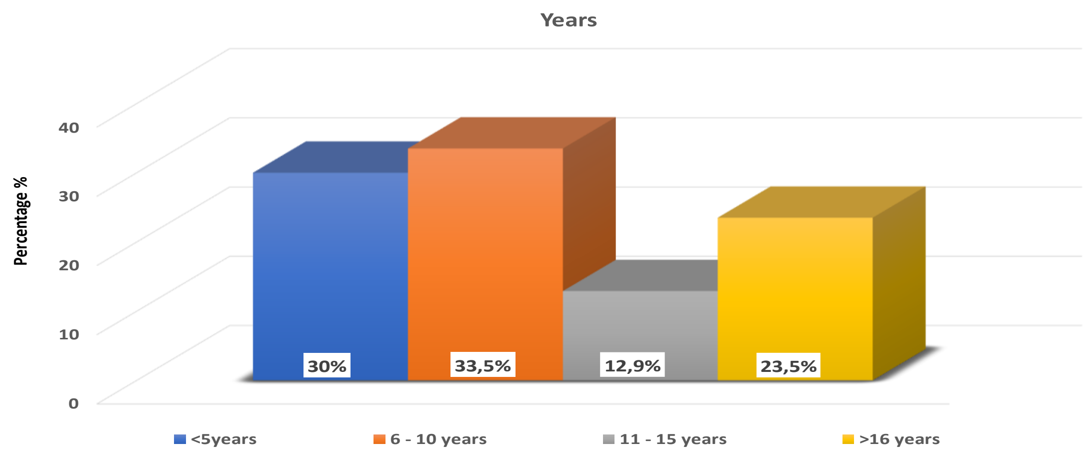


Figure 11: Tenure of employment

The demographic data indicate that the respondents encompass various organisations in diverse industries. The sample consisted of a segment of professionally registered business and infrastructure managers distinguished by their experience in senior decision-making roles. The respondents occupy senior positions within their organisations and demonstrate varied engagement with cloud computing technologies. Although not all respondents are directly involved in implementing cloud computing solutions, they oversee teams that do, indicating a range of indirect experience with these technologies. Given the depth and breadth of experience and positions held by the sample, the sample was suitable for examining the proposed model that explores the use and impacts of cloud computing on organisational performance.

4.2.2 Data screening

Data collected was analysed using IBM's "Statistical Package for the Social Sciences (SPSS) Version 28." Initial steps included a thorough screening process to identify missing data. In this process, seven responses were observed to have missing data, and these occurrences were randomly distributed throughout the survey. Furthermore, 20 responses were found to be entirely blank and were subsequently excluded from the data analysis. This elimination was necessary to maintain the integrity and reliability of the dataset, which is crucial for valid and robust research findings. Seven responses had little data missing: the items affected were Technology resources, Policy and regulation, and financial performance (Table 3). The median of nearby points method was employed to address the issue of absent data. This technique involves calculating the median based on the average of values proximate to the missing data point, as (Byrne, 2013) outlined. The SPSS software facilitated this process through its' span of nearby points' option, enabling an efficient median computation. This computed median considered all available values of the items above and below the missing data point, as described by (Hair et al., 2010). The derived median value was then used to replace missing data, ensuring a more complete and accurate dataset.

Table 4: Responses to missing data

Item	Number of missing Responses
Technology resources (TR)	5
Policy and regulation (PR)	1
Financial performance (FP)	1

4.2.3 *Sample outliers*

Outliers are data points that vary significantly from other observations (Hair et al., 2010). Responses with unusually high or unusually low values were screened to identify potential outliers (Tarka, 2018). Extreme responses might suggest that the respondents are not from the same population. Extreme values are typically a response of more than three standard deviations above or below the sample mean (Hair et al., 2010). Standardised scores on an item reflect the number of standard deviations from the mean. Standardised scores of each respondent were examined on each questionnaire item and none were identified as outliers. This is surprising, given that all the questionnaire items were answered on the same given scale.

4.3 Descriptive statistics

The construct investigated in this study was measured using two different scales. First, constructs such as human resources, technological resources, business resources, cloud computing use, change management, leadership, and policy and regulation were measured on a seven-point Likert scale where 1 corresponds to 'strongly disagree' and 7 corresponds to 'strongly agree'. Second, the remaining constructs, operational, customer, and financial performance, were measured using a 7-point Likert scale where 1 corresponds to 'Much worse than expected' and 7 corresponds to 'Much better than expected'. Therefore, the midpoint of the seven-point Likert scale is '4'. This means that when the mean values are less than 4, most of the respondents tended to disagree with the statements. Values between 4 and 4.5 indicate that respondents tended to be more neutral. Where the means are greater than 4.5, most respondents tend to agree or strongly agree with the statements. The mean, standard deviation, skewness, and kurtosis of the composites are presented in Table 4.

Table 5: Descriptive statistics

Descriptive Statistics									
	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness	Kurtosis
Human resources	200	6.00	1.00	7.00	5.0300	1.34810	1.817	-.741	.277
Technology resources	200	6.00	1.00	7.00	5.0919	1.34573	1.811	-.887	.384
Business resources	200	6.00	1.00	7.00	5.3500	1.30075	1.692	-.949	.986
Change management	200	6.00	1.00	7.00	5.1500	1.20246	1.446	-.306	-.300
Policy and regulation	200	5.80	1.00	7.00	4.9359	.905318	.820	-.033	1.340
Leadership	200	6.00	1.00	7.00	4.7322	.867864	.753	-.092	1.573
Operational performance	200	5.60	1.00	7.00	5.1709	1.15604	1.336	-.492	-.056
Customer performance	200	6.00	1.00	7.00	4.8760	1.07461	1.155	-.228	.610
Financial performance	200	6.00	1.00	7.00	5.1067	1.15184	1.327	-.472	.420
Cloud computing use	200	6.00	1.00	7.00	5.5740	1.10990	1.232	-.557	.183

Human resources: As indicated in Table 3, HR has an overall mean of 5.0 with a standard deviation of 1.34, suggesting a predominant agreement among respondents about the significant influence of HR in this context. Five items were adopted from prior work related to attributes of cloud computing use (Gangwar, 2017) and “measured using a 7-point Likert scale”. The mean of items ranges from 5.15 (1.392) to 5.61 (1.374), as shown in Table 4, showing a tendency to agree with statements reflecting human resources.

Table 6: Statistical results of HR items

Variable	OBS	Mean	Std.Dev.	Min	Max
HR1	200	5.47	1.392	1	7
HR2	200	5.61	1.374	1	7
HR3	200	5.15	1.352	1	7
HR4	200	5.53	1.393	1	7
HR5	200	5.54	1.263	1	7

Technology Resources: Results in Table 3 show that the mean score for the technology resources scale is 5.10, with a standard deviation of 1.35, indicating a consensus among respondents about the adequacy of technological resources in organisations, including robust Internet bandwidth, to leverage cloud services. The study further stresses the importance of utilising diverse technologies such as wikis, SharePoint, blogs, and Facebook within organisations to enhance employee knowledge sharing about products and processes. As shown in Table 5, the mean of items ranges from 5.58 (1.426) to 5.74 (1.212). Tools like Google Sites and Lotus Notes are also employed to create and store knowledge on various functionalities. Additionally, business intelligence tools are strategically utilised to store knowledge. A key finding of the study is the recognition of the essential managerial IT skills possessed by IT personnel, which are vital for exploiting the competitive benefits of cloud services. Five items were adopted from prior work related to attributes of cloud computing use (Gangwar, 2017) and "measured using a 7-point Likert scale". This extensive use of technological infrastructure reflects a robust organisational commitment to integrating advanced technology solutions into their operational framework.

Table 7: Statistical results for TR items

Variable	OBS	Mean	Std.Dev.	Min	Max
TR1	200	5.72	1.346	1	7
TR2	200	5.59	1.350	1	7
TR3	200	5.58	1.426	1	7
TR4	200	5.74	1.212	1	7
TR5	200	5.74	1.167	1	7

Business Resources: Results in Table 3 revealed an overall mean of 5.3 and a standard deviation of 1.3. The mean of items shown in Table 6 ranges from 5.43

(1.711) to 5.71 (1.184). Five items were adopted from prior work related to attributes of cloud computing use (Gangwar, 2017) and “measured using a 7-point Likert scale”. These findings suggest that respondents generally agree that organisations foster open and trusting relationships with suppliers, highlighting a commitment to collaborative and transparent business practices.

Table 8: Statistical results for BR items

Variable	OBS	Mean	Std.Dev.	Min	Max
BR1	200	5.62	1.427	1	7
BR2	200	5.71	1.184	1	7
BR3	200	5.39	1.622	1	7
BR4	200	5.61	1.403	1	7
BR5	200	5.34	1.711	1	7

Change management: Results in Table 3 revealed an overall mean of 5.12 and a standard deviation of 1.21. The mean of items in Table 7 ranges from 5.06 (1.532) to 5.52 (1.432). Five items were adopted from prior work related to attributes of cloud computing use (Gangwar, 2017) and “measured using a 7-point Likert scale”. These findings suggest that respondents generally agree that the organisation is adept in change management and can readily adapt to new operational flows facilitated by cloud system deployments.

Table 9: Statistical results for CM items

Variable	OBS	Mean	Std.Dev.	Min	Max
CM1	200	5.52	1.432	1	7
CM2	200	5.34	1.423	1	7
CM3	200	5.30	1.399	1	7
CM4	200	5.06	1.532	1	7
CM5	200	5.39	1.445	1	7

Policy and regulation: Results in Table 3 revealed an overall mean of 4.90 and a standard deviation of 0.90.). Five items were adopted from prior work related to attributes of policy and regulation (Baker et al., 2020) and “measured using a 7-point Likert scale”. The mean of items ranges from 5.20 (1.831) to 5.84 (1.374). These findings suggest that respondents generally agree that the organisation's policies are structured to support cloud computing, aligning with current laws and regulations deemed sufficient for its protection.

Table 10: Statistical results for PR items

Variable	OBS	Mean	Std.Dev.	Min	Max
PR1	200	5.84	1.374	1	7
PR2	200	5.63	1.369	1	7
PR3	200	5.62	1.509	1	7
PR4	200	5.20	1.831	1	7
PR5	200	5.65	1.439	1	7

Cloud Computing Usage: Table 3 revealed an overall mean of 5.57 and a standard deviation of 1.109. Five items were adopted from prior work related to attributes of cloud computing (Rong et al., 2020) and "measured using a 7-point Likert scale". As shown in Table 9, the mean of items ranges from 5.60 (1.617) to 585 (1.182). These findings suggest that respondents generally agree with the extent to which cloud computing should be supported.

Table 11: Statistical results for CCU items

Variable	OBS	Mean	Std.Dev.	Min	Max
CCU1	200	5.85	1.182	1	7
CCU2	200	5.65	1.370	1	7
CCU3	200	5.60	1.617	1	7
CCU4	200	5.82	1.403	1	7
CCU5	200	5.73	1.352	1	7

Leadership: Table 3 results revealed an overall mean of 4,73 and a standard deviation of 0.867, as indicated in the table. As shown in Table 10, the mean of items ranges from 4.18 (1.549) and 4.89 (1.648). Five items were adopted from prior work on leadership attributes (Bass et al.,1995) and "measured using a 7-point Likert scale". These findings suggest that respondents generally agree that the active involvement and support from leadership in our organisation have significantly facilitated the usage of cloud computing.

Table 12: Statistical results for LD items

Variable	OBS	Mean	Std.Dev.	Min	Max
LD1	200	4.70	1.802	1	7
LD2	200	4.18	1.549	1	7
LD3	200	4.79	1.655	1	7
LD4	200	4.30	1.727	1	7
LD5	200	4.89	1.648	1	7

Operational performance: Table 3 results revealed an overall mean of 5,17 and a standard deviation of 1.15, as indicated in the table. Five items were adopted from prior work on operational performance attributes (Zhang et al.,2021) and "measured using a 7-point Likert scale". The mean of items ranges from 4.93 (1.414) and 5.36 (1.425). Results suggest that respondents generally agree that the consensus within our organisation is that cloud computing has significantly enhanced operational efficiency.

Table 13: Statistical results for OP items

Variable	OBS	Mean	Std.Dev.	Min	Max
OP1	200	5.28	1.360	1	7
OP2	200	5.33	1.327	1	7
OP3	200	5.31	1.353	1	7
OP4	200	4.93	1.414	1	7
OP5	200	5.36	1.425	1	7

Customer performance: As shown in Table 3, results revealed an overall mean of 4.87 and a standard deviation of 1.074. Five items were adopted from prior work related to attributes of customer performance (Kumar et al., 2020) and "measured using a 7-point Likert scale". The mean of items in Table 12 ranges from 4.93 (1.629) to 5.37 (1.277). This suggests that respondents generally agree that our organisation's ability to deliver superior, personalised customer experiences has markedly improved. This enhancement is reflected in our increased responsiveness to customer needs, which has led to more effective handling of customer inquiries. As a result, there has been a notable improvement in customer satisfaction and retention rates.

Table 14: Statistical results for CP items

Variable	OBS	Mean	Std.Dev.	Min	Max
CP1	200	5.37	1.277	1	7
CP2	200	5.06	1.357	1	7
CP3	200	4.93	1.629	1	7
CP4	200	5.26	1.421	1	7
CP5	200	5.32	1.448	1	7

Financial performance: Table 3 revealed an overall mean of 5.01 and a standard deviation of 1.15. Five items were adopted from prior work related to attributes of financial performance (Kaplan et al.,1992) and "measured using a 7-

point Likert scale”. The mean of items, shown in Table 13, ranges from 5.06 (1.306) to 5.18 (1.295). These findings suggest that respondents generally agree that the financial performance of our organisation has exhibited significant improvements across various metrics. There has been an increase in operating income, alongside a notable improvement in the sales growth rate.

Additionally, there has been an increase in both return on investment and return on assets. Gross profit has also shown an upward trend. Furthermore, there has been a commendable reduction in operating costs, emphasising the efficiency of our operational strategies.

Table 15 Statistical results for FP items

Variable	OBS	Mean	Std.Dev.	Min	Max
FP1	200	5.12	1.285	1	7
FP2	200	5.14	1.314	1	7
FP3	200	5.09	1.144	1	7
FP4	200	5.18	1.295	1	7
FP5	200	5.06	1.306	1	7

4.4 Assessment of normality

Descriptive statistics depicted in Table 3 show the “Skewness and kurtosis coefficients” for each construct. These coefficients are crucial for assessing the normality of the dataset. According to (George and Mallery,2010), skewness and kurtosis values that fall within the range of -2 to +2 typically indicate normal distribution in data. The analysis of these values indicates that most of the kurtosis and skewness coefficients align with this accepted range, suggesting data normality. However, an outlier is observed in the construct of individual performance, characterised by a notably higher kurtosis value of +6. Despite the noted deviation in kurtosis, the Central Limit Theorem, as expounded by (Muzaffar, 2016), posits that deviations from normality have a diminished impact in large datasets. This principle implies that anomalies in kurtosis, even those surpassing the -2 to +2 normative range, are unlikely to influence the overall results substantially. Therefore, concerns regarding normality in this dataset were considered mitigated. This assurance paves the way for utilising the data for further analysis utilising parametric tests, which requires the data to be normally distributed.

4.5 Sample adequacy

Before proceeding with a 'principal component analysis (PCA)' to confirm the validity of multi-item scales, it is necessary to establish the adequacy of the sample. 'Adequacy of the sample is measured using the Kaiser-Meyer-Olkin (KMO)' test, which was developed by (Kaiser and Rice,1974). According to (Field, 2009), KMO measures the sampling characteristics of the 'ratio of the squared correlation between variables to the squared partial correlation between variables'. The patterns of correlations vary between 0 and 1; if the correlation value is closer to 1, the correlations should produce reliable factors (Field, 2009). The values between 0.5 and 0.7 are poor, 0.7 and 0.8 are good, 0.8 and 0.9 are great, and above 0.9 are excellent (George and Mallery, 2010). The results of this study are illustrated in Table 15, which indicates that the KMO results are 0.761. The results of KMO indicate that the sampling adequacy falls within the acceptable range. This suggests that the sampling size is adequate to produce reliable factors.

Table 16: Sample adequacy test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of the sampling adequacy.		0.761
Bartlett's Test of Sphericity	Approx. Chi-Square	9294.713
	Df	1225
	Sig.	.000

4.6 Principal components analysis (PCA)

Factor analysis (principal component) was conducted using the orthogonal rotation (Varimax) method. "This method was selected because it essentially captures the components with high eigenvalues and organises by order of importance" (Hair et al., 2011). Factor analysis functions on the assumption that measurable and observable variance can be reduced to a few latent variables that share common variance (Vonglao, 2017). This is known as the reduction of dimensionality. The unobserved factors are not measured directly but are critical in a hypothetical model. Exploratory Factor Analysis (EFA) is the first step in constructing scales (Hair et al., 2011). EFA is considered a helpful first step before any Confirmatory Factor Analysis (CFA) at the early stages of developing the scale. EFA allows a researcher to explore the leading dimension to produce a theory or model from latent constructs represented by sets of items (Sangthong, 2020). Before proceeding with a "principal component analysis (PCA)" to confirm the validity of the multi-item scales, it is necessary first to establish sample adequacy. The "adequacy of the sample is measured using the Kaiser-Meyer-Olkin (KMO)" test, which was developed by (Kaiser and Rice, 1974). According to Field (2009), KMO measures sampling characteristics of the "ratio of the squared correlation between variables to the squared partial correlation between variables". The patterns of correlations vary between 0 and 1, and if the correlation value is closer to 1, the correlations should produce reliable factors (Field, 2009). The values between 0.5 and 0.7 are poor, 0.7 and 0.8 are good, 0.8 and 0.9 are great, and above 0.9 are excellent (George and Mallery, 2010).

In this study, an exploratory analysis was considered necessary prior to formal model testing as there is not enough research evidence of the use of cloud computing on and performance in public sector organisations in the South African context and therefore, an initial exploratory approach was warranted. (Hair et al., 2010) detailed that for a construct to be labelled a factor, it should have at least three variables (i.e., scale items); this can also depend on how the study has been designed. The number of factors produced depends on whether the variable might have a relationship with more than one factor (Murray, 2013). Using a rotation matrix maximises high item loadings while minimising low item loadings. This produces a more interpretable and simplified solution. The rotation on SPSS can be carried out using five methods: varimax, quartimax, equamax, direct oblimin, and promax (Sangthong, 2020). This study chose to use varimax rotation to maximise high item loadings.

