

UNIVERSITY OF THE  
WITWATERSRAND,  
JOHANNESBURG



**ADOPTION OF SOFTWARE AS A SERVICE: A QUALITATIVE CASE STUDY IN A  
STATE-OWNED COMPANY IN SOUTH AFRICA**

**RESEARCH REPORT**

Submitted in fulfilment of the requirements for the degree of Master of Commerce (MCom) by  
Research in the field of Information Systems

School of Business Sciences  
Faculty of Commerce, Law and Management  
University of the Witwatersrand, Johannesburg, South Africa

Student: Vukile Kholiwe Dlamini  
Student no: 2290811  
Supervisor: Neetu Ramsaroop  
Protocol Number: CBUSE/1598  
Date: November 2021

## DECLARATION

---

I declare that this dissertation is my own, unaided work. It is being submitted for the degree of Master of Commerce in Information Systems to the Wits University, Johannesburg. It has not been submitted before for any other degree or examination at this or any other University.



Vukile Kholiwe Dlamini

23<sup>rd</sup> November 2021

## ABSTRACT

---

Software as a Service (SaaS) is a type of cloud computing service which has capabilities that enable organisations to efficiently and effectively render business applications as well as deliver services to stakeholders via the Internet, in a secure manner. This service model has benefits as well as critical challenges which need to be considered by management when deciding to adopt or not to adopt SaaS. In South Africa (SA), organisations that are in the public sector, specifically state-owned companies, are also considering this maturing SaaS technology in order to improve service delivery to citizens and efficiencies whilst operating within a tight state budget and a highly regulated environment.

This study developed an integrated conceptual framework underpinned by the Technology Organisation Environment (TOE) framework and the Institutional (INT) theory. This integrated framework was used to investigate organisational considerations in SaaS adoption and to identify the key factors which influence the decision to adopt SaaS, by means of a qualitative case study that was conducted in a South African state-owned company. Data for this research was collected from fifteen participants representing both business and IT units.

The results of the study indicate that the factors drawn from the TOE framework and INT theory can be used to understand adoption of SaaS in state-owned companies in South Africa. Additionally, it was found that ten TOE factors could drive or hinder the adoption of SaaS in a state-owned company. The Security factor within the Technology context was found to be the most important SaaS adoption consideration in the case study site.

This research paper is a unique attempt, to study SaaS adoption within a state-owned institution in South Africa, through the lens of an integrated TOE-INT conceptual framework, which could advance the Information Systems (IS) field. Furthermore, the conceptual framework could present practical implications; for practitioners it will highlight key factors to consider when faced with the decision to adopt SaaS, for the SA Government it could generate insights for creating a conducive regulatory environment (including national cloud adoption policies), and for SaaS service providers it could produce useful information for packaging SaaS solutions that are suited to state-owned entities in SA.

## ACKNOWLEDGEMENTS

---

To God, thank you for your blessings and the strength you gave to me during this research project.

My sincere thanks and appreciation go to the following people:

- My Supervisor, Neetu Ramsaroop, who always made herself available and provided valuable counsel, in spite of her heavy work load.
- My employer for allowing me to further my studies and to conduct the qualitative case study onsite.
- The participants who sacrificed their time to provide valuable information and insights.

## DEDICATION

---

I dedicate this report to my very special family, especially my beloved son Vhulenda Dlamini and my helper Happy Shongwe, for their patience and support throughout my studies while I spent countless hours on my laptop. Both passed away in November 2020 during the data analysis phase of my research.

To my amazing and special son, who encouraged me to pursue my second Master's degree and endured weekends without my presence, thank you for being the loving, patient and wise young man that you were. Rest knowing that mom achieved it, for you Ndazokie!