Furthermore, a "factor score coefficient matrix was used in the scores menu and opted for listwise exclusion, sorting by size and suppressing absolute values less than 0.40 in the options menu". Suppressing absolute values less than 0.40 allows a more straightforward visual interpretation of the loadings. This study has 200 responses, and the factor loading was low at 0.50 or less. Items with loadings of less than 0.50 were eliminated from the study. Table 16 presents the results of factor analysis on the set of items. The principal component analysis indicates that ten factors were extracted from 50 items. The total variance explained is **75%.**

Table 17: Principal component matrix

Rotated Component Matrix										
Component										
Item	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
HR1								.816		
HR2								.847		
HR3								.779		
HR4								.826		
HR5								.893		
TR1										.890
TR2										.909
TR3										.728
TR4										.719
TR5										.678
BR1	.946									
BR2	.787									
BR3	.904									
BR4	.834									
BR5	.924									
CM1			.938							
CM2			.880							
CM3			.833							
CM4			.757							
CM5			.899							
PR1				.865						
PR2				.860						
PR3				.925						
PR4				.747						
PR5				.922						

Rotated Component Matrix										
Component										
Item	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CCU1						.743				
CCU2						.843				
CCU3						.821				
CCU4						.859				
CCU5						.914				
LD1									.802	
LD2									.750	
LD3									.789	
LD4									.777	
LD5									.832	
OP1							.849			
OP2							.851			
OP3							.841			
OP4							.889			
OP5							.826			
CP1					.873					
CP2					.803					
CP3					.831					
CP4					.855					
CP5					.883					
FP1		.864								
FP2		.879								
FP3		.890								
FP4		.904								
FP5		.830								
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser normalisation. The rotation converged in 6 iterations. **Total Variance Explained 75%**										

The results in Table 15 support the convergence validity, as all items displayed factor loadings greater than 0.4. Consequently, no items were removed from the analysis. Each item was accurately loaded onto its respective factor, and there were no cross-loading instances, affirming the validity of the measurement scales.

The factors were named Human resources (HR), Technology resources (TR), Business resources (BR), Change management (CM), Policy and regulation (PR), Leadership (LD), Cloud Computing Usage (CCU), Operation performance (OP), Customer performance (CP) and financial performance (FP).

The model consisted of ten constructs confirmed by the underlying factor structure of the EFA. The analysis could then compute composite scales of the constructs and use them for descriptive and correlation analysis.

The factor loadings in Table 15 are well above the threshold of 0.50. No items were eliminated from the scale. All factor loadings are high. The general results of the exploratory factor analysis indicate that all items were associated with a component.

In refining the research model, the decision to eliminate the security construct was taken carefully to enhance the model's theoretical coherence and empirical robustness. The rationale behind excluding certain constructs, including security, stemmed from a strategic intent to improve the fit, focus, and relevance of the model to the research objectives. This decision aligned with established methodological practices in empirical research, where constructs may be removed for redundancy, lack of relevance, poor factor loadings, or insufficient contribution to the model's explanatory power (Hair et al., 2010).

The exclusion of specific constructs such as security was attributed to several justifiable reasons within the context of scholarly research. First, it was related to the construct's weak or nonsignificant loading on the hypothesised factors, suggesting that the items did not adequately measure the intended construct or did not cohere well with the study's theoretical framework (Kline, 2011). Second, removal was driven by considerations of construct redundancy, where the construct overlapped significantly with others in the model, thus not providing a unique explanatory value (Tabachnick & Fidell, 2013). Third, the decision was informed by the construct's limited impact on the research model's overall explanatory or predictive capability, indicating that its presence did not substantively enhance the understanding of the phenomena under investigation (Bollen, 1989).

In the case of eliminating the security construct from the research model, the decision was underpinned by a comprehensive evaluation of the alignment of the construct with the study's core objectives, its theoretical justification within the proposed model, and its empirical support through preliminary data analyses.

This evaluation process ensured that the research model remained focused, theoretically sound, and empirically valid, facilitating a more precise and meaningful interpretation of the results.

Human resources (HR) were measured through five items. According to Table 15, five items loaded highly the same factor and noncross-loaded above 0.40 onto other factors. Therefore, no human resources items needed to be dropped.

Technology resources (TR) were measured through five items. Table 15 shows Five items loaded highly onto the same factor and noncross-loaded above 0.40 onto other factors. Therefore, no technology items needed to be dropped.

Business resources (BR) were measured through three items. Table 15 shows five items loaded highly onto the same factor and noncross-loaded above 0.40 onto other factors. Therefore, no items for business resources needed to be dropped.

Change management (CM) was measured through five elements. Table 15 shows five items loaded highly onto the same factor and noncross-loaded above 0.40 onto other factors. Therefore, all items were retained.

Policy and regulation (PR) were measured through five elements. Table 15 shows five items loaded highly onto the same factor and noncross-loaded above 0.40 onto other factors. Therefore, all items were retained.

Cloud computing use (CCU) was measured through five elements. Table 15 shows five items loaded highly onto the same factor and noncross-loaded above 0.40 onto other factors. Therefore, all items were retained.

Leadership (LD) was measured through five elements. Table 15 shows five items loaded highly onto the same factor and noncross-loaded above 0.40 onto other factors. Therefore, all items were retained.

Operation performance (OP) was measured through five elements. Table 15 shows five items loaded highly onto the same factor and noncross-loaded above 0.40 onto other factors. Therefore, all items were retained.

Customer performance (CP) was measured through five elements. Table 15 shows five items loaded highly onto the same factor and noncross-loaded above 0.40 onto other factors. Therefore, all items were retained.

Financial performance (FP) was measured through five elements. Table 15 shows five items loaded highly onto the same factor and noncross-loaded above 0.40 onto other factors. Therefore, all items were retained.

The model consisted of ten constructs, confirmed by the PCA's underlying factor structure. The analysis could then proceed to examine the reliability of the scales.

4.5.1. Reliability and validity

Reliability is the ability of a scale to produce the same results if used under the same conditions with the same objectives (Hair et al., 2010); the reliability assessment used Cronbach's alpha to evaluate internal consistency in this study. Specifically, Cronbach’s alpha was calculated for ten different measurement scales that were integral to the conceptual framework of the study. These scales encompass Human Resources (HR), Technology Resources (TR), Business Resources (BR), Change Management (CM), Policy and Regulation (PR), Leadership (LD), Cloud Computing Usage (CCU), Operational Performance (OP), Customer Performance (CP), and Financial Performance (FP). The criterion for a reliable scale is presented in Table 16. Table 17 then presents the results of the Cronbach alpha, both before and after adjustment, to highlight whether any items were excluded from the original scales to improve the reliability of the scale.

The reliability results in Table 16 show that all the scales exhibited suitable levels of internal consistency. Composite reliability values for all factors are more significant than 0.8, indicating good internal consistency.

Convergent validity evaluates the degree to which unique measures of the same construct are correlated (Field, 2018). The AVE was vital in evaluating the convergent validity in this study. AVE is determined as the average of the squared loadings of each indicator on its corresponding latent factor divided by the sum of the variances of the measurement errors (Field, 2018). AVE values range from 0 to 1. Higher AVE values indicate better convergent validity. A commonly used rule of thumb is that an AVE value greater than 0.5 suggests good convergence validity (Field, 2018). As shown in Table 16, the AVE values for all ten factors are more significant than 0.5, indicating convergent validity. Table 16 presents the results of Cronbach's alpha, 'average variance extracted (AVE)' and 'composite reliability (CR)'. The 'Cronbach' alpha was used to measure reliability. The scale is reliable if the 'Cronbach' alpha' is at least 0.70 (Hair et al., 2010). Table 16 indicates that the 'Cronbach's alpha' ranges from 0.779 to 0.973, above the recommended value of 0.70. The CR ranges from 0.624 to 0.935, above the threshold of 0.70. In addition, the AVE for each construct was calculated. The AVE has a minimum value of 0.58, more than the recommended threshold of 0.50.

Table 18: Results of reliability and validity

Scale	Original number items	Final number of items	Cronbach Alpha after adjustment	"Average variance extracted (AVE)"	Composite reliability (CR)"	Mean	Standard deviation
Human resources	5	5	0.906	0.693	0.918	5.03	1.348
Technology resources	5	5	0.851	0.624	0.891	5.09	1.345
Business resources	5	5	0.935	0.776	0.945	5.35	1.300
Change management	5	5	0.922	0.584	0.915	5.15	1.202
Policy and regulation	5	5	0.914	0.750	0.937	4.93	0.905
Cloud computing usage	5	5	0.906	0.702	0.921	5.57	1.109
Leadership	5	5	0.624	0.916	0.892	4.73	0.867
Operational performance	5	5	0.912	0.724	0.929	5.17	1.156
Customer performance	5	5	0.914	0.702	0.921	4.87	1.074
Financial performance	5	5	0.933	0.763	0.941	5.10	1.109

4.6.1 Correlation matrix of composite scores

Construct validity is a critical aspect of research methodology that can be established through convergent and discriminant validity, as (Sangthong, 2020) suggests. The intercorrelation has been calculated and presented in Table. This process involves evaluating the degree to which measures of a construct correlate with each other more significantly than with measures of different constructs, a principle elaborated by (Hair et al., 2010). In practice, this principle is assessed by examining the inter-correlations among constructs and comparing these with the Average Variance Extracted (AVE) or the square roots of AVE for each construct. This ensures that the constructs share more variance with their items than other constructs within the model, thus validating their reliabilities and convergent and discriminant validities.

Further analysis involves a correlation analysis through the Pearson's correlation matrix (Table 18) and AVE to scrutinise the relationships between various constructs, including HR, TR, BR, CM, PR, LD, CCU, OP, CP, and FP. This step assesses discriminant validity by ensuring that the correlation between any two constructs is lower than the square root of the AVE for each construct, adhering to the Fornell-Larcker criterion. The descending diagonal in Table 18 presents the square roots of the AVE for each factor, against which the correlation coefficients between the factors are compared. The findings affirm discriminant validity, with all interconstruct correlations being lower than the square root of the AVE for each respective construct, allowing the model to proceed to the next section of testing.

Table 19: Pearson correlation matrix

	HR	LD	BR	CCU	PR	CM	TR	CP	OP	FP
HR	**0,918**									
LD	.783**	**0,891**								
BR	.694**	.758**	**0,945**							
CCU	.615**	.643**	.767**	**0,915**						
PR	.402**	.451**	.562**	.560**	**0,937**					
CM	.274**	.308**	.433**	.384**	.499**	**0,892**				
TR	.409**	.461**	.607**	.641**	.387**	.324**	**0,929**			
CP	.243**	.281**	.337**	.405**	.235**	.255**	.685**	**0,921**		
OP	.249**	.316**	.350**	.408**	.267**	.283**	.703**	.833**	**0,941**	
FP	.512**	.545**	.701**	.674**	.584**	.466**	.536**	.333**	.355**	**0,921**

4.7 Results of model testing

This research segment evaluates the collected data to test the measurement and structural models rigorously articulated within the study. Before the empirical assessment of the proposed structural model, it is recommended that a Confirmatory Factor Analysis (CFA) is performed as a conclusive evaluation of the measurement model. This step is crucial to ascertain whether all items are optimally loaded onto the hypothesised constructs within the model. The use of CFA aims to scrutinise the hypothesis concerning the sources of variance that account for the combined variance among a set of observed variables. This analysis comprises ten measurement items (Seven Factors that influence the use of Cloud Computing and three about cloud computing use on organisational customer, operational, and financial performance (non-financial and financial), focusing solely on the 50 items that measure the principal variables and retained after the exploratory factor analysis (PCA) phase. Therefore, the CFA validated the suitability of the proposed factor structure in relation to the gathered data.

The second step was to use 'Structural Equation Modelling (SEM)' to test the hypotheses represented by the relationship between independent and dependent variables, i.e., the structural model. The SEM model was conducted using AMOS version 25. AMOS is easier to use as the path diagrams are simplified compared to other software such as LISREL, STATA, etc. (Sangthong, 2020).

4.8 Confirmatory factor analysis (CFA)

This study used CFA to investigate the existence of a relationship between observed variables and their underlying latent variables. The initial model was formed through EFA, and examining the hypothesised measurement model for its adequacy was crucial. CFA was performed with AMOS V28 to validate the measurement specifications. The CFA process included model identification, specification, estimation, modification, and output analysis (Field, 2018). Given that the initial model was established using EFA, the pattern matrix obtained from the EFA output in SPSS was used to define the model to be confirmed through

CFA. EFA identified ten latent variables, each with at least five (5) manifest variables.

Model identification involves testing the functionality of the model. Initially, the program was tasked with estimating all variances and fixing each path from latent to observable variables. Figure 11 visually represents the complete CFA, which affirms a ten-factor structural measurement model. In this diagram, the double-headed arrows depict the covariance between two factors.

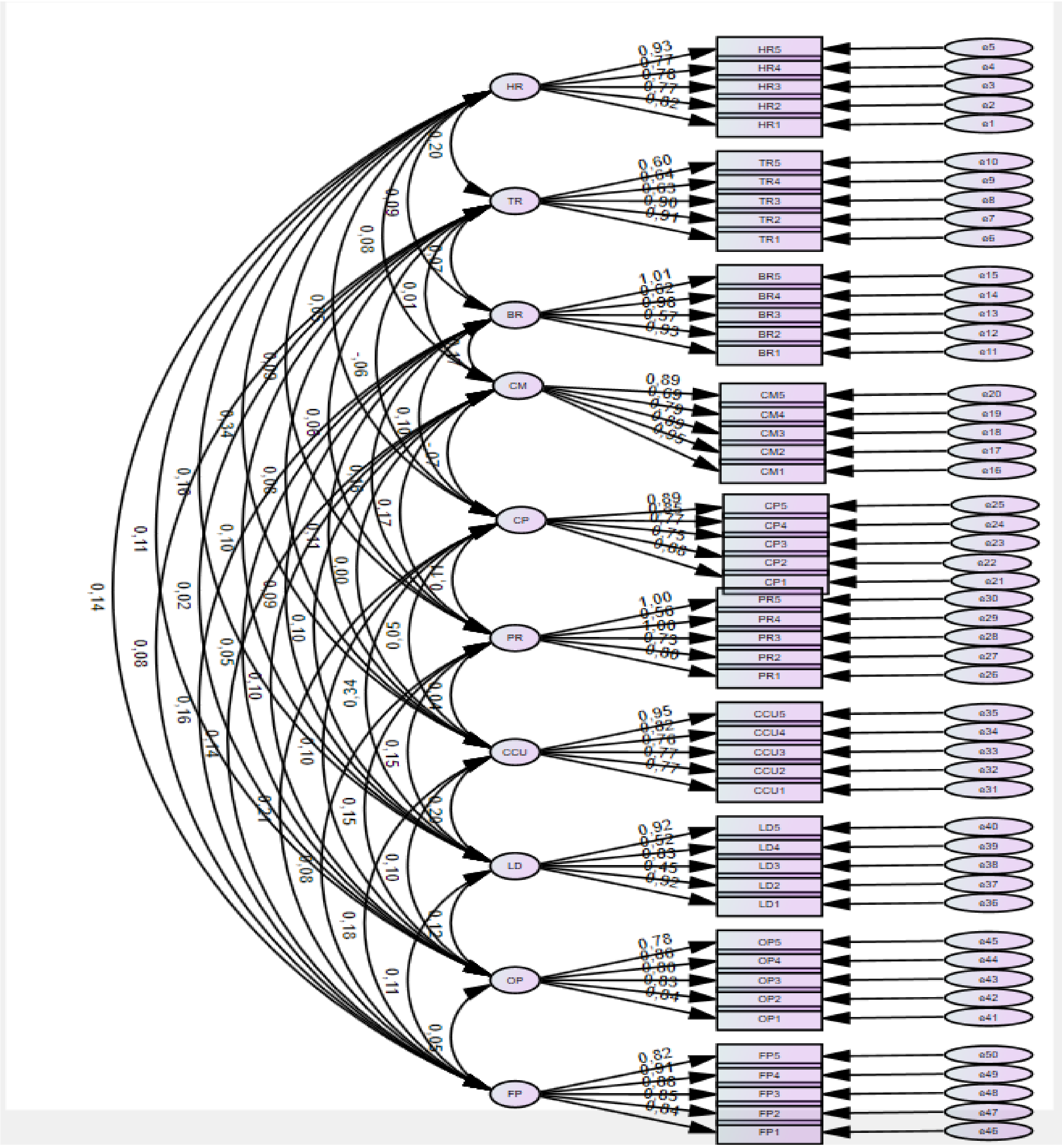


Figure 12: CFA Model

4.9 Goodness of fit indices

The "maximum likelihood" method was implemented to estimate the model parameters and all analyses were performed on covariance matrices. Model-fit indices need to be considered when analysing the model goodness-of-fit. The first step is assessing the Chi-square (X^2) of the tested model. The X^2 was high, and the ratio of X / DF=10 is higher than the recommended three, indicating that the data do not fit the model. This test may, however, unnecessarily reject the hypothesis (Hair et al., 2010) as even slight differences between the observed model and the excellent model fit might be significant. The fit indices were as follows (Table 18): [GFI= 0.623; NFI=0.658; CFI=0.648; IFI=0.843; RMSEA=0.071; DF=1130; TLI=0.921 and RFI=0.754]. The validity of the CFA model indicates that some model-fit indices were not satisfactory. However, the main objective of the CFA model was to check that all the items on the scale were loading into the model. The CFA test was conducted to confirm the validity of the construct and the factor loadings (Serrano Archimi, Reynaud, Yasin, and Bhatti, 2018). It was not meant to test the hypothesis among the constructs. The results indicate that all items are loading appropriately and in line with the theory. The factor loadings of this model range between 0.684 and 0.930, which is above the prescribed threshold of 0.50. The following section tested the hypothesised model.

Table 20: Goodness of fit indices

Fit Index	**Recommended Value**	**CFA Results**	**Original Structural Model**	**Final Structural Model**
Goodness-of-fit (GFI)	Less than 0.80 (No fit) Between [0.80-0.90] (acceptable) Above 0.90 (Perfect fit)	0.623	0.863	0.983
Normed fit index (NFI)	Less than .80 (poor) Between [0.80-0.90] (acceptable) Above 0.90 (good)	0.658	0.778	0.918
Comparative fit index (CFI)	Less than 0.90 (poor) Above 0.90 (good)	0.648	0.878	0.978
Incremental fit index (IFI)	Less than 0.90 (poor) Above 0.90 (good)	0.843	0.928	0.933
Root mean square error of approximation (RMSEA)	Less than 0.05 (good) Between [0.06-1] (acceptable) Above 1 (poor)	0.071	0.05	0.0380
Chi-square (χ2 /DF)	Less than 3 (good) Between [3-5] (acceptable) Above 5 (poor)	10.268	4.652	2.92
Tucker-Lewis Index (TLI)	Less than 0.80 (poor) Between [0.80-0.90] (acceptable) Above 0.90 (good)	0.921	0.925	0.930
Relative Fit Index (RFI)	Less than 0.80 (poor) Between [.80-.90] (acceptable) Above .90 (good)	0.754	0.914	0.919

4.10 Original model testing

The results in Table 16 confirm that the reliability, convergent validity, and discriminant validity constructs have been rigorously evaluated and supported by applying the EFA and CFA methodologies. After this validation process, the investigation examined the postulated interrelations between exogenous and endogenous latent variables, as delineated in Figure 12. This examination was carried out through the analysis of the structural model, where the dynamics between dependent and independent variables are meticulously defined. Specifically, the causal links between these variables are represented symbolically by unidirectional arrows, whereas the covariance among independent variables is depicted through bidirectional arrows. This study adopts an approach of unfixed pathways for hypothesising causal relationships among variables, reflecting a departure from predetermined pathways noted in preceding literature (Mudau, 2021).

The evaluation of the initial hypothesised model, illustrated in Figure 12, reveals a suboptimal fit to the model, which required enhancements to refine the predictive precision of the causal relationships between variables. Despite the statistical significance indicated by a p-value of 0.000, the model's Chi-square to

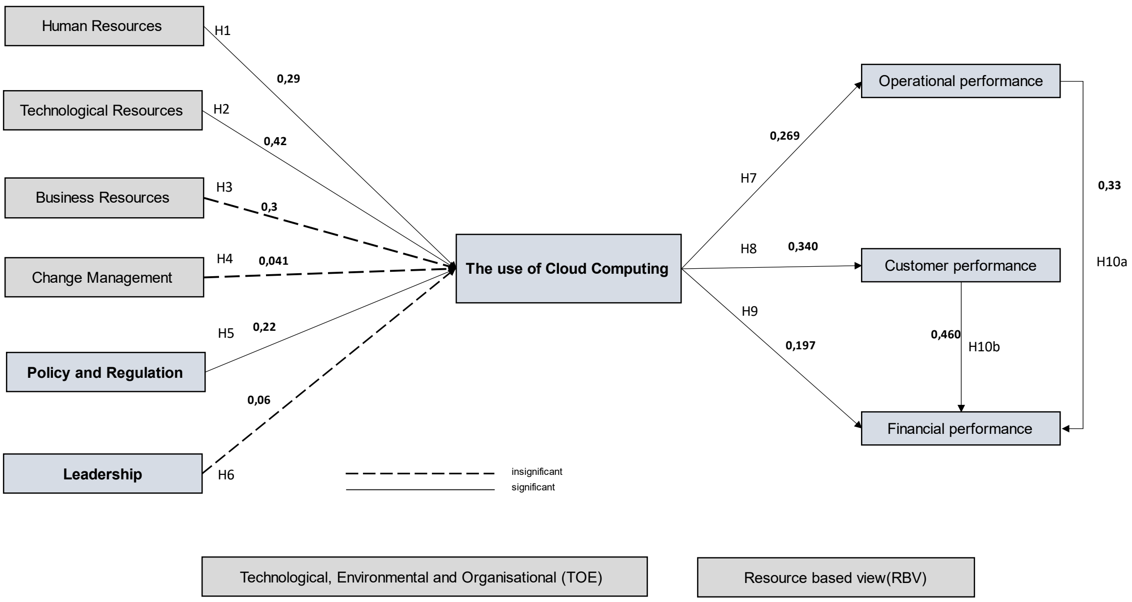


Figure 13 Original model

degrees-of-freedom ratio (X 2 / DF) is 4,652, surpassing the recommended threshold range of 3 to 5. The fit indices, as reported in Table 18, encompass the following metrics: Goodness-of-fit index (GFI) at 0.863, normal metric fit index (NFI) at 0.778, comparative fit index (CFI) at 0.878, incremental fit index (IFI) at 0.928, root mean square error of approximation (RMSEA) at 0.05, Tucker-Lewis index (TLI) at 0.925, and relative fit index (RFI) at 0.914. These indices predominantly suggest acceptable fit levels, albeit with reservations regarding the CFI and IFI measures.

To improve the model and achieve a superior fit, it was imperative to re-assess and potentially modify the original model. This entailed imposing constraints on certain constructs to zero and effectively removing them from the model under consideration. Furthermore, error covariance estimates were adjusted to enhance the fit of the model. Such methodological refinements were critical to ensuring the robustness and validity of the model, thereby facilitating a more accurate interpretation of the causal relationships among the variables under study. These methodologies refer to seminal works in the field, such as (Hair et al., 2010) "Multivariate Data Analysis" for EFA and CFA techniques and (Kline, 2011) "Principles and Practice of Structural Equation Modeling" for structural model testing, which provide comprehensive frameworks and best practices for conducting such analyses.

4.11 Final model testing

4.11.1 *Model improvement steps taken*

The following improvements were made to improve the fit of the model. These improvements were identified by examining the AMOS output. Table 19 indicates that the modification indices with high covariance may be combined if they do not compromise the tested theoretical model (Fan and Sivo, 2005). Modification of the indices below was confirmed to improve the fit of the model. Table 18 shows the model fit summary for the original and final SEM. As shown in Table 18, the original model had a poor fit, as several fit indices fell below acceptable levels. Improvements were made to the original model to improve the fit of the model. Modification indices guided this.

Finally, Table 19 indicates the modification indices with high covariance that may be combined if they do not compromise the tested theoretical model (Fan and Sivo, 2005). The modification of the indices below was confirmed to improve the fit of the model.

Table 21 Modification indices

Covariances	M.I	Par Change
e3 <--> e4	117,113	1,194
e1 <--> e4	97,410	0,797
e1 <--> e3	83,496	0,798
e9 <--> e8	80,663	0,626

The significant paths are indicated by one-header arrows, while the non-significant paths are indicated by dotted one-header arrows. The final indices suggest that examining the hypothesised relationships within the model was acceptable. Table 20 indicates the path coefficients of the 'hypothesis relationships within the proposed research model'.

This stage involved the examination of the relationships among the latent and observed variables within the proposed model. The AMOS software facilitated the assessment of the model's measurement and structural components, allowing for an in-depth understanding of the complex interplay between variables. The study aimed to validate the hypothesised structural model, providing solutions to the hypothesis formulated in this study. Table 19 shows the summary of the model fit for the original and final SEM. As shown in Table 19, the original model had a poor fit as several fit indices fell below acceptable levels. Improvements were made to the original model to improve the fit of the model. Modification indices guided this.

The GFI for the final model demonstrated a good fit (GFI= 0.983), surpassing the recommended threshold for a perfect fit. The NFI was within the acceptable range, suggesting an adequate fit (0.918). The CFI (0.987) and IFI (0.933) indicated a good fit for the model. The RMSEA (0.038) demonstrated a good fit, well below the recommended threshold. The Chi-Square (χ^2 /df) indicated a good fit and the TLI showed a satisfactory fit. The RFI (0.919) fell within the acceptable range, signalling a decent fit. Overall, the fit indices suggest a reasonably good fit of the final SEM, highlighting its suitability for capturing the relationships between observed and latent variables in the study.

The SEM parameter estimates are reported in Table 20, which shows the relationships among the constructs as hypothesised in the study.

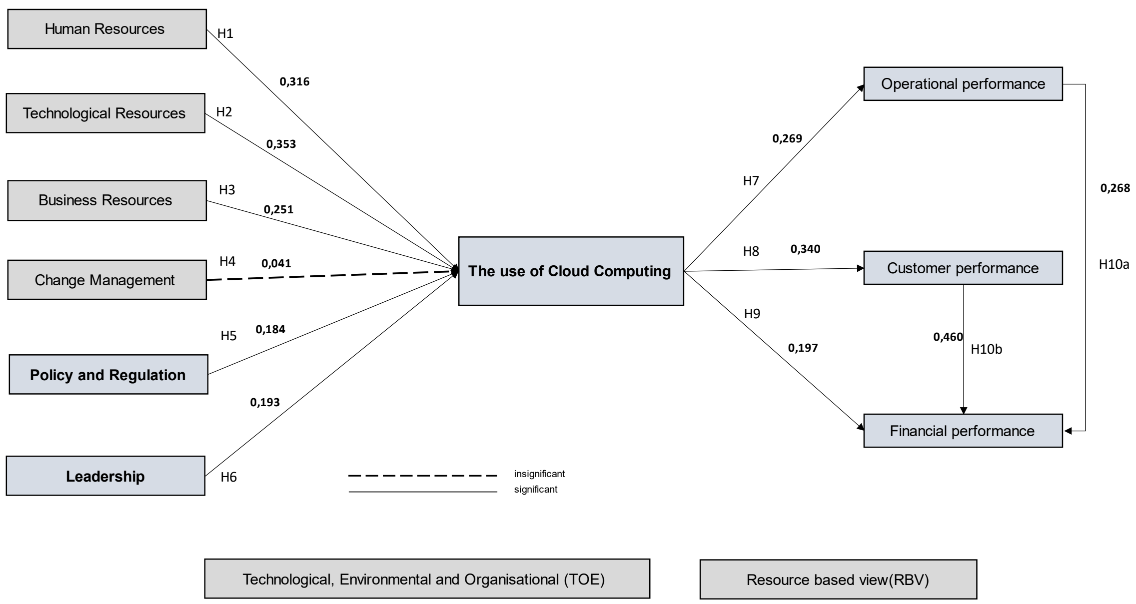


Figure 14: Final model

Table 22: SEM parameter estimates

Hypothesis	Independent variable		Dependant Variable	Estimate	S.E.	C.R.	P	Comment	P
H1	HR	.--->	CCU	0,316	0,068	4,658	***	Supported	P<0.001
H2	TR	.--->	CCU	0,353	0,053	6,704	***	Supported	P<0.001
H3	BR	.--->	CCU	0,251	0,092	2,728261	0,012	Supported	P<0.05
H4	CM	.--->	CCU	0,041	0,07	0,594	0,553	Not supported	P>0.05
H5	PR	.--->	CCU	0,184	0,053	3,495	***	Supported	P<0.001
H6	LD	.--->	CCU	0,193	0,069	2,797101	0,009	Supported	P<0.05

Hypothesis	**Independent variable**		**Dependant Variable**	**Estimate**	**S.E.**	**C.R.**	**P**	**Comment**	**P**
H7	CCU	.--->	CP	0,34	0,071	4,788732	***	Supported	P<0.001
H8	CCU	.--->	OP	0,269	0,078	3,442	***	Supported	P<0.001
H9	CCU	.--->	FP	0,197	0,152	1,296053	0,219	Not supported	P>0.05
H10a	OP	.--->	FP	0,268	0,059	4,576	***	Supported	P<0.001
H10b	CP	.--->	FP	0,46	0,094	4,893617	***	Supported	P<0.001
HR=Human resources TR=Technology resources BR=Business Resources CM=Change management PR=Policy and regulation LD=Leadership OP=Operational performance CP=Customer performance FP=Financial performance									

Table 23 R-squared results

Variances	**Estimate**
CCU	0,322
OP	0,215
CP	0,320
FP	0,308

As presented in Table 20, nine of the ten hypotheses were directly supported by the model being tested. The results of the SEM analysis revealed significant associations between technological, organisational and environmental factors and the use of cloud computing in South African public sector organisations, as well as subsequent impacts on organisational performance (non-financial and financial). In particular, human resources (HR) demonstrated a positive and statistically significant influence on cloud computing use (CCU) ($\beta = 0.316$, $p < 0.001$), suggesting that effective human resource management can improve cloud computing use. This means that focusing on the strategic and efficient management of people within organisations will enhance an organisation's performance while using cloud computing. Therefore, Hypothesis 1 was supported. Technological resources (TR) also showed a significant positive impact on cloud computing use (CCU) ($\beta = 0.353$, $p < 0.001$), emphasising the crucial role of technology in influencing cloud computing use. Significance is often correlated with depth of insight, innovation, and foundational impact in the field. Therefore, Hypothesis 2 was supported. Business resources were shown to influence cloud computing use positively and significantly ($\beta=0.251$, $p < 0.05$). The significance of resources can often be gauged by their foundational impact, widespread application, and contribution to advancing the field, providing evidence to support Hypothesis 3. Policy and regulation (PR) similarly showed a positive and significant relationship with cloud computing use (CCU) ($\beta = 0.184$, $p < 0.001$), indicating the influence of the regulatory environment on cloud computing usage. Their foundational impact on the field can often measure the importance of contributions, their influence on policymaking processes, and their application in various domains. Therefore, Hypothesis 5 was supported. The results also show that leadership positively influences the use of cloud computing use ($\beta=0{,}193$, $p<0.001$). Influential leaders provide a clear strategic vision for how cloud computing can support the organisation's goals. This means that Hypothesis 6 was supported. However, change management (CM) had no significant impact on cloud computing use (CCU) (($\beta=0{,}041$, $p>0.05$). Focusing on methods and techniques to manage change in a structured and effective manner does not affect cloud computing use. This could mean that people resist change in the public sector or need more research in that industry. Therefore, Hypothesis 4 was not supported.

Among performance outcomes, operational performance (OP) and customer performance (CP) were positively and significantly influenced by cloud computing use (CCU) (OP: $\beta = 0.269$, $p<0.001$; CP: $\beta = 0.340$, $p <0 .001$). Organisations seeking to improve operational performance often use cloud computing for its scalability and flexibility, and high customer expectations for constant access to services and products pressure organisations to ensure their systems are highly available and reliable. This means that Hypotheses 7 and 8 were supported. However, the use of cloud computing did not significantly impact financial performance (FP). Organisations may prioritise strategic goals, such as digital transformation, innovation, or market expansion, over immediate financial performance gains, implying that Hypothesis 9 was not supported. Furthermore, the results reveal that there is a significant positive relationship between financial performance and operational performance ($\beta=0.268$, $p<0.001$) and between financial performance and customer performance ($\beta=0.460$, $p<0.001$), providing evidence to support Hypotheses 10a and 10b.

In-depth discussions and interpretations will be conducted in the subsequent chapter. The path diagram of the final projected model is shown in Figure 13

4.12 Chapter summary

This chapter provided results concerning the use of cloud computing and its influence on organisational performance(non-financial and financial). The discussion commenced with an exploration of the characteristics of the sample, which revealed the demographic composition of the sample. Following this, an assessment of the reliability and validity of the measurement models was conducted, employing Cronbach's alpha for reliability, exploratory factor analysis to uncover underlying structures of variables, and confirmatory factor analysis to validate the measurement model. Subsequently, hypotheses were tested using structural equation modelling. The results indicated that technological resources, human resources, business resources, leadership, and policy and regulations significantly determine the usage of cloud computing; however, change management did not. Furthermore, the study revealed a positive influence of cloud computing usage on organisations' operational, customer, and financial performance. These results are discussed in the following chapter.

CHAPTER 5. DISCUSSION OF THE RESULTS OR FINDINGS

5.1 Introduction

The purpose of the chapter was to understand factors that influence the adoption of cloud computing within the public sector and examine the effects of such use on the balanced set of organisational performance (non-financial and financial). More importantly, to address *(RO1), which is to examine the factors that influence the use of cloud computing in the public sector,* this study has identified and empirically assessed seven key factors (human resources, technology resources, business resources, policy and regulation, change management, cloud computing use, and leadership) contributing to the variance in cloud computing use. Additionally, in pursuit of (RO2) - *To examine how cloud computing use affects cloud computing on a balanced view of organisational performance (non-financial and financial) - the* effect of cloud computing usage on the organisational performance of public sector organisations was investigated. A model was developed that defines the success factors of cloud computing use and empirically validated to facilitate this analysis.

In executing the study, to understand the effect of cloud computing use on organisational performance, two models were extended: the integrated, comprehensive, and multidimensional expanded model provided by (Gangwar, 2017), which is grounded in the Technology-Organisation-Environment (TOE) framework (Tornatzky & Fleischer, 1990) and the Resource-Based View (RBV) theory. This extension included crucial variables such as leadership and policy and regulation, customer performance, operation performance, and financial performance, laying the foundation for the model's development. Data was collected from individual users working for public companies in South Africa. It allowed for an expanded conceptualisation of cloud computing, including its use and impact on financial and non-financial performance from users' perspectives through a detailed survey. The application of the TOE framework and RBV theory provided a robust theoretical foundation for this research. As highlighted by

(Tornatzky and Fleischer, 1990), the TOE framework offers a complete perspective on the external and internal factors that influence the organisational adoption of technological innovations.

Meanwhile, the RBV theory, articulated by (Barney, 1991), emphasizes the strategic management of internal resources to achieve and maintain a competitive advantage. The inclusion of leadership, policy, and regulation as variables in this study highlights the importance of strategic alignment and governance in leveraging technological innovations such as cloud computing to improve organisational performance. Additionally, this study hypothesized that these factors, as highlighted in TOE and RBV, would influence organisational performance from a balanced point of view. The Balanced Scorecard approach developed by (Kaplan and Norton, 1996) indicated a shift in perspective towards a more holistic interpretation of organisational performance, integrating financial and non-financial factors to present a broader and comprehensive viewpoint.

The results of the Analytical Moment Structures (AMOS) tests, as presented in Figure 13 and Table 20, revealed the importance of human resources, technological resources, business resources, policy and regulation, change management, and leadership as key factors influencing the use of cloud computing. The results also indicated that cloud computing improves customer, financial, and operational performance. The relationship between financial and non-financial performance was positive and significant. This chapter provides a detailed discussion of these results.

5.2 Factors that influence the use of cloud computing in the public sector

The results of Chapter 4 provided answers to the factors that influenced the use of cloud computing in the public sector. The influence of the Cloud Computing success factors is summarised as follows:

Table 24: Summary of results

Factors influencing cloud computing use	Cloud computing use
Human resources	Yes
Technology resources	Yes
Business resources	Yes
Change management	No
Policy and regulation	Yes
Leadership	Yes

The conceptual model (Figure 1) identifies seven factors that affect cloud computing usage and the subsequent impact of cloud computing use on organisational performance. These factors are essential to understand how cloud computing can improve organisational efficiency, effectiveness, and productivity. By extending the Gangwar (2017) model, the RBV model and the TOE framework have been widely adopted for studies in organisational contexts. Although a wide range of empirical and conceptual studies have justified the significant, dominant, and relevant role of the RBV model and TOE framework in explaining technology adoption at their levels, the models have individual limitations to encompass leadership policy and regulation, and the study contributes a dimension that acknowledges the unique context of the public sector. To develop an integrated model, this study includes the variables (significant and insignificant) of RBV and TOE identified from various studies based on these two models. For this, contrary to the findings of (Jeyaraj et al., 2006), the study argues that since the significance of variables varies with the context, such as technology, country of study, and size of companies (revenue, number of employees), no variable should be discarded just because it has consistently been found insignificant in a set of studies and contexts. The study's extended model provides a holistic view of the factors that influence the effective use of cloud computing, emphasising the importance of strategic leadership and a supportive policy environment in realising the benefits of cloud technologies for public service delivery and organisational performance (non-financial and financial).

Human resources was found to be one of the factors that influence the use of cloud computing. The research highlights the significant role of human resources, encompassing individuals' skills, knowledge, and capabilities within an organisation, particularly in effectively utilising cloud computing technologies. Results found that skilled and well-informed employees are essential for successfully using cloud technologies, with organisations prioritising staff training and readiness showing a higher propensity for leveraging these technologies optimally. The research centred on analysing employees' skills and understanding of cloud computing, testing their comprehension of such technologies, operational capacities, and preparation to integrate these systems into their everyday duties. Most respondents agreed with the critical need for a workforce proficient in cloud computing, highlighting the importance of continuous training and skill enhancement to ensure the efficient use of cloud technologies. The findings indicated that employees must be thoroughly trained and skilled to effectively use cloud computing, particularly in enhancing public sector services and efficiency. Moreover, the hypothesis (H1) that human resources positively influence the use of cloud computing has been empirically supported in this study. This was expected as previous studies (Morgan and Conboy,2013; Alshamaila, Papagiannidis, and Li, 2013); Manca et al.,2016; and Yoo, 2011)emphasised the necessity of skill, knowledge, and training for cloud computing use, especially within the public sector, thus highlighting the indispensable influence of human resources in the practical usage of cloud technologies. Therefore, the result is now supported in the context of cloud computing use in the South African public sector.