## TABLE OF CONTENTS

---

DECLARATION .....	2
ABSTRACT .....	3
ACKNOWLEDGEMENTS.....	4
DEDICATION.....	5
TABLE OF CONTENTS .....	6
LIST OF TABLES .....	8
LIST OF FIGURES .....	9
LIST OF KEY ABBREVIATIONS.....	10
CHAPTER 1: INTRODUCTION .....	12
1.1 Background.....	12
1.2 Contextualisation.....	14
1.3 Rationale For the Research On Adoption.....	15
1.4 Research Objective.....	16
1.5 Research Design.....	16
1.6 Research Questions .....	16
1.7 Assumptions.....	17
1.8 Theoretical and Practical Contribution.....	17
1.9 Limitations of the Study .....	18
1.10 Ethics .....	19
1.11 Organisation of this Research .....	19
CHAPTER 2: LITERATURE REVIEW .....	21
2.1 Introduction.....	21
2.2 Understanding Cloud Computing and SaaS Adoption .....	21
2.3 SaaS Trends – Worldwide .....	30
2.4 Understanding Adoption of Technology .....	32
2.5 State-Owned Companies.....	32
2.6 Overview of Existing Literature – Cloud Computing/SaaS Adoption.....	34
2.7 Existing Literature Contexts, Models and Frameworks .....	35
2.8 Summary of Chapter.....	36
CHAPTER 3: THEORETICAL BACKGROUND AND RESEARCH FRAMEWORK .....	37
3.1 Introduction.....	37
3.2 The Technology Organisation Environment (TOE) Framework .....	37

3.3 The Institutional (INT) Theory .....	39
3.4 Integrated TOE-INT Conceptual Framework.....	40
3.5 Summary of Chapter.....	42
CHAPTER 4: RESEARCH METHODOLOGY .....	43
4.1 Introduction.....	43
4.2 Research Paradigm, Approach and Design.....	44
4.3 Research Methodology Alignment with Objective and Questions .....	45
4.4 Research Context – Single Site.....	46
4.5 Research Sampling – Non-probalistic .....	47
4.6 Research Data Collection Procedures.....	47
4.7 Research Data Analysis - Thematic .....	49
4.8 Research Quality .....	50
4.9 Research Ethical Considerations.....	52
4.10 Summary of Chapter.....	53
CHAPTER 5: DATA ANALYSIS AND FINDINGS .....	54
5.1 Introduction.....	54
5.2 Participants.....	54
5.3 Interview Questions Profile and Response Rate .....	56
5.4 Documents Reviewed .....	57
5.5 Analysis of Qualitative Data.....	58
5.6 Final Conceptual Framework for SaaS Adoption .....	90
5.7 Summary of Chapter.....	91
CHAPTER 6: EVALUATION OF THE RESEARCH.....	91
6.1 Overview of Chapters.....	91
6.2 Research Objective .....	92
6.3 Contributions of The Study.....	93
CHAPTER 7: CONCLUDING REMARKS .....	97
REFERENCES .....	98
APPENDIX A: ETHICS CLEARANCE CERTIFICATE.....	104
APPENDIX B: PARTICIPATION INFORMATION .....	105
APPENDIX C: INTERVIEW SCHEDULE .....	108
APPENDIX D: INTERVIEW TRANSCRIPT TEMPLATE.....	112
APPENDIX E: ILLUSTRATION OF TRANSCRIBED INTERVIEW AND CODING .....	113
APPENDIX F: LETTER OF PERMISSION FROM THE STATE-OWNED COMPANY .....	115
APPENDIX G: ILLUSTRATION OF SIGNED CONSENT FORM .....	116

## LIST OF TABLES

---

Table 1: Key Strengths and Weaknesses of Case Research .....	46
Table 2: Participants By Area of Function .....	54
Table 3: Participants By Role Level .....	55
Table 4: Participants By Years In The Organisation .....	55
Table 5: Overall Interview Questions And Response Rate .....	56
Table 6: Main Response Questions – Response Rate .....	57
Table 7: Document Confirmation .....	57
Table 8: Summary of Theme Analysis.....	59
Table 9: SaaS Factor Criticality.....	88

## LIST OF FIGURES

---

Figure 1: Mainstream Cloud Computing Service Models vs. Traditional IT (IBMCloud, 2019) .....	13
Figure 2: Evolution of SaaS (Velev, 2010).....	23
Figure 3: Gartner Hype Cycle For SaaS (Heiser & Santoro, 2018) .....	31
Figure 4: Literature Review Methodology (Okoli & Schabram, 2010) .....	34
Figure 5: Proposed Integrated TOE-INT Conceptual Framework.....	40
Figure 6: The Research Onion (Saunders et al., 2016).....	43
Figure 7: Final Integrated Conceptual Framework .....	90