Technology resources were found to be one of the factors that influence the use of cloud computing. The research highlights the significant role of technology resources and the vital significance of technical resources in implementing cloud computing in organisations, citing these resources as a critical component for success. Results found that technology infrastructure, skilled staff, and advanced hardware and software are critical for a smooth transition to cloud services integration and use. The research centred on technological resources by looking at the availability and quality of technology infrastructure, the capacity for integration, technological innovation, and the security and reliability of these systems. Most respondents agreed and confirmed these resources' necessity for cloud computing, emphasising the importance of a robust technology setup and competent personnel for successful use. The findings indicated that mobile technologies and cloud computing allow public sector employees to access work-related resources and perform their duties from any location. This flexibility can improve work-life balance, accommodate different work styles, and ensure continuity of service in various situations, including emergencies. Moreover, the hypothesis (H2) that technology resources positively influence the use of cloud computing has been empirically supported in this study. This was expected as previous studies (Mell and Grance, 2011; Khajeh-Hosseini et al., 2010; Venters and Whitley, 2012; Janssen and van den Hoven, 2015) emphasised the importance of solid technological infrastructure and capabilities in using cloud computing to boost the efficiency and accessibility of public services. Therefore, the result is now supported in the context of cloud computing use in the South African public sector.

Business resources were found to be one of the factors that influence the use of cloud computing. The research highlights the significant role of business resources and the vital significance of involving the combination of financial, human, and strategic assets, which are essential for integrating and utilising cloud computing technologies within organisations, citing these resources as a critical factor for success. Results found that effective management of business resources, namely financial investments, human capital readiness, and strategic partnerships, plays an essential role in successfully using and operationalising cloud computing. The research centred on how organisations effectively manage these business resources, focusing on their availability and strategic utilisation for cloud computing initiatives. Most respondents agreed that these resources' critical role in cloud computing use aligns with the view that financial, human, and strategic resources are vital for effectively acquiring and leveraging cloud technologies. These resources include financial assets, human capital, physical assets, and informational technology resources essential for public sector organisations' daily operations and long-term strategic goals. The findings indicated that business resources in the public sector play a crucial role in enabling employees to perform their duties more efficiently and effectively. Moreover, the hypothesis (H3) that effective management of business resources is crucial for facilitating the use of cloud computing, which is vital for enhancing public service delivery. This was expected as previous studies (Bharadwaj, 2013;

Mell and Grance, 2011; Sultan, 2011; Marston et al., 2011; Armbrust et al., 2010) highlight business resources' strategic significance in the technological adoption process. The result is further supported by studies from (Low et al., 2011; Venters and Whitley, 2012; Khajeh-Hosseini et al., 2010), and Janssen and van den Hoven (2015), emphasising the need for effective financial planning, strategic partnerships, clear organisational policies, and supportive infrastructure in cloud computing initiatives Therefore, business resources significantly impact the use and effectiveness of cloud computing and was empirically validated in this study, in the South African public sector.

Change management refers to the systematic approach and application of knowledge, tools, and resources to deal with the change. It encompasses the methods that redirect or redefine the use of resources, business processes, budget allocations, or other modes of operation that significantly change a company or organisation (Kotter, 1996; Cameron and Green, 2019). This change management attribute was a factor that was not supported, and H4 was rejected. Thus, Despite prior expectations that effective change management would be vital to overcoming resistance to new technologies, most respondents disagreed, revealing significant barriers, including concerns over job security, unclear benefits of cloud computing, and general reluctance towards new practices and respondents highlighted a gap between the anticipated benefits of change management and its real-world efficacy. This result was not expected as previous studies (Burnes, 2004; Kotter,1996; Armenakis and Harris, 2009; and Aladwani, 2001) in the context of emphasise the need for a comprehensive change management strategy that considers organisational culture, procedural changes and the human aspect of technological transitions. However, prior research(Beer et al., 1990; Strebel, 1996; Goldstein et al.,2010) argues that the gaps between change management theory and practice and questioning the effectiveness of traditional change management models in complex real-world scenarios and has often minimal impact on top-down change programs, highlighting the challenges of implementing change in organisations without engaging employees or altering underlying corporate culture. Organisations must focus on applying change management more effectively rather than questioning its validity. This is important in ensuring cloud computing use. Understanding individual differences in resistance to change can help tailor change management strategies to diverse employee needs. (Oreg, 2006). The study also did not measure the effectiveness of existing change management strategies and the impact of inadequate change management on users. It might be observable that change management outputs lead to efficiency, but good change management outputs do not necessarily have opportunities for improvement. This is an opportunity for potential future work to explore.

A policy is a deliberate system of principles to guide decisions and achieve rational outcomes. Policies are statements of intent that are implemented as procedures or protocols. In organisations, policies set strategic directions and expectations, while in government, policies can dictate social, economic, and environmental objectives (Howlett et al., 2009; Baldwin et al., 2012). Regulation consists of rules or directives made and maintained by an authority to regulate behaviour. A government or governmental agency enacts a specific law to regulate, authorise, provide, sanction, grant, declare, or restrict. Policy and regulation were found to be essential factors in the public sector context and significantly influenced cloud computing use. Policy and regulation play critical roles in the use of cloud computing, influencing how cloud services are provided, used, and managed across different sectors and jurisdictions. The model tested supports the hypothesis that their foundational impact on the field can often measure the significance of contributions, their influence on policymaking processes, and their application across various domains (Figure 15). Including policy and regulation on the extended model was crucial in ensuring that the model included governance mechanisms ensuring data privacy, security, compliance with legal standards, and fostering trust between cloud service providers and users. Most previous impacts of regulatory and policy frameworks on cloud services focused on data protection, security, and compliance issues (Martens and Teuteberg, 2022; Millard et al., 2021; Kshetri, 2019). Including policy and regulation will ensure that users are more likely to use cloud computing if it supports the need for effective regulation to ensure market efficiency and protect public interests (Baldwin et al., 2012). Therefore, the H5 hypothesis was empirically supported by the model (Figure 15).

Leadership is the art and science of influencing and guiding individuals or groups towards achieving common goals or objectives. It involves setting a vision, inspiring and motivating others to work towards it, making strategic decisions, and fostering an environment that encourages innovation and collaboration (Northouse, 2021.; Eifetz et al., 2021). Effective Leadership is characterised by adapting to change, communicating effectively, and exhibiting emotional intelligence in managing relationships. Leadership was found to be an essential factor in the public sector context and significantly influenced cloud computing use. Leadership in cloud computing influences how cloud services are provided, used, and managed across different sectors and jurisdictions. The model tested supports the hypothesis, highlighting the critical role of Leadership in adopting and effectively using cloud computing within an organisation (Figure 15). Including Leadership in the extended model was crucial in ensuring that the model included effective Leadership that could drive the strategic vision, foster an innovative culture, manage change effectively, and ensure the alignment of cloud computing initiatives with organisational goals. This is in line with prior studies and was expected, which confirms the findings of research by (Bass,1990; Yukl, 2010 Herold et al.,2008; and Avolio et al.,2009), which all highlighted Leadership's transformative impact on embracing technological innovations. In contrast, research by (Pfeffer, 2015; Kellerman, 2012; Cain, 2012) argues that Leadership does not align with the reality of most organisational Leadership and that Leadership is a process that is inclusive and accessible to all individuals, regardless of position have however, produced mixed results. Results from the study suggest that Including Leadership will ensure that users are more likely to use cloud computing if They play a crucial role in making strategic decisions regarding cloud investments and steering the organisation towards realising the benefits of cloud technologies (Kane et al., 2021). Therefore, the H5 hypothesis was empirically supported by the model (Figure 15).

5.3 Impact of cloud computing use on organisational performance (financial and non-financial)

The results in Chapter 4 provide findings on the investigation of how cloud computing use affects organisational performance from a balanced view of organisational performance (financial and non-financial performance). Having established the critical factors of cloud computing use, the conceptual framework analysed how cloud computing impacted three organisational performance outcomes: customer performance, operational performance, and financial performance.

Customer performance was found to be one of the factors that influence the use of cloud computing. The research highlights cloud computing's impact on customer performance, focusing on how well organisations meet customer needs, efficiency, data-driven decisions, and innovation. Results found that it significantly impacts cloud computing by influencing customer satisfaction, loyalty, and, ultimately, the financial performance of cloud service providers (CSPs). High customer performance in cloud computing means that the services meet or exceed customer expectations in reliability, security, usability, and customer support, which is essential in successfully using cloud computing. The research centred on how organisations are more likely to adopt and continue using cloud computing services that consistently meet or exceed their performance expectations. Customer performance indicators like uptime, speed, and customer support quality directly influence satisfaction and loyalty towards the cloud service provider, affecting long-term relationships and contracts. Most Respondents agreed on the crucial role of cloud computing in boosting customer engagement and satisfaction by enhancing operational processes and speeding up service delivery. Customer performance expectations influence organisations' desires for flexibility, scalability, and cost-efficiency in cloud computing services. The findings show the strategic goal of using cloud computing to foster a relationship that boosts customer performance, pushing public sector organisations toward greater efficiency, innovation, and customer satisfaction. Moreover, the hypothesis (H7) is that effective management of business resources is crucial for facilitating the use of cloud computing, which is vital for enhancing public service delivery. This was expected as previous studies (Sultan, 2011; Armbrust et al., 2010; Marston et al., 2011) highlight the advantages of cloud computing, such as enhanced data analysis, scalability, and personalised service provision, which are crucial for modern customer demands. The result is further supported by studies from (Low et al., 2011 Venters and Whitley, 2012), emphasising the importance of customer performance, such as reliability and support, in the decision-making process for adopting cloud computing solutions. Therefore, customer performance significantly impacts the use and effectiveness of cloud computing, and this study was empirically validated in the South African public sector.

Operational performance was found to be one of the factors that influence the use of cloud computing. The research highlights that cloud computing operational performance significantly impacts the adoption and effectiveness of cloud computing within organisations. Enhanced operational performance through cloud computing can improve efficiency, agility, cost savings, and innovation capabilities when cloud services enable organisations to optimise their operational efficiency by offering scalable resources that can be quickly adjusted to meet fluctuating demands. This flexibility reduces the need for upfront investments in IT infrastructure and allows for more efficient resource utilisation. Results found that operational performance is typically gauged through various indicators such as productivity, cost efficiency, quality of service or products, flexibility, and responsiveness to market changes. Improvements in operational performance can lead to enhanced customer satisfaction, reduced operational costs, and increased profitability. The study looked at how companies are more likely to use and keep using cloud computing services if these services always meet or do better than what the companies expect in terms of performance. Most Respondents agreed on the crucial role of cloud computing in streamlining operations, leading to strategic and economic advantages, with many noting significant improvements in cost savings, service capabilities, and innovation. The findings show that organisations seeking to improve operational performance often use cloud computing for its scalability and flexibility, and high customer expectations for constant access to services and products pressure organisations to ensure their systems are highly available and reliable. Moreover, the hypothesis (H8) is that enhancing operational performance through various indicators can lead to significant benefits for organisations, including increased efficiency, competitiveness, and the ability to respond effectively to market demands. This was expected as previous studies (Mell and Grance, 2011; Venters and Whitley, 2012; Kankanhalli, Tan, and Sia, 2015; Berman et al., 2012) highlight confirm the positive effects of cloud computing on operational and organisational performance in general. The result is further supported by studies from (Mell and Grance, 2011), emphasising the importance of operational performance, setting the stage for understanding its impact on organisational operations. Therefore, operational performance significantly impacts the use and effectiveness of cloud computing, and this study was empirically validated in the South African public sector.

Financial performance was found to be one of the factors that did not influence the use of cloud computing. The research highlights that organisations with strong financial performance are more capable of investing in cloud technologies, which can lead to further cost savings, operational efficiencies, and innovation. The study measured financial performance regarding cost-effectiveness, ROI, and contribution to revenue growth. The extended model hypothesised that cloud computing use directly influences financial performance. Most respondents provided mixed views and did not agree on the financial advantages of cloud computing usage, with some recognising potential savings and efficiencies. In contrast, others struggled to quantify these benefits or fully leverage them financially. However, despite expectations grounded in existing literature suggesting that cloud computing use leads to financial benefits through operational efficiencies and cost reductions, the findings did not show a significant correlation between cloud computing and financial performance in the public sector. Findings that suggest cloud computing utilisation might proceed independently of an organisation's immediate financial performance, focusing instead on long-term strategic benefits, overcoming financial constraints through cost-effective solutions, or leveraging cloud computing to catalyse financial recovery and transformation(Benlian et al., 2011; Hoberget al.,2012). This means that this study did not support the hypothesis that the use of cloud computing positively influences financial performance. The result deviated from the expectations of this study and previous studies (Mell and Grance, 2011; Marston et al., 2011; Armbrust et al., 2010; Gupta et al., 2013; Sultan, 2011; and Low et al., 2011), which highlighted the financial benefits of cloud computing. While previous literature, including the Balanced Scorecard approach and studies by Devaraj and Kohli (2003), supported the link between technological investments and performance improvements, this study highlights a potential gap in realising financial benefits from cloud computing use in the public sector. The findings prompt further investigation into how cloud computing affects financial performance within public sector organisations' unique operational and regulatory frameworks, suggesting that the value of cloud computing use may also lie in intangible benefits that foster long-term organisational success.

The study analysed the relationship between an organisation's financial and non-financial performance. Results supported the hypothesis that financial performance positively correlates with operational and customer performance within public sector organisations. Most respondents agreed on the financial and non-financial advantages of cloud computing usage, recognising potential savings and efficiencies. This suggests that increased cloud computing usage would enhance operational and customer performance, positively affecting the organisation's financial performance. Therefore, hypotheses 10a and 10b were supported, aligning with the study's expectations and resonating with previous research findings. Prior literature, including foundational frameworks like the Balanced Scorecard (Kaplan and Norton,1992) and studies by (Devaraj and Kohli, 2003; Mell and Grance, 2011); Low et al., 2011), and Gupta et al., 2013), supports the notion that technological investments, such as cloud computing, foster improvements across both financial and non-financial domains. Cloud computing technologies have been shown to improve service delivery times—a key non-financial performance indicator—with subsequent financial benefits. The flexibility and scalability presented by cloud computing are also in harmony with non-financial indicators such as customer and operational efficiency, which contribute to revenue growth and positively affect financial performance. These findings show the comprehensive impact of cloud technologies on organisational performance, suggesting that the actual value of cloud adoption lies in tangible financial returns and intangible benefits that promote long-term success.

Therefore, an organisation's financial and non-financial performance significantly impacts the use and effectiveness of cloud computing and was empirically validated in this study in the South African public sector.

5.4 Chapter summary

The analysis of cloud computing within organisations has identified five key factors (human resources, technology resources, business resources, policy, regulation, and leadership) that play a significant role in its use. Change management was found to be insignificant. A greater understanding of these factors is essential to realise the potential benefits of cloud computing in increasing efficiency, effectiveness, and productivity within organisations. Based on (Gangwar, 2017), the study introduces leadership, policy, and regulation considerations, offering a comprehensive view that is particularly relevant to the public sector. This approach points out the importance of strategic leadership and supportive policy environments in maximising the use of cloud technologies for public service enhancement.

The research highlights the crucial role of human resources in cloud computing, emphasising the importance of training and skill development alongside effective management of technological changes. This aligns with broader academic findings on the pivotal role of human resources in managing organisational and technological transitions, thereby maintaining a competitive edge in today's digital landscape. The need to have a solid IT infrastructure and skilled staff for the successful deployment and use of cloud computing is also stressed, reflecting broader discussions on the need for technological readiness and strategic planning in public sector service and efficiency improvements.

In addition, the study points out the importance of business resources, such as financial investments and strategic management of human and intellectual capital, in the effective use of cloud technology. This is consistent with the literature that underlines the importance of strategically managing business resources to fully exploit advanced cloud services and ensure robust data security and analytics capabilities.

However, examining change management within South African public sector organisations reveals a complex scenario. Despite expectations, the impact of change management on cloud computing use was found to be less significant, indicating the need for more sector-specific strategies.

The role of policy and regulation is confirmed to be critical in overcoming cloud computing use barriers, especially those related to data privacy, security, and compliance. This finding aligns with academic discussions on the strategic importance of supportive regulatory frameworks for the use of technology.

Leadership is identified as a key driver, with the study highlighting the need for visionary leadership to navigate challenges and integrate cloud initiatives with organisational performance. This mirrors the literature on the significant impact of effective leadership in fostering innovation and encouraging the use of cloud computing.

This investigation reveals the positive effects of cloud computing on various performance metrics within organisations, including customer service, operations, and financial results. Although direct financial benefits in the public sector were not conclusively proven, the study suggests a complex relationship between cloud computing use and non-financial performance improvements, hinting at a broader impact on financial results.

In summary, this comprehensive analysis demonstrates the complex impact of cloud computing on organisational performance, particularly in the public sector. It highlights the critical role of a coordinated approach to resource management, visionary leadership, and supportive policies in the use of cloud technologies to improve public service delivery and organisational efficiency.

The following chapter concludes the study.

.

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS

6.1 Introduction

The previous chapters of this document, specifically Chapters 3, 4, and 5, examined how cloud computing is used, considering organisational performance(non-financial and financial) perspectives. This chapter integrates the results of these studies, providing a comprehensive overview of the research findings. It began with the principal conclusions drawn from the research before outlining the contributions of the research across theoretical, contextual, methodological, and practical dimensions. Furthermore, this chapter critically evaluates the limitations of the research while identifying potential directions for future research.

The conclusion of the thesis provides an extensive analysis designed to clarify the technological, environmental, and organisational factors that affect the successful use of cloud computing technologies within public sector organisations in South Africa. As expanded in Chapter 5, the research findings offer deep insights into the complex interplay of factors that facilitate or hinder the use of cloud computing solutions. However, it is essential to acknowledge that this study is subject to limitations. These limitations narrow the scope of the study's conclusions and create opportunities for further research. Such constraints highlight the complex nature of cloud computing use and stress the need for continued empirical research to expand the understanding of this significant technological trend.

In summary, this chapter not only synthesizes the findings of the thesis but also underlines its significant contributions to the field, recognises its limitations, and proposes pathways for future research. Thus, it provides a comprehensive overview of the investigation into the influence of cloud computing use in improving organisational performance in the public sector.

6.2 Summary of the study

In **Chapter 1**, the study introduced research problems and the study's motivation. The study investigated two research problems. *The first problem of the study is to investigate the factors influencing the use of cloud computing by organisations in the public sector.* The adoption of cloud computing in the public sector is impeded by concerns over technological capabilities, specifically regarding data security and privacy risks associated with third-party server management, highlighted by (Pearson and Benameur, 2011). The complexity of data jurisdiction across multiple legal entities further complicates compliance with local and global regulations, as noted by (Kshetri,2013) and (Millard, 2013), deterring organisations from implementing cloud solutions. Previous research, including studies by (Gangwar et al., 2015; Marston et al., 2011; Oliveira et al., 2014; Enlianet al., 2009; Venters and Whitley,2012; and Rajabi et al.,2013), has primarily focused on financial impacts, often overlooking non-financial performance. Furthermore, the rapid technological evolution outpaces policy and regulatory frameworks, leading to significant compliance challenges in deploying cloud computing solutions (Kshetri, 2013; Millard, 2013). The transnational storage of cloud data introduces legal uncertainties and compliance risks, potentially increasing costs and legal hurdles, thereby hindering cloud computing among organisations.

The second problem to be investigated is the impact of cloud computing use on a balanced view of organisational performance (financial and non-financial). Despite previous studies, such as those by (Etro, 2009; Zhang, Cheng, and Boutaba,2010; Benlian and Hess, 2011; Li and Wu , 2015; Cegielski et al., 2012; Armbrust et al.,2010), focusing on the financial benefits of cloud usage, there is a noted gap in examining non-financial performance impacts. The Balanced Scorecard (BSC), introduced by (Kaplan and Norton,1992, 2001), is a comprehensive framework integrating financial and non-financial metrics to offer an in-depth assessment of organisational performance. (Ittner and Larcker, 2003) advocate incorporating non-financial indicators into performance evaluations and point out the Balanced Scorecard's role in aligning business activities with strategic objectives. (Nrreklit,2000; Hoque, 2014) contribute to the discourse by emphasising a balanced approach to performance assessment and identifying research opportunities within the BSC framework.

This study explores cloud computing's potential to enhance not only financial but also customer and operational performance, as indicated by (Sultan and Sultan, 2012; Lin and Chen,2012; Aljabre, 2012), who highlight the technology's impact on customer satisfaction and service quality. The objective is to provide an understanding of the drivers and challenges of cloud computing, offering insights for organisations contemplating this technological shift (Armbrust et al., 2010; Low, Chen, and Wu, 2011; Gupta, Seetharaman, and Raj, 2013). By examining the balanced effects of cloud computing on organisational performance, this study aims to inform and guide organisations in their decision-making regarding adopting cloud technology, considering its advantages and potential drawbacks.

In **Chapter 2**, through the literature review, Chapter 1 established the foundation for this study by introducing cloud computing and the problems associated with its adoption and usage. The subsequent chapter expanded on this groundwork through a meticulous literature review, beginning with the methodology of the review process and offering a detailed definition and exploration of cloud computing. This examination included its evolution, key characteristics, and benefits while highlighting existing research gaps regarding its use and impact. The literature review critically assessed the potential effects of cloud computing on both financial and non-financial dimensions of organisational performance, aiming for a balanced analysis.

Utilising diverse sources such as Google Scholar, Science Direct, ResearchGate, and Emerald, the review process involved searching for topics related to cloud computing's usage, impact, security, and performance alongside models like the Technology, Organisation, and Environment (TOE) and the Resource-Based View (RBV). This comprehensive search aimed to gather a holistic understanding of how cloud computing influences organisational performance, sifting through various academic databases to pinpoint relevant literature that builds upon the initial cloud computing context provided.

This chapter argues for adopting cloud computing based on its pros and cons and meticulously selects research papers that directly contribute to the discourse on its organisational implications. By scrutinising multiple peer-reviewed journal articles focused on cloud computing's impact on organisational performance, the review adopted a thorough approach to categorise the collected literature into subtopics such as cloud computing use, its advantages and disadvantages, its impact on organisational performance, and frameworks for technology adoption.

Chapter 3 focused on meticulously detailing the methodologies employed to test the research models and achieve the objectives outlined in Chapters 1 and 2, focusing on the impact of cloud computing on organisational performance through financial and non-financial lenses. It outlines the research approach, including survey strategies, data collection methods, ethical considerations, research instruments, and analysis techniques, while also addressing reliability, validity, limitations, and threats. Employing a conceptual framework, the study delves into the factors driving cloud computing usage by organisations and the public, articulating the data-gathering methods, analysis, tools, and sampling techniques used, all within ethical research standards.

Adopting a positivist philosophical tradition, the research assumes that objective reality can be described through causal relationships and quantified data, as advocated by (Cohen et al., 2007; Evans,2010). This positivist stance underpins the deductive reasoning approach, where theories and hypotheses are empirically tested against observed phenomena to infer causality, aligning with the perspectives of (Bryman and Bell, 2015; Saunders et al., 2009). The study emphasises the complementary nature of qualitative and quantitative methods, as noted by (Creswell, 2013; Ponterotto, 2005), ultimately choosing a quantitative approach to facilitate statistical analysis of collected data towards generalising findings, as described by (Collis and Hussey, 2014).

The research aims to explore the innovative use of cloud computing on organisational performance and the effects of its utilisation from a balanced perspective of financial and non-financial performance. Termed "explanatory research" by (Saunders et al.,2009), it seeks to elucidate causal relationships between variables, employing exploratory research for initial insights into innovative cloud computing usage before proceeding with a deductive, quantitative, and explanatory methodology. This comprehensive approach ensures a robust examination of cloud computing's influence on organisational performance, setting the stage for a detailed data collection and analysis investigation in subsequent sections.

Chapter 4 accurately analyses data collected from the specified demographic, focusing on the utilisation and impact of cloud computing on organisational performance, adhering to the methodology outlined in Chapter 3. Data was pivotal to this analysis was gathered through an online electronic questionnaire composed of close-ended questions designed to capture detailed insights into the operational and strategic effects of cloud computing within organisations.

The setting for data collection is thoroughly described to provide a contextual backdrop for the study's findings, emphasising the examination of how various organisational structures and technological infrastructures impact the adoption and usage of cloud computing solutions. The research primarily targeted organisations incorporating cloud computing into their operational framework to evaluate this technological adoption's immediate and extended impacts.

Further sections of the chapter offer a critical evaluation of the collected data, establishing parallels and contrasts with the literature on cloud computing and organisational performance as previously reviewed. This comparative analysis highlights the unique contributions of the study while pinpointing gaps in the current understanding. Discussions within the chapter revolve around key themes such as enhancements in efficiency, cost reductions, improvements in data accessibility, and the effects of cloud computing on organisational decision-making processes.

In conclusion, the chapter systematically addresses the research questions posed at the outset, providing a nuanced understanding of cloud computing's transformative role in contemporary organisational performance. Through this thorough investigation, the chapter makes a sizable contribution to the expanding amount of knowledge regarding the influence of cloud computing on the dynamics of organisational operations.

Chapter 5 presents the research results that were analysed in Chapter 4. The preceding chapter meticulously presents the research outcomes, centring on evaluating hypotheses about adopting cloud computing within South African public sector organisations. Utilising a structural equation model, the study aimed to discern the pivotal technological, environmental, and organisational factors that influence the integration of cloud computing technologies. The analysis and discussion of these findings were thoroughly aligned with the literature review conducted in Chapter 2, ensuring a comprehensive understanding of each tested hypothesis and its implications.

A significant revelation of this investigation was identifying human resources as a critical determinant in adopting cloud computing, highlighting the necessity of skills and competencies in leveraging cloud technology. Additionally, technological resources were recognised for their importance, corroborating the Resource-Based View (RBV) that suggests an increase in cloud computing adoption as organisations employ advanced technological infrastructures.

Furthermore, the role of organisational policies and regulations, both internal and external, was emphasised as crucial in navigating the use process of cloud technologies within the public sector. This aspect underlined the intricate relationship between organisational strategies and the broader regulatory environment in effectively implementing cloud computing solutions.

The chapter also explored the effects of cloud computing on organisational performance, indicating a positive impact on both financial and operational dimensions. This observation supported the anticipated positive correlation between cloud computing utilisation and improved financial outcomes, attributing cost savings, innovation, and operational efficiency as key contributors.

6.3 Contributions of the study

This thesis examined the influence of cloud computing on the use of cloud computing in public sector analysis. This has enabled the thesis to make several theoretical, contextual, methodological, and practical contributions.

6.3.1 *Theoretical contributions*

The research notably advances the theoretical landscape of cloud computing's impact on organisational performance by elaborating and extending the (Gangwar,2017) model, improving it with leadership, policy, and regulation factors. This development addresses a critical gap in understanding the comprehensive effects of cloud computing use in the public sector, particularly within South Africa. By integrating leadership as a fundamental driver of financial and non-financial organisational performance, the study aligns with the leadership theories of (Kotter, 1990) and (Bass and Avolio,1994), emphasising the transformative role of effective leadership in technological usage and its subsequent impact on organisational performance.

Adding policy and regulation frameworks as pivotal factors in cloud computing use within public sector organisations further extends the model's applicability and relevance. This aspect of the research draws upon the regulatory and supportive frameworks discussed by (Berman et al., 2012) and (Gangwar et al., 2015), highlighting the critical role of favourable policies and regulatory environments in facilitating cloud computing adoption and mitigating associated risks.

Furthermore, the study's exploration of human and technological resources, change management, and strategic alignment of business resources with cloud computing usage provides an understanding of the complex nature of cloud computing. The emphasis on the strategic adaptation of financial investments, human capital readiness, and partnerships for operationalising cloud technologies within the public sector is particularly noteworthy. This approach is grounded in the resource-based views of (Bharadwaj,2013) and (Sultan, 2011), which emphasise the importance of aligning organisational resources with technological initiatives to maximise benefits.

The research also examines change management within South African public sector organisations, advocating for strategies to overcome resistance and enhance cloud adoption processes. This contribution was vital for understanding the complexities of managing technological changes and aligns with industry-specific insights, offering a clearer perspective on the role of change management in the evolution of cloud computing within public organisations; however, the study found that change management was insignificant and will require further investigation in the Public sector. The study bridges internal operational improvements with external-facing outcomes by comprehensively analysing the impact of cloud computing use on operational and customer performance. It draws upon established research by (Mell and Grance,2011) and (Venters and Whitley, 2012) to demonstrate the strategic advantages of cloud technologies in enhancing operational efficiency and service delivery. In prior research, non-financial factors such as Customer, Operational and Financial performance were ignored, as the primary focus was on financial performance.

Theoretical contributions were made. First, using the RBV approach, the study confirms that cloud computing affects various financial and non-financial performance measures. The non-financial and financial performance constructs in a cloud computing environment have not been sufficiently explored. Cloud computing use was found to improve both financial and non-financial performance directly. Furthermore, cloud computing significantly influenced some elements of non-financial performance, except for customer performance. Thus, this study was able to trace the impact of cloud computing use on performance directly and indirectly through effects in South Africa's public sector. Surprisingly, the formal and informal controls had no direct statistically significant influence on financial performance. Cloud computing use resulted in an improvement in financial performance. This is a new contribution, as previous studies measured non-financial performance as a single item instead of expanding it to include customer, operational and financial performance. The testing of the model thus contributes to developing a theory that explains the mechanisms through which cloud computing influences organisational performance and extends our understanding of the organisational conditions under which cloud computing usage is most important to performance.

In summary, this research significantly contributes to the theoretical understanding of the impact of cloud computing on organisational performance(non-financial and financial) by extending the (Gangwar,2017) model to include leadership, policy, and regulation. It offers a holistic view of the factors influencing cloud computing adoption and utilisation in the public sector, providing actionable insights and recommendations for policymakers, organisational leaders, and practitioners. This comprehensive approach advances theoretical knowledge and guides effective cloud computing strategies to enhance efficiency, effectiveness, and service delivery within public sector organisations.

6.3.2 *Contextual contribution*

This study emphasizes the pivotal role of human resources in leveraging cloud computing within the public sector, stressing the need for skilled personnel equipped with continuous training and development. This perspective is based on the research of (Morgan and Conboy, 2013; Alshamaila, Papagiannidis, and Li, 2013), who highlight the indispensable nature of human capital readiness for the successful adoption and utilisation of cloud technologies. These insights resonate with the understanding that operational efficiency and enhanced service delivery are directly linked to the workforce's competency and readiness.

Complementing the human capital aspect, this research accentuates the critical importance of technological resources. Foundational studies by (Mell and Grance, 2011; Venters and Whitley, 2012) assert the essential need for robust IT infrastructure and skilled technical staff, particularly within the public sector, where technological advancements aim to elevate service delivery.

In addition, the study extends its discourse to the strategic management of business resources, integrating financial, human, and intellectual capital. Drawing from insights (Bharadwaj, 2013); Marston et al., 2011), posits that strategic planning and partnerships are instrumental in harnessing cloud technologies, enhancing an organisation's ability to achieve operational efficiency, and underlining the strategic significance of comprehensive resource management.

Contrary to traditional models, which place a significant weight on change management, this study reveals a minimal impact of change management on cloud computing use within the public sector. This finding challenges conventional frameworks, such as those proposed by (Kotter, 1996), advocating for sector-specific strategies tailored to the unique challenges of public sector organisations.

Furthermore, policy and regulation emerge as foundational elements, with studies by (Berman et al., 2012) supporting the necessity of clear, supportive frameworks to facilitate cloud computing adoption, especially in overcoming barriers related to data privacy, security, and compliance.

Leadership also plays a decisive role in this ecosystem, where effective leadership is a vital driver for the successful use of cloud computing. As highlighted (Bass, 1990; Yukl, 2010), the transformative influence of visionary leadership emphasizes the alignment of cloud initiatives with organisational goals, fostering a culture of innovation and strategic decision making.

In the South African context, this research offers significant implications. By focusing on human resources, technology, strategic management of business resources, and supportive policies and regulations, South Africa can leverage cloud computing to improve public service delivery and operational efficiency. The insights provided by this study are particularly relevant for South Africa's efforts to improve public sector performance, addressing both unique challenges and opportunities within its evolving technological landscape.

The comprehensive approach of the study, which integrates the TOE framework and RBV theory with leadership, policy and regulatory considerations, presents a strategic blueprint to navigate the multifaceted factors that influence the use of cloud computing and its impact on organisational performance (non-financial and financial) in South Africa. By advocating for coordinated management of resources, implementation of supportive policies, and fostering visionary leadership, the report emphasises the strategic relevance of cloud computing in improving public service delivery, operational and financial efficiency, and overall organisational performance in the South African public sector. This aligns with recent studies such as those by (Smith and Ndlovu, 2020; Johnson et al., 2021), which further explore the nuances of cloud computing adoption in emerging economies, highlighting the need for context-specific strategies that reflect the unique socioeconomic and regulatory landscapes of countries like South Africa.

In South Africa, the public sector's use of cloud computing promises substantial enhancements in service efficiency, accessibility, and innovation. By adopting cloud solutions, government operations can transition from capital to operational expenditure, allowing streamlined processes, reduced infrastructure costs, and reallocating savings to boost public services (Morgan, 2014; Mell & Grance, 2011). This technological shift not only makes government services more responsive and accessible around the clock, but also bridges the service delivery divide between rural and urban communities, aligning with the nation's digital transformation goals (United Nations E-Government Survey, 2020). Furthermore, the robust data storage and analytics capabilities of cloud computing equip agencies with the tools to analyze big data for informed policymaking and service improvements (Hashem et al., 2015). The adoption of cloud services also introduces advanced security measures and compliance standards essential to protect citizen data and adhere to regulations such as the Protection of Personal Information Act (POPIA), addressing critical data sovereignty concerns (Popovi et al., 2018; South Africa's Protection of Personal Information Act, 2013).

Furthermore, cloud computing facilitates the integration of emerging technologies such as AI, IoT, and blockchain, streamlining processes, and improving public engagement (European Commission, 2019). The pandemic highlighted the potential of cloud computing to assist distant work and sustain government operations during disasters (CISCO, 2020). Despite these benefits, successful cloud implementation in South Africa's public sector requires overcoming infrastructure, connectivity, and digital literacy challenges, ensuring that strategies are aligned with national development objectives.

6.3.3 *Pratical contributions*

This study makes several critical practical contributions to understanding and utilising cloud computing within the public sector, offering actionable insights for organisations, policymakers, and IT managers. Research highlights ways to enhance operational efficiency, strategic decision making, and service delivery in public sector entities by analysing the complexities of cloud computing and its impact on organisational performance(non-financial and financial).

Strategic implementation and risk mitigation are vital practical contributions of this research, which is developing a strategic framework for cloud computing use. The study identifies essential factors that influence cloud adoption, including leadership, policy and regulation, technology, business and human resources, and change management. This framework serves as a blueprint for public sector organisations to navigate the complexities of cloud adoption, highlighting the need for a comprehensive risk assessment and mitigation strategy. The discussion on managing data jurisdiction and ensuring compliance with both local and global regulations is particularly pertinent, as highlighted by recent studies, which underline the importance of trust and organisational culture in adopting cloud governance (Alhashmi et al., 2020).

Balanced Performance Evaluation Using the BSC Framework Employed the Balanced Scorecard (BSC) framework, this study advances the evaluation of cloud computing's usage impact, advocating for a balanced assessment encompassing financial and non-financial metrics. This approach enables public sector organisations to align cloud computing initiatives with broader strategic objectives, ensuring that technological investments translate into meaningful improvements across various performance dimensions. Recent literature supports the integration of non-financial indicators into performance evaluations, suggesting that such a holistic view is crucial for capturing the comprehensive benefits of cloud computing (Khan et al., 2019).

Building Organisational Capabilities emphasises the critical role of human resources and technological infrastructure in successfully using cloud computing. Practical guidance is provided to public sector organisations to focus on skill development and enhancement of IT infrastructure, ensuring readiness to adopt and effectively use cloud technologies. This focus is corroborated by contemporary studies that stress developing competencies and technological proficiencies to fully leverage cloud computing (Alhashmi et al., 2020).

Guidance on Policy and Regulatory Frameworks is a significant practical contribution of this study, providing information to develop supportive organisational policies and regulatory frameworks. By highlighting the importance of policy alignment and regulatory compliance in facilitating cloud usage, the research offers valuable recommendations for policymakers and public administrators. This guide is essential for crafting cloud-friendly policies that address security, privacy, and compliance concerns, enabling a smoother transition to and with the use of cloud-based services.

Enhancing Decision-Making Processes is how cloud computing can transform decision-making processes within public sector organisations and presents practical implications for enhancing strategic and operational decision-making. By improving data accessibility and fostering innovation, cloud computing supports more informed decision-making, aligning with recent findings that emphasize the technology's role in facilitating agile and strategic decisions (Khan et al., 2019).

This research also provided a comprehensive guide for public sector organisations looking to optimise the usage of cloud computing, emphasising strategic planning, capability building, policy development, and performance evaluation. These practical contributions, supported by recent literature, highlight the transformative potential of cloud computing in the public sector, paving the way for improved efficiency, innovation, and service delivery.

6.4 Limitations and recommendations for future research

6.4.1 Limitations

The study offers significant information on the factors that influence cloud computing use in the public sector. However, it is marked by certain limitations that highlight areas that are ready for further scholarly exploration. A primary limitation is the exclusion of direct measurements of user satisfaction and experience with cloud computing services. This omission signifies a potential gap in fully understanding the end-user's perspective, which is vital for gauging the practical effectiveness and receptivity of cloud computing within public sector frameworks. The scope of the study, which focuses predominantly on organisational and technological factors, may not include the influences affecting the impact of cloud computing. Expanding the investigative lens to include user feedback mechanisms and their role in technology utilisation could offer a more rounded understanding of the implications of cloud computing.