## LIST OF KEY ABBREVIATIONS

---

AI	Artificial Intelligence
APPS	Applications
ASP	Application Service Provider
AWS	Amazon Web Services
CC	Cloud Computing
CaaS	Communication as a Service
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CIO	Chief Information Officer
DOI	Diffusion of Innovation
DR	Disaster Recovery
EDI	Electronic Data Interchange
eGov	Electronic Government
ERP	Enterprise Resource Planning
GDPR	European General Data Protection Regulation
HCM	Human Capital Management
IaaS	Infrastructure as a Service
INT	Institutional Theory
Info Sec	Information Security
IS	Information Systems
ISAE	International Standard on Assurance Engagements
ISO 27001	International Organization of Standardization – Information Security Management Standard
IT	Information Technology
MS	Microsoft
NaaS	Network as a Service
OS	Operating System
PaaS	Platform as a Service
PFMA	Public Finance Management Act

PoPIA	Protection of Personal Information Act
PAYG	Pay-as-you-Go
SA	South Africa
SaaS	Software as a Service
SLA	Service Level Agreement
SME	Small and Medium-Sized Enterprise
SOA	Service Oriented Architecture
SOC	State-Owned Company
SOC 2	Service Organisation Controls (Guide 2)
STaaS	Storage as a Service
TAM	Technology Acceptance Model
TCO	Total Cost of Ownership
TM	Top Management
TOE	Technology Organisation Environment Framework
TPB	Theory of Planned Behaviour
UK	United Kingdom
UN	United Nations
USA	United States of America
UTAUT	Unified Theory of Acceptance and Use of Technology
VPN	Virtual Private Network
XaaS	‘Anything’ as a Service

### 1.1 BACKGROUND

---

Historically, Information Technology (IT) was deemed to be a product, however this view has changed as many IT service providers are opting to provision IT artefacts as a cloud-based service (Senyo et al., 2016). Gonzalez and Smith (2014) concur with this view and suggest that cloud computing is feasibly a branch of the long established IT outsourcing hosting model. Since the early 2000s, cloud computing has been a phenomenon of interest to both academics and practitioners, as evident in studies which continue to be conducted primarily to understand various cloud computing dynamics from perspectives such as organisational, industry, individual and societal.

Cloud computing comprises of three mainstream service models (Figure 1), namely Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). IaaS is typically the base layer of infrastructure management, PaaS is primarily used for software development, and SaaS is directly accessed by the subscribers (i.e. users) of cloud based software such as business applications (Clemmons et al., 2012). The customer manages all technology layers for on-premise (i.e. 'Traditional IT') solutions whilst for cloud computing models the management responsibilities vary between the customer and vendor. Examples of global providers of all cloud computing models include Amazon Web Services, Google, Microsoft and Oracle (Bala et al., 2019). SaaS specific solutions include SalesForce, ERP (SAP or Oracle), Google Docs, Microsoft Office 365, Apple iCloud, and Workday (Heiser & Santoro, 2018).