Moreover, the study findings, derived primarily from the context of South African public sector organisations, present concerns regarding their generalizability across different regions or sectors. The unique socioeconomic and regulatory landscapes of South Africa may not mirror those of other regions, suggesting a need for caution when extrapolating these results universally.

Addressing these limitations, future research directions, informed by the literature, should encompass the integration of user satisfaction and experience studies. (Venkatesh et al., 2003; DeLone and McLean, 2003) have highlighted the critical nature of user feedback in the successful use and operational success of technological innovations. By incorporating metrics that capture user satisfaction and experience, future studies can enrich our comprehension of cloud computing's efficacy from the user's standpoint.

Furthermore, broadening the range of examined factors to include elements such as the influence of cloud computing on collaborative work practices, its role in fostering innovation, and its contributions to long-term strategic goals could provide a more comprehensive perspective on cloud computing's multifaceted impacts (Kaplan and Norton, 1992; Bharadwaj et al., 2013). Engaging in comparative and cross-sectional studies across various geographical regions and sectors could address the limitation of the generalizability of the findings. As suggested by (Avgerou, 2008), such studies would elucidate the universal versus localised determinants of cloud computing use, offering valuable insights applicable across diverse contexts.

In addition, a detailed examination of security and compliance issues related to cloud computing is warranted. The evolving data protection and privacy landscape mandates a rigorous analysis of how organisations navigate these challenges within the cloud computing ecosystem, identifying best practices and areas requiring regulatory enhancements (Kankanhalli et al., 2015).

By navigating beyond the constraints of the initial study to embrace these comprehensive research avenues, future inquiries can shed light on the nuanced dynamics of adopting cloud computing in the public sector. This expanded research scope will undoubtedly contribute to a richer understanding of the strategic value of cloud computing, facilitating informed decision-making and policy development aimed at optimising technology utilisation for enhanced organisational performance and service delivery.

6.4.2 Future research

The recent examination of factors influencing cloud computing in the public sector has illuminated significant areas of impact, yet notably omitted a direct evaluation of user satisfaction and experience. This oversight highlights a critical avenue for enriched research. A future investigative trajectory should encompass an array of dimensions to deepen our comprehension and application of cloud computing within public entities, guided by existing literature and theoretical frameworks.

Taking into account user satisfaction and experience, future inquiries should aim to delineate the intricacies of public sector engagements with cloud computing services. Drawing on models such as the Technology Acceptance Model (TAM) and the DeLone and McLean Information Systems Success Model, research can systematically evaluate user interactions, satisfaction levels, and the spectrum of challenges encountered (DeLone & McLean, 2003; Davis, 1989). Such endeavours will provide a nuanced understanding of cloud computing's operational impact and its reception by end-users, addressing current knowledge gaps.

Moreover, a nuanced cost-benefit analysis warrants attention, extending beyond financial performance metrics to thoroughly examine cloud computing's total cost of ownership and its return on investment over varying timelines. This approach should leverage frameworks similar to the Balanced Scorecard (Kaplan & Norton, 1992) to assess both tangible and intangible benefits of cloud computing, enabling a comprehensive financial perspective that includes both short-term and long-term financial outcomes.

Comparative studies across different regions, especially considering the unique context of South African public sector organisations, could unveil universal and localised determinants of cloud computing use and its effectiveness. Such comparative research, supported by the diffusion theory of innovations (Rogers, 2003), could illuminate variances in adoption rates, challenges, and success factors across diverse geopolitical landscapes, contributing valuable insights into global best practices and region-specific strategies.

Investigating the impact of cloud computing on public service delivery is a significant research domain. Utilising service quality models such as SERVQUAL (Parasuraman, Zeithaml, and Berry, 1988), future studies can assess the alterations in service quality, accessibility, and efficiency engendered by cloud computing, thereby elucidating the technology's real-world implications on public service provision.

Security and privacy concerns remain paramount, necessitating in-depth exploration to gauge the efficacy of existing solutions and pinpoint areas necessitating enhancement. Drawing on cybersecurity frameworks and privacy theories, subsequent research can offer a rigorous evaluation of data protection measures, user privacy, and the overall security landscape within cloud computing environments.

Lastly, exploring leadership and change management's role in facilitating cloud computing use emerges as grounds for further study. Taking into account the mixed outcomes observed in current research, a deeper dive into the specific leadership styles, strategic initiatives, and change management practices that effectively support technological adoption is imperative. Qualitative methods such as case studies or interviews, informed by leadership theories (for example, transformational leadership theory; Bass, 1985) and change management models (for example, Kotter's 8-step process for leading change; Kotter, 1995), could provide profound insight into behaviours and strategies that enhance or hinder cloud technologies integration.

Future research efforts should adopt a holistic approach, integrating robust theoretical models and diverse methodologies to address these identified gaps. Such a comprehensive exploration will significantly advance our understanding of cloud computing's multifaceted impact on the public sector, paving the way for more practical implementations and strategies.

6.5 Conclusions

This study contributed to an extended cloud computing use model, which was tested using cross-sectional survey data collected from individuals and organisations in South Africa. Empirical results confirm that the use of cloud computing is vital to affect organisational performance in the public sector. The study also provides much needed evidence of the relationships addressed by the influence of cloud computing on a holistic perspective of organisational performance, encompassing operational, customer and financial aspects. The results confirm that cloud computing use in the functional areas of an organisation is associated with various financial and non-financial performance outcomes and has positive effects on performance. As a result, organisations are better positioned to justify investments into cloud computing systems and to improve how cloud systems are used over time to improve organisational performance.

REFERENCES

Abdi, H. (2010). Partial least squares regression and projection on latent structure regression (PLS Regression). Wiley Interdisciplinary Reviews: Computational Statistics,2, 97–106. https://doi.org/10.1002/wics.51

Adams, R., Adeleke, F., Anderson, D., Bawa, A., Branson, N., Christoffels, A., De Vries, J., Etheredge, H., Flack-Davison, E., Gaffley, M., Marks, M., Mdhluli, M., Mahomed, S., Molefe, M., Muthivhi, T., Ncube, C., Olckers, A., Papathanasopoulos, M., Pillay, J., … Ramsay, M. (2021). POPIA code of conduct for research. South African Journal of Science, 117(5–6). https://doi.org/10.17159/SAJS.2021/10933

Al Hadwer, A., Tavana, M., Gillis, D., and Rezania, D. (2021). A Systematic Review of Organisational Factors Impacting Cloud-based Technology Adoption Using Technology-Organisation-Environment Framework. In Internet of Things (Netherlands) (Vol. 15). Elsevier B.V. https://doi.org/10.1016/j.iot.2021.100407

Ali, O., & Osmanaj, V. (2020). The role of government regulations in adopting cloud computing: A case study of local government. Computer law & security review, 36, 105396. https://doi.org/10.1016/j.clsr.2020.105396

Ali, O., and Osmanaj, V. (2020). The role of government regulations in the adoption of cloud computing: A case study of local government. Computer Law and Security Review, 36, 105396. https://doi.org/10.1016/j.clsr.2020.105396

Ali, O., Shrestha, A., Osmanaj, V., & Muhammed, S. (2021). Cloud computing technology adoption: an evaluation of key factors in local governments. Information Technology & People, 34(2), 666-703. https://doi.org/10.1108/ITP-03-2019-0119

Almorsy, M., Grundy, J., and Ibrahim, A. S. (2011). Collaboration-based cloud computing security management framework. Proceedings - 2011 IEEE 4th International Conference on Cloud Computing, Cloud 2011, 364–371. https://doi.org/10.1109/CLOUD.2011.9

Amoako-Gyampah, K., and Salam, A. (2004). An extension of the technology acceptance model in an ERP environment. Information and Management, 41, 731–745. https://doi.org/10.1016/j.im.2003.08.010

Arce, D. G. (2020). Cybersecurity and platform competition in the cloud. Computers and Security, 93. https://doi.org/10.1016/j.cose.2020.101774

Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., Stoica, I., and Zaharia, M. (2010). A view of cloud computing. In Communications of the ACM (Vol. 53, Issue 4, pp. 50–58). https://doi.org/10.1145/1721654.1721672

Armstrong, M. (2014). A Handbook of Human Resource Management. Kogan Page Limited.

Arora, A., and Ceccagnoli, M. (2006). Patent Protection, Complementary Assets, and Firms' Incentives for Technology Licensing. Management Science, 52(2), 293–308. https://doi.org/10.1287/mnsc.1050.0437

Artino, A. R. (2012). Academic self-efficacy: from educational theory to instructional practice. Perspectives on Medical Education, 1(2), 76–85. https://doi.org/10.1007/s40037-012-0012-5

Aydiner, A. S., Tatoglu, E., Bayraktar, E., Zaim, S., and Delen, D. (2019). Business analytics and firm performance: The mediating role of business process performance. Journal of Business Research, 96, 228–237. https://doi.org/10.1016/j.jbusres.2018.11.028

Babbie, E. (2012). The Practice of Social Research (13th Edition).

Bainter, S. A., and Bollen, K. A. (2014). Interpretational Confounding or Confounded Interpretations of Causal Indicators? Measurement, 12(4), 125–140. https://doi.org/10.1080/15366367.2014.968503

Baker, J. (2012). The Technology–Organisation–Environment Framework (pp. 231–245). https://doi.org/10.1007/978-1-4419-6108-2_12

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. Journal of Management, 17(1), 99–120. https://doi.org/10.1177/014920639101700108

Barrett, P. (2007). Structural equation modelling: Adjudging model fit. Personality and Individual Differences, 42(5), 815–824. https://doi.org/10.1016/j.paid.2006.09.018

Bass, B. M., and Avolio, B. J. (1994). Improving organisational effectiveness through transformational leadership. Sage Publications.

Bass, B. M., and Riggio, R. E. (2006). Transformational Leadership. Psychology Press. https://doi.org/10.4324/9781410617095

Batt, R. (2002). Managing customer services: Human resource practices, quit rates, and sales growth. Academy of Management Journal, 45(3), 587–597. https://doi.org/10.2307/3069383

Becker, B., and Gerhart, B. (1996). The impact of human resource management on organisational performance: Progress and prospects. Academy of Management Journal, 39(4), 779–801. https://doi.org/10.2307/256712

Bell, M., and Pavitt, K. (1993). Technological Accumulation and Industrial Growth: Contrasts Between Developed and Developing Countries. Industrial and Corporate Change, 2, 157–210.

Benlian, A., Hess, T., and Buxmann, P. (2009). Drivers of SaaS-Adoption – An Empirical Study of Different Application Types. Business and Information Systems Engineering, 1(5), 357–369. https://doi.org/10.1007/s12599-009-0068-x

Bennis, W., and Thomas, R. (2002). Crucibles of Leadership. Harvard Business Review, 80, 39–45, 124.

Berman, S., Kesterson-Townes, L., Marshall, A., and Srivathsa, R. (2012). How cloud computing enables process and business model innovation. Strategy and Leadership, 40, 27–35. https://doi.org/10.1108/10878571211242920

Bharadwaj, A. S. (2000). A resource-based perspective on information technology capability and firm performance: An empirical investigation. MIS Quarterly: Management Information Systems, 24(1), 169–193. https://doi.org/10.2307/3250983

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., and Venkatraman, N. (2013). Digital business strategy: Toward a next generation of insights. MIS Quarterly: Management Information Systems, 37(2), 471–482. https://doi.org/10.25300/MISQ/2013/37:2.3

Boritz, J. E., Efendi, J., & Lim, J. H. (2018). The impact of senior management competencies on the voluntary adoption of an innovative technology. Journal of Information Systems, 32(2), 25-46. https://doi.org/10.2308/isys-51685

Bourne, M., Neely, A., Mills, J., and Platts, K. (2003). Implementing performance measurement systems: a literature review. International Journal of Business Performance Management, 5(1), 1–24. https://doi.org/10.1504/IJBPM.2003.002097

Boxall, P., and Purcell, J. (2000). Strategic human resource management: where have we come from and where should we be going? International Journal of Management Reviews, 2(2), 183–203. https://doi.org/10.1111/1468-2370.00037

Breaux, T. D., and Antón, A. I. (2008). Analyzing regulatory rules for privacy and security requirements. IEEE Transactions on Software Engineering, 34(1), 5–20. https://doi.org/10.1109/TSE.2007.70746

Bryman, A. (2016). Social research methods. Oxford University Press.

Bryman, A., and Bell, E. (2015). Business Research Methods. Oxford University Press.

Bughin, J., Chui, M., and Manyika, J. (2010). Clouds, big data, and smart assets: Ten tech-enabled business trends to watch. McKinsey Quarterly, 56, 75–86.

Burnes, B. (2004). Managing Change: A Strategic Approach to Organisational Dynamics (4th ed.). Prentice Hall, Pearson Education.

Buyya, R., Yeo, C. S., Venugopal, S., Broberg, J., and Brandic, I. (2009a). Cloud Computing and Emerging IT Platforms: Vision, Hype, and Reality for Delivering Computing as the 5th Utility. Future Generation Computer Systems, 25, 599–616. https://doi.org/10.1016/j.future.2008.12.001

Buyya, R., Yeo, C. S., Venugopal, S., Broberg, J., and Brandic, I. (2009b). Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the 5th utility. Future Generation Computer Systems, 25(6), 599–616. https://doi.org/https://doi.org/10.1016/j.future.2008.12.001

Byrne, B. M. (2013). Structural Equation Modelling With AMOS. Psychology Press. https://doi.org/10.4324/9781410600219

Caldwell, K. A., and Taylor, G. (2005). Developing a framework for critiquing health research. In Journal of Health, Social and Environmental Issues (Vol. 6, Issue 1). http://www.cybernurse.org.uk/research/Reading_and

Cameron, E., & Green, M. (2019). Making sense of change management: A complete guide to the models, tools and techniques of organisational change. Kogan Page Publishers.

Cameron, E., and Green, M. (2015). Making Sense of Change Management: A Complete Guide to the Models, Tools and Techniques of Organisational Change (4th ed.). Kogan Page Publishers.

Carcary, M., Doherty, E., Conway, G., and Mclaughlin, S. (2014). Cloud Computing Adoption Readiness and Benefit Realization in Irish SMEs—An Exploratory Study. Information Systems Management, In Press. https://doi.org/10.1080/10580530.2014.958028

Carroll, A. B., and Shabana, K. M. (2010). The business case for corporate social responsibility: A review of concepts, research, and practice. In International Journal of Management Reviews (Vol. 12, Issue 1, pp. 85–105). https://doi.org/10.1111/j.1468-2370.2009.00275.x

Carson, P. P. (1998). Book Review: Highflyers: Developing the Next Generation of Leaders Morgan W. McCall, Jr. Harvard Business School Press, 1998 254.

Journal of Leadership Studies, 5(1), 171–173. https://doi.org/10.1177/107179199800500119.

Cavusoglu, H., Mishra, B., and Raghunathan, S. (2005). The Value of Intrusion Detection Systems in Information Technology Security Architecture. Information Systems Research, 16(1), 28–46. https://doi.org/10.1287/isre.1050.0041

Chauhan, M. A., and Babar, M. A. (2012). Towards process support for migrating applications to cloud computing. Proceedings of the 2012 International Conference on Cloud Computing and Service Computing, CSC 2012, 80–87. https://doi.org/10.1109/CSC.2012.20

Chen, H.-R., and Tseng, H.-F. (2012). Factors that influence acceptance of web-based e-learning systems for the in-service education of junior high school teachers in Taiwan. Evaluation and Program Planning, 35(3), 398–406. https://doi.org/10.1016/j.evalprogplan.2011.11.007

Cheung, G., and Rensvold, R. (2002). Evaluating Goodness-of-Fit Indexes for Testing Measurement Invariance. Structural Equation Modelling, 9, 233–255. https://doi.org/10.1207/S15328007SEM0902_5

Choubey, R., Dubey, R., and Bhattacharjee, J. (2011). A Survey on Cloud Computing Security, Challenges and Threats.

Christopher Westland, J. (2010). Lower bounds on sample size in structural equation modelling. Electronic Commerce Research and Applications, 9(6), 476–487. https://doi.org/10.1016/j.elerap.2010.07.003

Clarke, R. V., and Varano, S. P. (2003). Thefts, Accidents, and Employee Morale: Evaluating the Benefits of Security Measures in the Workplace (McGill, Ed.). London: Perpetuity Press.

Cohen, L., Manion, Lawrence., and Morrison, Keith (2007). Research methods in education. Routledge.

Collis, J., and Hussey, R. (2014). Business research: A practical guide for undergraduate and postgraduate students.

Conger, J. A., and Benjamin, B. (1999). Building Leaders: How Corporations Are Developing the Next Generation. Jossey-Bass.

Creswell, J. W. (2013). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (4th ed.). SAGE Publications, Inc., London.

Day, D. V. (2001). Leadership development: a review in context.

Denzin, N. K., and Lincoln, Y. S. (2008). Collecting and Interpreting Qualitative Materials. Sage.

Dery, K., Sebastian, I. M., and van der Meulen, N. (2017). The Digital Workplace is Key to Digital Innovation. MIS Quarterly Executive, 16, 135–152.

Dhillon, G., and Backhouse, J. (2001). Current directions in IS security research: towards socio-organisational perspectives. Information Systems Journal, 11(2), 127–153. https://doi.org/10.1046/j.1365-2575.2001.00099.x

Dillman, A., Smyth, J. D., Leah Christian, M., and Díaz De Rada, V. (2016). Internet, Mail and Mixed-Mode Surveys: The Tailored Design Method by Don. https://doi.org/10.2307/41061275

Eccles, R., Ioannou, I., and Serafeim, G. (2014). The Impact of Corporate Sustainability on Organisational Processes and Performance. Management Science, 60, 2835–2857. https://doi.org/10.1287/mnsc.2014.1984

El Aguez, K., Hajji, N., & Barka, H. (2016). The Cloud Computing: the impact of regulation on adoption. International Journal of Computers, 1, 22-32. https://www.iaras.org/iaras/filedownloads/ijc/2016/006-0003.pdf

Etikan, I. (2016). Comparison of Convenience Sampling and Purposive Sampling. American Journal of Theoretical and Applied Statistics, 5(1), 1. https://doi.org/10.11648/j.ajtas.20160501.11

Evans, L. (2010). Partial Differential Equations (Vol. 19). American Mathematical Society. https://doi.org/10.1090/gsm/019

Fan, X., and Sivo, S. A. (2005). Sensitivity of fit indexes to misspecified structural or measurement model components: Rationale of two-index strategy revisited. In Structural Equation Modelling (Vol. 12, Issue 3, pp. 343–367). https://doi.org/10.1207/s15328007sem1203_1

Field, A. (2013). Discovering statistics using IBM SPSS statistics. sage.