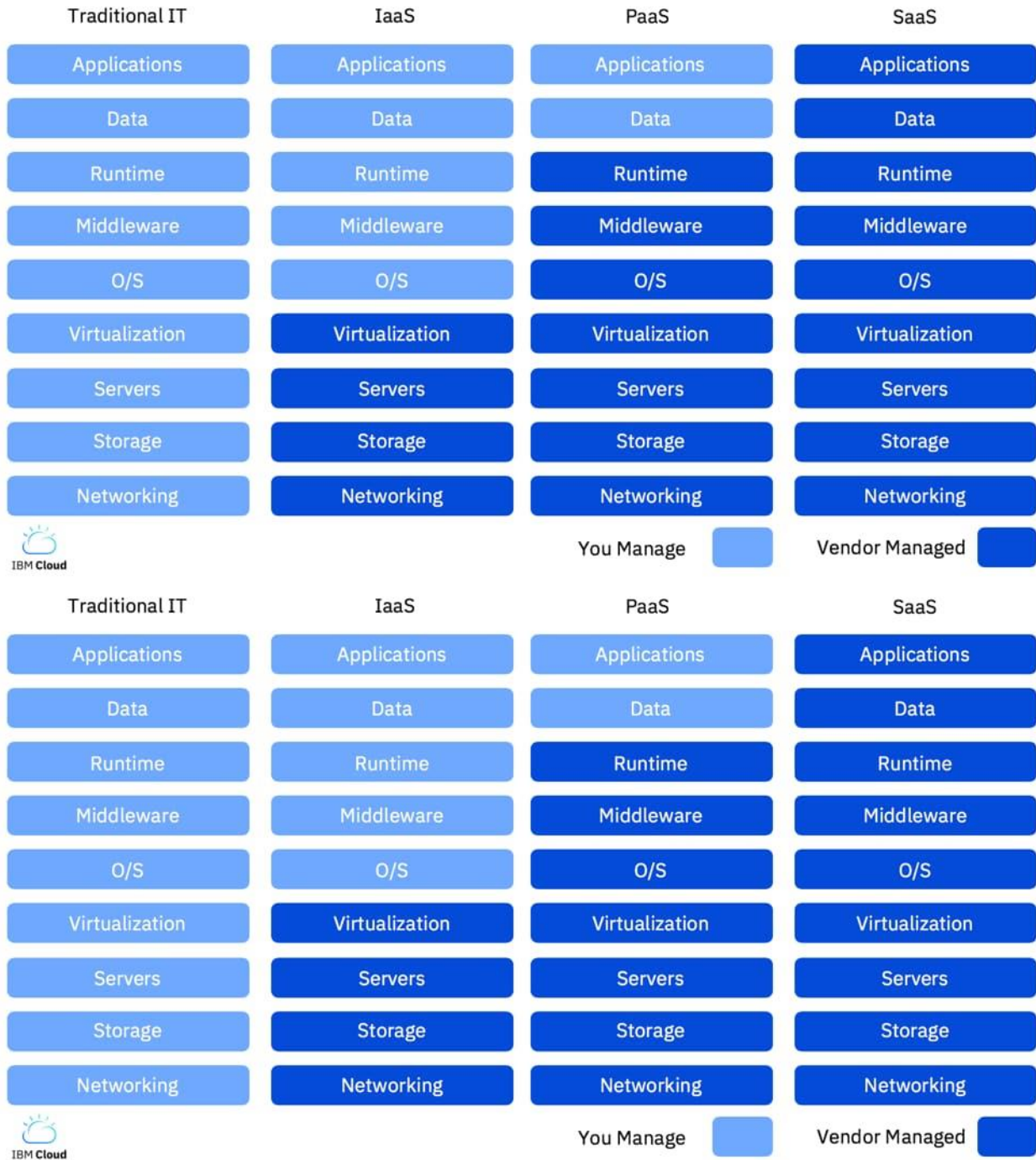


FIGURE 1: MAINSTREAM CLOUD COMPUTING SERVICE MODELS VS. TRADITIONAL IT (IBMCLOUD, 2019)

SaaS, one of the prominent and evolving service models of cloud computing, is a phenomenon that has only in the last decade seen more interest from researchers and business leaders who need to understand the adoption of Internet provisioned applications, for academic and organisational reasons respectively. SaaS allows organisations to offer internal and external stakeholders access to the cloud-based applications via a company network or the Internet. Importantly, SaaS technology directly enables business users to perform mission critical and non-core business capabilities which contribute to the achievement of organisational goals, whilst PaaS and IaaS predominantly support information and communications technology functions. Consequently, this study focused particularly on SaaS.

---

## 1.2 CONTEXTUALISATION

---

In this research, a state-owned company (also referred to as a ‘SOC’) is seen as a public sector institution that is under the control of the government. The public sector plays a significant role in any country, irrespective of economic standing, especially in terms of service delivery to citizens on behalf of the government (Campbell et al., 2010). Thus, the need to improve how public sector organisations deliver service is crucial, and in order to do so IS innovations such as SaaS play a significant role (Tweneboah-Koduah et al., 2014). In South Africa, state-owned institutions rely on technology to deliver services (Masana & Muriithi, 2019). However state-owned companies are confronted by challenges such as bloated capex budget requirements, lack of skills, prolonged procurement processes, and legacy applications that cannot satisfy current and future business needs (Liya, 2014). Consequently, state institutions are exploring cloud computing (including SaaS) to address organisational challenges and fulfil their mandates (Fitch Solutions, 2019).

“Given that the South African government is facing challenges to meet growing demand for enhanced service delivery with a limited budget, disruptive technologies like cloud computing have the potential to enable government to meet its mandate and policy objectives of a collaborative government, greater internal efficiencies and better service delivery” (Masana & Muriithi, 2019, p. 2). This is one of the motivators for this study and the selected context i.e. a state-owned company in South Africa. Additionally, IT managers are faced with complex IT governance frameworks as well as public policy processes that make technology decision making (e.g. SaaS adoption) and related investments more difficult than in the contextually different private sector (Campbell et al., 2010); this further prompted

the selection of the public sector as the context and a state-owned company as the unit of analysis for this research.

---

### 1.3 RATIONALE FOR THE RESEARCH ON ADOPTION

---

Globally, organisations are faced with the decision to either maintain on-premise applications or migrate to cloud based applications (i.e. SaaS). There are significant studies on cloud computing in general and not specifically on SaaS technologies. However, empirical studies within developing countries are scarce as supported by the finding in Ghana (Tweneboah-Koduah et al., 2014) which indicates that there are limited studies on the migration of existing public agencies' IT systems to the cloud. In the South African context, the same was noted despite the significant role of IT artefacts (i.e. SaaS) in studied organisations (Abrahams et al., 2015). Perhaps this is attributed to lack of knowledge on how to approach the very complex decision to adopt SaaS (Trope, 2014) as well as lack of empirically tested frameworks that indicate the key SaaS adoption factors for an organisation to address. This was the motivation for this research i.e. to comprehend the reasons and factors pertaining to how the state-owned organisation to be studied dealt with this complex decision. Furthermore, understanding SaaS adoption factors and how they influence the decision making process is not confined to organisations (incl. practitioners), however this is also critical for Government policy makers, SaaS service providers and researchers.

Therefore, this study focused on specific factors worth considering prior to or during the adoption of SaaS. This is important in order to minimise the effects of adoption challenges in organisations (Benlian & Hess, 2011). The adoption process for technological innovation in organisations, is a sequence of stages which start from Initiation, followed by the Adoption Decision and concluded with the Implementation (Oliveira & Martins, 2011). This research focused on the "Adoption Decision" which is at the organisational level and emphasizes the consideration of pertinent technological innovation adoption factors (e.g. characteristics of the innovation, organisation and environment). It is important to study the adoption phenomenon at the organisational level as the technological innovation, if implemented, ultimately enables the achievement of operational and strategic goals of an organisation, irrespective of industry or sector.

---

## 1.4 RESEARCH OBJECTIVE

---

SaaS represents the technological innovation of interest in this research. The main objective of the study was to review existing literature in order to formulate an integrated TOE-INT conceptual framework (including relevant factors) for the adoption of SaaS in state-owned organisations. The conceptual framework was validated using a single site case study strategy. The framework could be utilised by academics to investigate or test SaaS adoption, and by practitioners as a guideline to consider pertinent factors when faced with SaaS adoption decisions. Furthermore, the framework could benefit Government efforts to effectively regulate SaaS adoption, and SaaS service providers to identify factors deemed critical by state-owned institutions as they package their SaaS offering.

---

## 1.5 RESEARCH DESIGN

---

The research was an interpretivist study that was inductive (i.e. theory building) in nature, with a partial deductive element since factors adopted from existing literature were applied in the context of the study. The research was carried out through a qualitative research methodology, utilising a single site case study strategy at a South African state-owned company. Cross-sectional and qualitative data was collected primarily through semi-structured interviews of participants who have experience with SaaS adoption and reviews of related documentation. The data collected from the case study site was analysed using a thematic approach. The main purpose of this research was to enhance the body of knowledge in the IS field and to better understand the factors considered in the adoption of SaaS within the South African public sector context.

---

## 1.6 RESEARCH QUESTIONS

---

The main research questions that needed to be answered were:

**1.6.1. ‘What are the key factors that are considered by a state-owned company in South Africa when faced with the decision to adopt SaaS technology?’; and**

**1.6.2 ‘How do these factors influence the decision to adopt or not to adopt SaaS in a state-owned organisation?’.**

Sub-questions sought answers to:

1.6.3 ‘What are the key benefits and risks of SaaS in the context of a state-owned organisation within South Africa?’; and

1.6.4 ‘Can the TOE-INT conceptual framework be applied to better understand SaaS adoption in local state-owned institutions?’.