Fischer, J., Dyball, R., and Gross, C. (2012). Human Behaviour and Sustainability Scientific diversity in risk mitigation View project A network model of institutional fit between actor networks and cross-sector governance issues View project. 2012. https://doi.org/10.2307/41480675

Florida, S., and Bhattacherjee, A. (n.d.). Social Science Research: Principles, Methods, and Practices. https://digitalcommons.usf.edu/oa_textbooks/3

Fondas, N., and Denison, D. R. (1991). Corporate Culture and Organisational Effectiveness. The Academy of Management Review, 16(1), 203. https://doi.org/10.2307/258613

Fornell, C., and Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. Journal of Marketing Research, 18(1), 39. https://doi.org/10.2307/3151312

Gable, G., Sedera, D., and Chan, T. (2003). Enterprise Systems Success: A Measurement Model.

Gangwar, H. (2017). Cloud computing usage and its effect on organisational performance. Human Systems Management, 36(1), 13–26. https://doi.org/10.3233/HSM-171625

Gangwar, H., Date, H., and Ramaswamy, R. (2015). Understanding determinants of cloud computing adoption using an integrated TAM-TOE model. Journal of Enterprise Information Management, 28(1), 107–130. https://doi.org/10.1108/JEIM-08-2013-0065

Gardner, H. J., and Martin, M. A. (2007). Analyzing Ordinal Scales in Studies of Virtual Environments: Likert or Lump It! Presence: Teleoperators and Virtual Environments, 16(4), 439–446. https://doi.org/10.1162/pres.16.4.439

Gerow, J., Thatcher, J., and Grover, V. (2014). Six types of IT-business strategic alignment: An investigation of the constructs and their measurement. European Journal of Information Systems, 24. https://doi.org/10.1057/ejis.2014.6

Gong, M., Xu, Y., and Yu, M. Y. (2004). An Enhanced Technology Acceptance Model for Web-Based Learning. J. Inf. Syst. Educ., 15, 365–374.

Gordon, R., Carrigan, M., and Hastings, G. (2011). A framework for sustainable marketing. Marketing Theory, 11, 143–163. https://doi.org/10.1177/1470593111403218

Grant, R. M. (1991). The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation. California Management Review, 33(3), 114–135. https://doi.org/10.2307/41166664

Gravetter, F. J., and Wallnau, L. B. (2016). Statistics for the Behavioural Sciences. Cengage Learning.

Gruman, G., and Knorr, E. (2008). What Cloud Computing really means. Technical Report, Info World Inc.

Gunningham, N., Kagan, R. A., and Thornton, D. (2004). Social License and Environmental Protection: Why Businesses Go Beyond Compliance. Law and Social Inquiry, 29(2), 307–342. https://doi.org/10.1086/423681

Gupta, A. (2017). Load Balancing in Cloud Computing.

Gupta, P., Seetharaman, A., and Raj, J. (2013). The usage and adoption of cloud computing by small and medium businesses. International Journal of Information Management, 33, 861–874. https://doi.org/10.1016/j.ijinfomgt.2013.07.001

Gupta, V., MacMillan, I. C., and Surie, G. (2004a). Entrepreneurial leadership: developing and measuring a cross-cultural construct. Journal of Business Venturing, 19(2), 241–260. https://doi.org/10.1016/S0883-9026(03)00040-5

Gupta, V., MacMillan, I., and Surie, G. (2004b). Entrepreneurial Leadership: Developing and Measuring a Cross-Cultural Construct. Journal of Business Venturing, 19, 241–260. https://doi.org/10.1016/S0883-9026(03)00040-5

Hair, J. F., Black, W. C., and Babin, B. J. (2010). Multivariate Data Analysis (7th ed.). Pearson Prentice Hall.

Hair, J. F., Ringle, C. M., and Sarstedt, M. (2011). PLS-SEM: Indeed, a Silver Bullet. Journal of Marketing Theory and Practice, 19(2), 139–152. https://doi.org/10.2753/MTP1069-6679190202

Harpe, S. (2015). How to analyze Likert and other rating scale data. Currents in Pharmacy Teaching and Learning, 7, 836–850. https://doi.org/10.1016/j.cptl.2015.08.001

Hashem, I. A. T., Yaqoob, I., Anuar, N. B., Mokhtar, S., Gani, A., and Ullah Khan, S. (2015). The rise of “big data” on cloud computing: Review and open research issues. Information Systems, 47, 98–115. https://doi.org/10.1016/j.is.2014.07.006

Hassan, H., Nasir, M. H. M., Khairudin, N., & Adon, I. (2017). Factors influencing cloud computing adoption in small and medium enterprises. Journal of Information and Communication Technology, 16(1), 21-41. https://e-journal.uum.edu.my/index.php/jict/article/view/8216/1234

Hassan, J., Shehzad, D., Habib, U., Aftab, M. U., Ahmad, M., Kuleev, R., & Mazzara, M. (2022). The rise of cloud computing: data protection, privacy, and open research challenges—a systematic literature review (SLR). Computational intelligence and neuroscience, 2022. doi: 10.1155/2022/8303504.

Heaton, J. (2008). Secondary Analysis of Qualitative Data. Historical Social Research, 3.

Henderson, J. C., and Venkatraman, H. (1993). Strategic alignment: Leveraging information technology for transforming organisations. IBM Systems Journal, 32(1), 472–484. https://doi.org/10.1147/sj.382.0472

Herath, T., and Rao, H. R. (2009). Protection motivation and deterrence: A framework for security policy compliance in organisations. European Journal of Information Systems, 18(2), 106–125. https://doi.org/10.1057/ejis.2009.6

Herbane, B. (2010). Small business research: Time for a crisis-based view. 26, 61–67. https://doi.org/10.1108/sd.2010.05626had.005

Herold, R., and Beaver, K. (2014). The Practical Guide to HIPAA Privacy and Security Compliance. Auerbach Publications. https://doi.org/10.1201/b17548

Hiatt, J., and Hiatt, J. (2006). ADKAR: A Model for Change in Business, Government and Our Community.

Hitt, M., Ireland, R., Camp, M., and Sexton, D. (2001). Strategic Entrepreneurship: Entrepreneurial Strategies for Wealth Creation. Strategic Management Journal, 22, 479–491. https://doi.org/10.1002/smj.196

HOE, S. (2008). Issues and Procedures in Adopting Structural Equation Modelling Technique. Journal of Applied Quantitative Methods, 3.

Hoyle, R., and St, C. (2022). Handbook of Structural Equation Modelling.

Hsu, P., Ray, S., and Li-Hsieh, Y.-Y. (2014). Examining cloud computing adoption intention, pricing mechanism, and deployment model. International Journal of Information Management, 34, 474–488. https://doi.org/10.1016/j.ijinfomgt.2014.04.006

Huang, M. H., and Rust, R. T. (2022). A Framework for Collaborative Artificial Intelligence in Marketing. Journal of Retailing, 98(2), 209–223. https://doi.org/10.1016/j.jretai.2021.03.001

HUSELID, M. A. (1995). Human resource management practices impact turnover, productivity, and corporate financial performance. Academy of Management Journal, 38(3), 635–672. https://doi.org/10.2307/256741

Ittner, C. D., and Larcker, D. F. (1998). Are Non-financial Measures Leading Indicators of Financial Performance? An Analysis of Customer Satisfaction. Journal of Accounting Research, 36, 1. https://doi.org/10.2307/2491304

Jadeja, Y., and Modi, K. (2012). Cloud computing - concepts, architecture, and challenges. 2012 International Conference on Computing, Electronics and Electrical Technologies (ICCEET), 877–880. https://doi.org/10.1109/ICCEET.2012.6203873

Judge, T. A., Heller, D., and Mount, M. K. (2002). Five-factor model of personality and job satisfaction: A meta-analysis. Journal of Applied Psychology, 87(3), 530–541. https://doi.org/10.1037/0021-9010.87.3.530

Kankanhalli, A., Teo, H., Tan, B., and Wei, K.-K. (2003). An integrative study of information systems security effectiveness. International Journal of Information Management, 23, 139–154. https://doi.org/10.1016/S0268-4012(02)00105-6

Kaplan, R. S., and Norton, D. P. (1996). strategic learning, and the balanced scorecard. Strategy and Leadership, 24(5), 18–24. https://doi.org/10.1108/eb054566

Kaplan, R. S., and Norton, D. P. (2001). Transforming the Balanced Scorecard from Performance Measurement to Strategic Management: Part I The balanced scorecard emerges.

Kaplan, R., and Norton, D. (1992). The Balanced Scorecard—Measures That Drive Performance. Harvard Business Review, 79.

Kaplan, R., and Norton, D. (2008). Mastering the management system. Harvard Business Review, 86, 62–77, 136.

Khanda, M., and Doss, S. (2018). SME cloud adoption in Botswana: Its challenges and successes. International Journal of Advanced Computer Science and Applications, 9(1), 468–478. https://doi.org/10.14569/IJACSA.2018.090165

Kim, L. (1997). Imitation to Innovation: The Dynamics of Korea's Technological Learning. Harvard Business Press.

Kline, R. B. (2011). Principles and Practice of Structural Equation Modelling.

Konstantinos, K., Persefoni, M., Evangelia, F., Christos, M., and Mara, N. (2015). Cloud computing and economic growth. Proceedings of the 19th Panhellenic Conference on Informatics, 209–214. https://doi.org/10.1145/2801948.2802000

kotter, J. P. (1990). A Force for Change: How Leadership Differs From Management. The Free Press, New York.

Kotter, J. P. (1995). Leading Change: Why Transformation Efforts Fail. Harvard Business Review, 59–67.

Kshetri, N. (2013). Cybercrime and Cybersecurity in the Global South. https://doi.org/10.1057/9781137021946

Kumar, V., and Bala Nayar, K. (2014). Benefits of Cloud for the Banking Sector. IJCST, 5. https://www.researchgate.net/publication/273321920

Lall, S. (1992). Technological capabilities and industrialization. World Development, 20(2), 165–186. https://doi.org/https://doi.org/10.1016/0305-750X(92)90097-F

Lavalle, S., Lesser, E., Shockley, R., Hopkins, M. S., and Kruschwitz, N. (n.d.). Big Data, Analytics and the Path From Insights to Value.

Lee, N., and Ian Lings. (2008). doing Business Research. (1st ed.). Sage Publications.

Leonardi, P., Huysman, M., and Steinfield, C. (2013). Enterprise Social Media: Definition, History, and Prospects for the Study of Social Technologies in Organisations. Journal of Computer-Mediated Communication, 19. https://doi.org/10.1111/jcc4.12029

Li, L. (2022). Reskilling and upskilling the future-ready workforce for Industry 4.0 and beyond. Information Systems Frontiers, 1-16. doi: 10.1007/s10796-022-10308-y.

Lin, A., and Chen, N.-C. (2012). Cloud computing as an innovation: Perception, attitude, and adoption. International Journal of Information Management, 32, 533–540. https://doi.org/10.1016/j.ijinfomgt.2012.04.001

Liu, S., Yang, Y., Qu, W. G., and Liu, Y. (2016). The business value of cloud computing: the partnering agility perspective. Industrial Management and Data Systems, 116(6), 1160–1177. https://doi.org/10.1108/IMDS-09-2015-0376

Lombard, M., Snyder-Duch, J., and Bracken, C. C. (2002). Content Analysis in Mass Communication: Assessment and Reporting of Intercoder Reliability. Human Communication Research, 28(4), 587–604. https://doi.org/10.1111/j.1468-2958.2002.tb00826.x

Low, C., Chen, Y., and Wu, M. (2011). Understanding the determinants of cloud computing adoption. Industrial Management and Data Systems, 111. https://doi.org/10.1108/02635571111161262

Lucadamo, A., and Amenta, P. (2014). A New Scaling Proposal for Handling Ordinal Categorical Variables in Co-inertia (-PLS) Analysis. Procedia Economics and Finance, 17, 10–19. https://doi.org/10.1016/s2212-5671(14)00873-9

Marston, S. R., Li, Z., Bandyopadhyay, S., Ghalsasi, A., and Zhang, J. (2011). Cloud Computing: The Business Perspective. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.1413545

Maxwell, J. A. (2016). The value of qualitative inquiry for public policy View project. https://www.researchgate.net/publication/43220402

Mell, P. M., and Grance, T. (2011). The NIST definition of cloud computing. https://doi.org/10.6028/NIST.SP.800-145

Mell, P., and Grance, T. (n.d.). The NIST Definition of Cloud Computing Recommendations of the National Institute of Standards and Technology.

Melville, N., Kraemer, K., and Gurbaxani, V. (2004). Review: Information Technology and Organisational Performance: An Integrative Model of IT Business Value. MIS Quarterly, 28, 283–322. https://doi.org/10.2307/25148636

Mertens, D., and McLaughlin, J. (2004). Research and Evaluation Methods in Special Education. SAGE Publications, Inc. https://doi.org/10.4135/9781412985666

Millard, C. (2013). Cloud Computing Law (C. Millard, Ed.). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199671670.001.0001

Mintzberg, H. (2009). Rebuilding Companies as Communities. www.hbr.org

Misra, S., and Mondal, A. (2011). Identification of a company's suitability for the adoption of cloud computing and modelling its corresponding Return on Investment. Mathematical and Computer Modelling, 53, 504–521. https://doi.org/10.1016/j.mcm.2010.03.037

Mithas, S., Ramasubbu, N., and Sambamurthy, V. (2011). How information management capability influences firm performance. MIS Quarterly: Management Information Systems, 35(1), 237–256. https://doi.org/10.2307/23043496

Mohamad, W., Bin, A., and Afthanorhan, W. (2014). Hierarchical Component Using Reflective-Formative Measurement Model In Partial Least Square Structural Equation Modelling (Pls-Sem).pdf Hierarchical Component Using Reflective-Formative Measurement Model In Partial Least Square Structural Equation Modelling (Pls-Sem). In International Journal of Mathematics and Statistics Invention (IJMSI) || (Vol. 2). www.ijmsi.org

Mohlameane, M., & Ruxwana, N. (2020). Exploring the impact of cloud computing on existing South African regulatory frameworks. South African Journal of Information Management, 22(1), 1-9. http://dx.doi.org/10.4102/sajim.v22i1.1132.

Murray, J. (2013). Likert Data: What to Use, Parametric or Non-Parametric? In International Journal of Business and Social Science (Vol. 4, Issue 11). https://www.researchgate.net/publication/301780402

Nambisan, S., Wright, M., and Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. Research Policy, 48(8). https://doi.org/10.1016/j.respol.2019.03.018

Nederhof, A. J. (1985). Methods of coping with social desirability bias: A review. European Journal of Social Psychology, 15(3), 263–280. https://doi.org/10.1002/ejsp.2420150303

Neirotti, P., De Marco, A., Cagliano, A. C., Mangano, G., and Scorrano, F. (2014). Current trends in smart city initiatives: Some stylised facts. Cities, 38, 25–36. https://doi.org/10.1016/j.cities.2013.12.010

Nengovhela, D. (2020). Improving technology adoption through change management. University of Johannesburg (South Africa).

Neuman, W. (2000). Social Research Methods: Qualitative and Quantitative Approaches. In Teaching Sociology (Vol. 30). https://doi.org/10.2307/3211488

Nonaka, I. (1994). A Dynamic Theory of Organisational Knowledge Creation. Organisation Science, 5(1), 14–37. https://doi.org/10.1287/orsc.5.1.14

Norman, G. (2010). Likert scales, levels of measurement and the “laws” of statistics. Advances in Health Sciences Education, 15(5), 625–632. https://doi.org/10.1007/s10459-010-9222-y

Northouse, P. g. (2016). Leadership Theory and practice (7th ed.). SAGE Publications, Inc.

Ochei, L. C., Petrovski, A., and Bass, J. M. (2016a). Implementing the Required Degree of Multitenancy Isolation: A Case Study of Cloud-Hosted Bug Tracking System. 2016 IEEE International Conference on Services Computing (SCC), 379–386. https://doi.org/10.1109/SCC.2016.56

Ochei, L. C., Petrovski, A., and Bass, J. M. (2016b). Optimizing the deployment of cloud-hosted application components to guarantee multitenancy isolation. 2016 International Conference on Information Society (i-Society), 77–83. https://doi.org/10.1109/i-Society.2016.7854180

Paine, L. S. (1994). Managing for organisational integrity. Harvard Business Review, 17–106.

Palvia, S. C., Ojha, A., Palvia, S., and Gupta, M. P. (2008). A Model for Impact of E-Government on Corruption: Exploring Theoretical Foundations E-Government to Combat Corruption View project A Model for Impact of E-Government on

Corruption: Exploring Theoretical Foundations. https://www.researchgate.net/publication/228369790

Parmar, B., Freeman, R., Harrison, J., Purnell, A., and De Colle, S. (2010). Stakeholder Theory: The State of the Art. The Academy of Management Annals, 3, 403–445. https://doi.org/10.1080/19416520.2010.495581

Petty, N. J., Thomson, O. P., and Stew, G. (2012a). Ready for a paradigm shift? Part 2: Introducing qualitative research methodologies and methods. Manual Therapy, 17(5), 378–384. https://doi.org/10.1016/j.math.2012.03.004

Petty, N. J., Thomson, O. P., and Stew, G. (2012b). Ready for a paradigm shift? Part 2: Introducing qualitative research methodologies and methods. Manual Therapy, 17(5), 378–384. https://doi.org/10.1016/j.math.2012.03.004

Piccoli, G., and Ives, B. (2005). Review: IT-Dependent Strategic Initiatives and Sustained Competitive Advantage: A Review and Synthesis of the Literature. MIS Quarterly, 29, 747–776. https://doi.org/10.2307/25148708

Ponterotto, J. G. (2005). Qualitative research in counselling psychology: A primer on research paradigms and philosophy of science. In Journal of Counselling Psychology (Vol. 52, Issue 2, pp. 126–136). https://doi.org/10.1037/0022-0167.52.2.126

Porter, M. E. (1985). Competitive Advantage. Creating and Sustaining Superior Performance. Free Press.

Porter, M., and Kramer, M. (2011). The Big Idea: Creating Shared Value. How to Reinvent Capitalism—and Unleash a Wave of Innovation and Growth. Harvard Business Review, 89, 62–77.

Punch, K. (2005). Introduction to Social Research – Quantitative and Qualitative Approaches. Http://Lst-Iiep.Iiep-Unesco.Org/Cgi-Bin/Wwwi32.Exe/[In=epidoc1.in]/?T2000=023993/(100).

Rai, A., Pavlou, P. A., Im, G., and Du, S. (2012). Interfirm IT capability profiles and communications for cocreating relational value : Evidence from the logistics industry. MIS Quarterly: Management Information Systems, 36(1). https://doi.org/10.2307/41410416

Reichheld, F., and W.E. Sasser, Jr. (1990). Zero Defections: Quality Comes to Services. Harvard Business Review, 68, 105–111.

Runeson, P., and Höst, M. (2009). Guidelines for conducting and reporting case study research in software engineering. Empirical Software Engineering, 14(2), 131–164. https://doi.org/10.1007/s10664-008-9102-8

Russolillo, G. (2012). Non-metric partial least squares. In Electronic Journal of Statistics (Vol. 6, pp. 1641–1669). https://doi.org/10.1214/12-EJS724

Salamon, L. (2002). The Tools of Government: A Guide to the New Governance.

Salkind, N. J. (2010). Encyclopaedia of research design (Vol. 1). sage.