The chosen research topic stemming from the research questions, context and design was ‘**Adoption of Software as a Service: A Qualitative Case Study in a State-Owned Company in South Africa**’.

---

## 1.7 ASSUMPTIONS

---

The first assumption of this study was that SaaS adoption occurs in state-owned companies within the South African context and continues to become prominent due to many factors (including the Covid-19 pandemic), hence the reason for this research.

The second assumption was that the unit of analysis (i.e. single state-owned company) is appropriate as the organisation employs both on-premise and SaaS business applications, hence is predisposed to consider SaaS adoption in response to business needs.

The third assumption was that the Business and IT participants within the studied state-owned company are well versed in previous, current and/or future SaaS adoptions. Therefore they are suitable respondents for this research and need to be directly engaged within their organisational setting.

The last assumption was that the research methodology is appropriate and aligned to meet the research objective and to answer the research questions which are exploratory in nature.

---

## 1.8 THEORETICAL AND PRACTICAL CONTRIBUTION

---

The integrated TOE-INT conceptual framework developed in this study could advance the IS field upon its application by academic researchers, particularly in South African state-owned organisations. The proposed TOE-INT conceptual framework presents a novel mix of factors drawn from theories obtained in the literature reviewed in this study. This unique approach, coupled with the different public sector focus, to the researcher’s knowledge, is different to any extant reviewed literature. This research could contribute towards closing the literature gap on cloud computing or SaaS technologies in

developing and developed economies. The findings from this research can be validated against previous and future studies that are similar.

The study could present empirical evidence for SaaS adoption decision makers or practitioners to plan SaaS adoption initiatives and enhance the related processes for successful implementation of SaaS in state-owned entities.

Findings based on this conceptual framework could be useful for SaaS or cloud computing service providers to refine their offering as well as services in order to be more attractive to South African state-owned institutions. For government, this study could highlight key factors that the government may consider in setting a supportive regulatory environment.

---

### 1.9 LIMITATIONS OF THE STUDY

---

The researcher anticipated some limitations in this study. Firstly, this case study was conducted in a single state-owned company within South Africa, hence may not be generalisable to other local state-owned companies, private sector companies and other countries with different contexts (e.g. government and cultural environments). Additionally, the findings may be affected by distinct characteristics of the state-owned company.

Secondly, the research focused specifically on one cloud computing service model i.e. SaaS, therefore caution must be taken not to generalise the findings to other cloud computing service models such as IaaS and PaaS.

Thirdly, the data collection process was conducted in a short pace of time (i.e. cross-sectional study) and therefore may not have a historic or longitudinal perspective of the phenomenon that may have been exposed in a longitudinal study.

Fourthly, the limitation in the selection of participants (i.e. internal business and IT representatives) may have caused the study to miss other factors and perspectives that could have been mentioned by other employees of the studied state-owned company, as well as external stakeholders (e.g. former employees, consultants, suppliers and so forth).

Finally, this was a qualitative study which may have bias introduced by the researcher's perceptions and experience that could influence the interpretation of the data analysed.

---

### 1.10 ETHICS

---

The research was designed and conducted in a manner that aligns with the ethical guidelines (including anonymity, confidentiality and privacy) of the Wits University. Prior to conducting the study, the researcher sourced written permission from the acting Chief Executive Officer of the case study site (Appendix D) as well as ethical clearance from the Wits University's School of Business Sciences Ethics Committee. Participants were provided comprehensive information (Appendix B) on the purpose and use of the study. Furthermore, they participated voluntarily and provided their written consent to be respondents in this study. Overall, the researcher complied with the ethics guidelines that are stipulated by the Wits University's School of Business Sciences Ethics Committee under which the research project was approved. The study adopted ethical quality assurance guidelines from Rosenthal (1994). Finally the researcher strived to be objective and to behave in a professional and ethical manner as expected within the IS research field, and guarded against interfering with the rights of those involved particularly, the participants, the organisation and university.

---

### 1.11 ORGANISATION OF THIS RESEARCH

---

Chapter 1 presented the introduction of this research, with particular emphasis on the research rationale, objective, design, questions, contributions (i.e. theoretical and practical), and limitations. The remainder of this report is organised into the following chapters:

---

## CHAPTER 2: LITERATURE REVIEW

---

This chapter presents an overview of previous research and findings stemming from a systematic literature review of academic journals and practitioner publications on the adoption of cloud computing and SaaS, at the organisational level. Additionally, this chapter introduces the gaps identified in reviewed literature which are partially addressed in this study.

---

### CHAPTER 3: THEORETICAL BACKGROUND AND RESEARCH FRAMEWORK

---

In this chapter the theoretical background of the research and the integrated TOE-INT conceptual framework for the study are presented. Additionally, the framework's technology, organisation and environment factors that are deemed to have an influence on SaaS adoption are developed. This study utilises the TOE framework as the primary lens to study factors that influence SaaS adoption in a South African state-owned company, with the environment context supplemented by INT theory factors.

---

### CHAPTER 4: RESEARCH METHODOLOGY

---

This chapter describes the methodology that was used to conduct this research. It presents the research philosophy, the related research strategy and the chosen design as well as the procedures for data collection and analysis. Additionally, the research context, qualitative evaluation criteria as well as ethical issues that were considered throughout the study are discussed.

---

### CHAPTER 5: DATA ANALYSIS AND FINDINGS

---

This chapter presents the empirical data collected and the related findings. This chapter analyses the data which was collected from fifteen participants through interviews. Furthermore, this chapter discusses the results as well as interpretation of the findings in relation to the literature reviewed. The research results are used to refine the proposed integrated conceptual framework to include a significant factor which was found in the study.

---

### CHAPTER 6: EVALUATION OF THE RESEARCH

---

This chapter presents a reflection on the research and whether the objective was met as well as the main and secondary research questions answered. The chapter also presents recommendations for future research, as well as contributions and limitations of the study.

---

### CHAPTER 7: CONCLUDING REMARKS

---

This chapter summarises the study, the objective, the process followed and the results realised.

---

## APPENDICES & REFERENCES

---

Appendices are provided to present supplementary material which provides more information that may help a reader to comprehensively understand the related research aspects, such as the final ethics approval, participant information, interview schedule, consent form, research permission letter, and an illustration of a transcribed interview (including coding). Finally, references of cited academic and practitioner literature are provided.

---

## CHAPTER 2: LITERATURE REVIEW

---

---

### 2.1 INTRODUCTION

---

This chapter introduces the key concepts of this research, as well as presents an overview of previous research and findings stemming from literature reviews of existing academic knowledge on cloud computing, specifically SaaS adoption. A discussion on the adoption of innovative technology in organisations is included. Additionally, the researcher provides an overview of cloud computing, positions SaaS (including its advantages, limitations and risks), presents discussions from practitioner literature as well as identified gaps in the reviewed literature.

---

### 2.2 UNDERSTANDING CLOUD COMPUTING AND SAAS ADOPTION

---

SaaS is a type of Cloud Computing hence the logical starting point is with an overview of this technology phenomenon.

---

#### 2.2.1 CLOUD COMPUTING

---

Historically, information Technology (IT) or Information Systems (IS) was deemed to be a product; however this view is changing as many IT service providers are opting to provision IT artefacts as a service (Senyo et al., 2016). This new IS offering is termed Cloud Computing (CC). Existing literature presents various yet parallel definitions or explanations of this new concept. According to Wang et al. (2016) cloud computing is the delivery of computing resources (e.g. software, hardware and information) as a utility through the Internet. Cloud computing is feasibly a branch of the long established IT outsourcing hosting model (Gonzalez & Smith Jr., 2014). Globally, all types of organisations have embraced cloud computing in spite of the fact that adoption and use in developed

economies is significantly ahead of the developing world (Senyo et al., 2016). “Cloud computing refers to both the applications delivered as services over the Internet and systems software in the data centers that provide these services and the hardware services as well” (Hung et al., 2018: p152).

Since mid-2000s the adoption of cloud computing has been a phenomenon of interest to both academics and practitioners, with various studies conducted to understand influencing factors at organisational, individual and societal perspectives. Organisations that intend to implement cloud are faced with complex and diverse decisions to make and this primarily starts with establishing a fit of the cloud computing strategy with the organisation’s strategic goals (Ray, 2016). Despite the noticeable increase in workloads being moved by organisations across different industries into the cloud, and vast amounts of academic research on cloud adoption (including challenges), there is still no single perspective of understanding of the adoption decision and success factors.