Sallehudin, H., Razak, R. C., Ismail, M., Fadzil, A. M., & Baker, R. (2019). Cloud computing implementation in the public sector: factors and impact. Asia-Pacific Journal of Information Technology and Multimedia, 7(2-2), 27-42. DOI: 10.1109/MCC.2018.011791710.

Sangthong, M. (2020). The Effect of the Likert Point Scale and Sample Size on the Efficiency of Parametric and Nonparametric Tests. Thailand Statistician.

Saunders, M., Lewis, P., and Thornhill, A. (2009). Research Methods for Business Students. Pearson.

Schein, E. H. (2010). Organisational Culture and Leadership (4th ed.). Jossey-Bass.

Schmenner, R. (2004). Service Business and Productivity. Decision Sciences, 35, 333–347. https://doi.org/10.1111/j.0011-7315.2004.02558.x

Schneider, S., and Sunyaev, A. (2016). Determinant factors of cloud-sourcing decisions: Reflecting on the IT outsourcing literature in the era of cloud computing. Journal of Information Technology, 31(1), 1–31. https://doi.org/10.1057/jit.2014.25

Schumacker, R. E., and Lomax, R. G. (2010). A beginner's guide to structural equation modelling. Routledge.

Schwartz, P., and Solove, D. (2011). The PII Problem: Privacy and a New Concept of Personally Identifiable Information. New York University Law Review, 86.

Subashini, S., and Kavitha, V. (2011). Kavitha, V.: A Survey on Security Issues in Service Delivery Models of Cloud Computing. Journal of Network and Computer Application 34(1), 1-11. Journal of Network and Computer Applications, 34, 1–11. https://doi.org/10.1016/j.jnca.2010.07.006

Sultan, N. (2011). Reaching for the “cloud”: How SMEs can manage. International Journal of Information Management, 31, 272–278. https://doi.org/10.1016/j.ijinfomgt.2010.08.001

Tarka, P. (2018). An overview of structural equation modelling: its beginnings, historical development, usefulness and controversies in the social sciences. Quality and Quantity, 52(1), 313–354. https://doi.org/10.1007/s11135-017-0469-8

Teece, D. J. (2007). Explicating dynamic capabilities: the nature and micro-foundations of (sustainable) enterprise performance. Strategic Management Journal, 28(13), 1319–1350. https://doi.org/10.1002/smj.640

Tornatzky, L. G., Fleischer, M., and Chakrabarti, A. K. (1990). Processes of technological innovation. Lexington books.

Trainor, K., Andzulis, J., Rapp, A., and Agnihotri, R. (2014). Social media technology usage and customer relationship performance: A capabilities-based examination of social CRM. Journal of Business Research, 67, 1201–1208. https://doi.org/10.1016/j.jbusres.2013.05.002

Treviño, L. K., Weaver, G. R., and Reynolds, S. J. (2006). Behavioural ethics in organisations: A review. Journal of Management, 951–990.

Tunggal tyas abi. (2023, May 1). Why is Cybersecurity Important? Up Guard, Inc.

Tyler, T. R. (2006). Why people obey the law: Procedural justice, legitimacy, and Compliance (2nd ed.). Princeton, NJ: Princeton University Press.

Varghese, B., and Buyya, R. (2018). Next generation cloud computing: New trends and research directions. Future Generation Computer Systems, 79, 849–861. https://doi.org/10.1016/j.future.2017.09.020

Vonglao, P. (2017). Application of fuzzy logic to improve the Likert scale to measure latent variables. Kasetsart Journal of Social Sciences, 38(3), 337–344. https://doi.org/10.1016/j.kjss.2017.01.002

Wang, Q., Chen, W., Liang, Y., Wang, Q. ;, and Chen, W. ; (2011). The Effects of Social Media on College Students Repository Citation. https://scholarsarchive.jwu.edu/mba_student

Weil, D., Fung, A., Graham, M., and Fagotto, E. (2006). The Effectiveness of Regulatory Disclosure Policies. Journal of Policy Analysis and Management, 155–181.

Weinhardt, C., Anandasivam, A., Blau, B., and Stöer, J. (2009). Business models in the service world. IT Professional, 11(2), 28–33. https://doi.org/10.1109/MITP.2009.21

Wernerfelt, B. (1984). A Resource-Based View of the Firm. Strategic Management Journal, 5(2), 171–180. http://www.jstor.org/stable/2486175

Whitman, M. E., and Mattord, H. J. (2012). Roadmap to Information Security: For IT and infosec managers. Cengage Learning.

Whitman, M. E., and Mattord, H. J. (2021). Principles of information security. Cengage Learning.

Winter, S. G. (1984). Schumpeterian competition in alternative technological regimes. Journal of Economic Behaviour and Organisation, 5(3), 287–320. https://doi.org/https://doi.org/10.1016/0167-2681(84)90004-0

Yin, R. K. (2018). Case Study Research and Applications: Design and Methods (6th ed.). Thousand Oaks, CA: Sage. .

Yukl, G. (2012). Effective leadership behaviour: What we know and what questions need more attention. Academy of Management Perspectives, 26(4), 66–85. https://doi.org/10.5465/amp.2012.0088

Zhang, Q., Cheng, L., and Boutaba, R. (2010). Cloud computing: State-of-the-art and research challenges. Journal of Internet Services and Applications, 1(1), 7–18. https://doi.org/10.1007/s13174-010-0007-6

Zhu, K., and Kraemer, K. L. (2005). Post-Adoption Variations in Usage and Value of E-Business by Organisations: Cross-Country Evidence from the Retail Industry. Information Systems Research, 16(1), 61–84. https://doi.org/10.1287/isre.1050.0045

Zissis, D., and Lekkas, D. (2012). Addressing cloud computing security issues. Future Generation Computer Systems, 28(3), 583–592. https://doi.org/10.1016/j.future.2010.12.006

Annexures

Annexure 1: Participation Invitation Letter

Dear Participant,

My name is Wesley Naidoo, and I am enrolled for a master's in management in the field of Digital business at the University of Witwatersrand. I am currently completing my minor dissertation through the supervision of Dr Norman Mudau.

My research topic is "The Use of cloud computing on organisational performance in the public sector."

This study examines the use of cloud computing on a balanced view of organisational performance (financial and non-financial performance). Furthermore, the study investigates the factors influencing cloud computing use. You have been chosen to participate in this research because you have experience working with Information technology within an organisation.

You are either a past or current engineer/manager/director, have worked closely with managers/engineers, and have experience implementing cloud computing solutions. We highly value your involvement in this survey. However, participation in this questionnaire is not mandatory, and you can withdraw at any stage. The data collected will be kept confidential, and any information that might make it possible for people to identify you will not be shared with anyone. The consolidated input data would then be made public in the report. However, the organisation and participants' names will be kept anonymous.

Thank you for taking the time to take part in this survey. The questions will take approximately 10-12 minutes of your time to complete.

For any queries or any other info related to the outcomes of the study, please get in touch with my supervisor or me at the provided contact details below:

Wesley Naidoo

E-mail: Wesle.naidoo@gmail.com or Mudauno1979@gmail.com

Annexure 3: Ethics Clearance Letter

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/DB2518786/156

This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

This certificate is only valid if accompanied by formal permission from the relevant stakeholder(s).

Project title	The use and impact of cloud computing on organisational performance
Investigator / Researcher	Mr Wesley Naidoo
Nature of Project	MM (Digital Business)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed confidentialty.
Issue Date of Certificate	2023/10/17
Expiry date	Date of submission of the project / research report
Chairperson	Dr Pius Oba ☎ +27 11 717 3976 +27 82 733 6587 pius.oba@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.

Wesley Naidoo	17th of October 2023
Signature	Date:

Annexure 2: Survey Questions

The Survey is divided into three sections:

Part A: Demographic information

Part B: Cloud Computing Use

Part C: Financial and Non-Financial Performance

This section answers questions about your demographic information, including your experience.

1. What is your highest qualification?

Grade 12 or Matric	
National Diploma	
Bachelor’s Degree	
Honours	
Masters	
PhD	
Other (Specify)	

2. What is the size of your organisation?

Small (1-50 employees)	
Medium (51-200 employees)	
Large (201-500 employees)	
Very Large (500+ employees)	

3. What industry does your organisation operate in?

Manufacturing	
Utilities and Energy	
Logistics	
Retail	
Telecommunication	
Airline	
Pharmaceutical	
Public Sector	
Service	
Finance Sector	
Mining	
Other (please specify)	

4. Please select your job title.

Chief Financial Officer	
Management Accountant	
Financial Director	
Managing Director	
Executive Director	
Chief Technology Officer	
Chief Architect	
Chief Information Officer	
Engineers	
Programme Manager	
Chief Digital Transformation Officer	
Chief Operating Officer	
Product Owner	
Senior Manager	
Other (please specify)	

5. Please select your years of experience in the organisation

<5 years	
6 – 10 years	
11 – 15 years	
>16 years	

6. Please indicate the amount of years your organisation has been in operation.

<5 years	
6 – 10 years	
11 – 15 years	
>16 years	

Part B: Use of Cloud Computing

The purpose of this section is to obtain your perceptions about the use of cloud computing.

7. Please indicate the extent to which you agree with each of the following statements related to using cloud computing in your organisation. Please indicate whether you Strongly disagree, Mostly disagree, Disagree, are Neutral, Agree, Mostly agree or Strongly Agree with each statement.

No	Statements	Strongly Disagree	Mostly Disagree	Disagree	Neutral	Agree	Mostly Agree	Strongly Agree
HR1	The use of cloud-based HR systems significantly improves the efficiency and productivity of HR operations.	1	2	3	4	5	6	7
HR2	Investment in employee training programs specific to cloud computing enhances the organisation's overall usage and understanding of cloud technologies.	1	2	3	4	5	6	7
HR3	Cloud computing positively impacts HR's capacity to manage remote work or flexible working arrangements.	1	2	3	4	5	6	7
HR4	The use of cloud computing in HR practices effectively boosts employee engagement and communication.	1	2	3	4	5	6	7
HR5	HR's role in promoting and facilitating the use of cloud computing is crucial for the digital transformation of the organisation.	1	2	3	4	5	6	7

No	Statements	Strongly Disagree	Mostly Disagree	Disagree	Neutral	Agree	Mostly Agree	Strongly Agree
TR1	Investing in advanced technology infrastructure (like high-speed internet and compatible devices) significantly improves cloud computing usage in our organisation.	1	2	3	4	5	6	7
TR2	The presence of in-house technology expertise (like IT specialists) enhances our organisation's ability to utilise cloud computing effectively	1	2	3	4	5	6	7
TR3	Regular updates and maintenance of our technology systems positively impact the performance and reliability of our cloud computing usage.	1	2	3	4	5	6	7
TR4	Access to continuous technology support (like a dedicated IT support team) increases our organisation's confidence and efficiency in using cloud computing.	1	2	3	4	5	6	7
TR5	Our organisation's adoption of advanced technology security measures effectively protects our cloud data and infrastructure, promoting more extensive use of cloud computing.	1	2	3	4	5	6	7

No	Statements	Strongly Disagree	Mostly Disagree	Disagree	Neutral	Agree	Mostly Agree	Strongly Agree
BR1	Our organisation's financial investment in cloud computing significantly improves its overall cloud usage.	1	2	3	4	5	6	7
BR2	Having a dedicated team or department for managing cloud computing resources in our organisation enhances the efficiency of cloud usage.	1	2	3	4	5	6	7
BR3	The presence of business resources such as training programs and learning materials specifically targeted at cloud computing increases the organisation's proficiency in its use.	1	2	3	4	5	6	7
BR4	The integration of cloud computing with our existing business operations and systems (like CRM, ERP, etc.) positively influences our organisation's cloud usage.	1	2	3	4	5	6	7
BR5	Our organisation's commitment to continuous improvement and updating of cloud strategies and policies effectively promotes the usage of cloud computing.	1	2	3	4	5	6	7

No	Statements	Strongly Disagree	Mostly Disagree	Disagree	Neutral	Agree	Mostly Agree	Strongly Agree
CM1	Resistance to change management practices in our organisation has hindered the successful implementation and usage of cloud computing.	1	2	3	4	5	6	7
CM2	Our organisation's unwillingness to manage and adapt to change has negatively affected the speed of transitioning to cloud-based systems.	1	2	3	4	5	6	7
CM3	Resistance to adopting new change management strategies has impaired the efficient use of cloud computing in our organisation.	1	2	3	4	5	6	7
CM4	A lack of effective change management has resulted in employees' reluctance to use cloud-based technologies.	1	2	3	4	5	6	7
CM5	The organisation's resistance to restructuring and reshaping processes for cloud use has negatively impacted the full utilisation of cloud computing.	1	2	3	4	5	6	7

No	Statements	Strongly Disagree	Mostly Disagree	Disagree	Neutral	Agree	Mostly Agree	Strongly Agree
PR1	Strict regulatory constraints faced by our organisation have hampered the effective use and implementation of cloud computing.	1	2	3	4	5	6	7
PR2	The organisation's policies and governance mechanisms have created barriers to the extensive usage of cloud computing.	1	2	3	4	5	6	7
PR3	Complying with data privacy and security regulations has negatively impacted our organisation's flexibility and ease of cloud computing usage.	1	2	3	4	5	6	7
PR4	Our organisation's policy limitations restrict the full potential of cloud computing, resulting in underutilisation.	1	2	3	4	5	6	7
PR5	The complex nature of local and international IT regulations has made the adoption and usage of cloud computing more challenging for our organisation.	1	2	3	4	5	6	7

No	Statements	Strongly Disagree	Mostly Disagree	Disagree	Neutral	Agree	Mostly Agree	Strongly Agree
CCU1	Effective information security measures in our organisation have increased trust and therefore the usage of cloud computing.	1	2	3	4	5	6	7
CCU2	Our organisation's investment in robust cybersecurity infrastructure has positively influenced the adoption and usage of cloud computing.	1	2	3	4	5	6	7
CCU3	Regular cybersecurity training and awareness for employees positively impact the safe and effective use of cloud computing in our organisation.	1	2	3	4	5	6	7
CCU4	The implementation of strong data encryption and other security protocols in our cloud systems positively impacts our confidence and usage of cloud computing.	1	2	3	4	5	6	7
CCU5	Our organisation's commitment to regular security audits and compliance checks has	1	2	3	4	5	6	7

No	Statements	Strongly Disagree	Mostly Disagree	Disagree	Neutral	Agree	Mostly Agree	Strongly Agree
	promoted the usage of cloud computing by ensuring data safety.							

No	Statements	Strongly Disagree	Mostly Disagree	Disagree	Neutral	Agree	Mostly Agree	Strongly Agree
LD1	Leadership's active involvement and support for cloud computing have positively impacted its adoption and usage in our organisation.	1	2	3	4	5	6	7
LD2	Lack of clear direction from leadership regarding the implementation and usage of cloud computing has been a hurdle to its adoption.	1	2	3	4	5	6	7
LD3	Leaders' willingness to invest in the necessary training and resources for cloud computing has positively influenced its usage in our organisation.	1	2	3	4	5	6	7
LD4	Inconsistent or wavering leadership decisions regarding cloud computing strategies have negatively impacted its effective usage.	1	2	3	4	5	6	7
LD5	Leadership's understanding and communication of the benefits and risks of cloud computing have fostered a positive environment for its usage in our organisation.	1	2	3	4	5	6	7

No	Statements	Strongly Disagree	Mostly Disagree	Disagree	Neutral	Agree	Mostly Agree	Strongly Agree
OP1	The use of cloud computing has positively impacted operational efficiency in our organisation, leading to an increased usage of these technologies.	1	2	3	4	5	6	7
OP2	Cloud computing has improved our organisation's scalability and flexibility, which has encouraged greater use of these services.	1	2	3	4	5	6	7

No	Statements	Strongly Disagree	Mostly Disagree	Disagree	Neutral	Agree	Mostly Agree	Strongly Agree
OP3	The implementation of cloud computing has significantly reduced our IT costs, thereby leading to increased usage.	1	2	3	4	5	6	7
OP4	The use of cloud computing has enhanced our organisation's data accessibility and collaboration, which has positively influenced its usage.	1	2	3	4	5	6	7
OP5	The ability of cloud computing to provide automatic updates and maintenance has positively impacted operational performance and resulted in greater usage.	1	2	3	4	5	6	7

No	Statements	Strongly Disagree	Mostly Disagree	Disagree	Neutral	Agree	Mostly Agree	Strongly Agree
CP1	The use of cloud computing in our organisation has improved customer service delivery, leading to an increased adoption of cloud-based services.	1	2	3	4	5	6	7
CP2	Our cloud computing implementation has enhanced the quality and speed of our services/products, thereby positively influencing customer satisfaction and increasing our use of the cloud.	1	2	3	4	5	6	7
CP3	Through cloud computing, our organisation has been able to offer personalised customer experiences, leading to higher customer satisfaction and increased cloud usage.	1	2	3	4	5	6	7
CP4	The ability of cloud computing to provide real-time customer data has positively influenced our customer relationship management and led to further adoption of cloud services.	1	2	3	4	5	6	7
CP5	The use of cloud computing has made it possible for our organisation to be more responsive to customer needs, promoting customer satisfaction and encouraging greater use of these technologies.	1	2	3	4	5	6	7

This section aims to obtain your opinion on your organisation's performance.

8. Please indicate the extent to which you agree with each of the following statements related to how the organisation has performed relative to the expectations it has set for itself.

No	Statements	Much worse than expected	Worse than expected	Somewhat worse than	Neutral	Somewhat better than	Better than expected	Much better than expected
NOP1	To what extent has the implementation of cloud computing improved your operational performance?	1	2	3	4	5	6	7
NOP2	To what extent has the implementation of cloud computing improved your business performance?	1	2	3	4	5	6	7
NOP3	Has cloud computing contributed to your organisation's continuous operational performance improvement?	1	2	3	4	5	6	7
NOP4	How would you evaluate the impact of cloud computing on the efficiency of your organisation's operational processes?	1	2	3	4	5	6	7
NOP5	to what extent has the use of cloud computing enhanced staff productivity within your operations?	1	2	3	4	5	6	7
NCR1	Customer satisfaction has been___	1	2	3	4	5	6	7
NCR2	Response time to customers has been___	1	2	3	4	5	6	7
NCR3	Customer retention has been___	1	2	3	4	5	6	7
NCR4	Time to market for our products/services has been_____	1	2	3	4	5	6	7
NOL1	Employee satisfaction has been____	1	2	3	4	5	6	7
NOL2	Success in employees testing new ideas has been_____	1	2	3	4	5	6	7

No	Statements	Much worse than expected	Worse than expected	Somewhat worse than	Neutral	Somewhat better than	Better than expected	Much better than expected
NOL3	Employee training has been______	1	2	3	4	5	6	7
NOL4	The number of new products/services launched has been_____	1	2	3	4	5	6	7
FP1	The increase in operating income has been___.	1	2	3	4	5	6	7
FP2	The improvement in sales growth rate has been___	1	2	3	4	5	6	7
FP3	The increase in return on investment has been___	1	2	3	4	5	6	7
FP4	The increase in return on assets has been___	1	2	3	4	5	6	7
FP5	Increase in gross profit has been___	1	2	3	4	5	6	7
FP6	The reduction in operating cost has been___	1	2	3	4	5	6	7