Gonzales (2014) extended the cloud computing discussion by noting six types of mainstream cloud services namely, Infrastructure as a Services (IaaS), Software as a Service (SaaS), Platform as a Service (PaaS), Network as a Service (NaaS), Communication as a Service (CaaS) and Storage as a Service (STaaS). Additional variants of cloud computing seen in existing literature include Business Process as a Service, Security as a Service, Data as a Service and Anything as a service (XaaS). The focal point of this paper is SaaS.

SaaS, one of the prominent and evolving service models of cloud computing, is one phenomenon that has only in the last decade seen more interest from researchers wanting to understand the adoption of Internet provisioned applications. SaaS allows organisations to offer internal and external ecosystem stakeholders access to applications hosted in the ‘cloud’ (i.e. public, private, community or hybrid) via company networks or the Internet.

---

### 2.2.2 SAAS HISTORY

---

The history of SaaS is related with some differences by IS researchers and practitioners, however the common view indicates that SaaS became topical in the 2000s. BeBusinessed.com (2017) argues, contrary to popular views from literature, that SaaS emanates from practises that emerged in the 1960s when early computers emerged. Computers at the time coupled with the required facilities and personnel were expensive for most organisations, hence organisations opted to lease computing

services from large organisations (e.g. IBM). This continued well into the 1970s and 1980s, until costs of computing power reduced, hence the emergence of dedicated organisational (or on-premise) datacentres and Application Service Providers (ASP) ensued. Macy (2009) advances that SaaS stems from legacy and centralised application hosting models such as ASP; through which organisations acquired perpetually licensed and single tenant software that was either managed remotely by a service provider or resources internal to the organisation. SaaS<sup>1</sup> emerged as a trend in the early 2000s as evidenced in organisational practitioner and academic literature. Velev (2010) supports this common view and advances that the emergence of SaaS is predominantly attributed to the expansion of the Internet and introduction of Service Oriented Architecture as the illustrated ‘Waves I-IV’ in Figure 2.

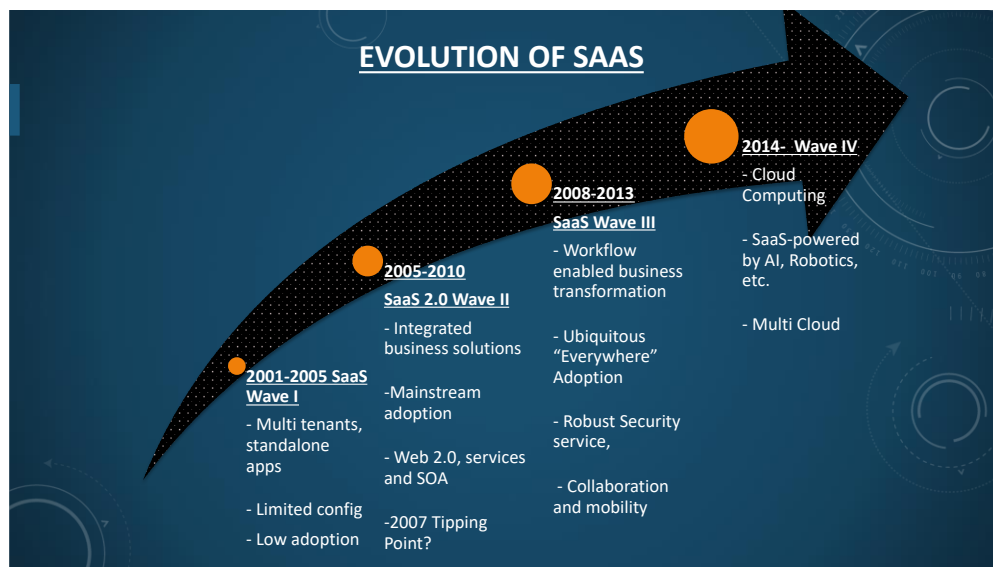


FIGURE 2: EVOLUTION OF SAAS (VELEV, 2010)

In the early stage (i.e. SaaS Wave I; 2001-2005) SaaS offered standalone applications, limited configurability and the focus of service providers was on quick implementations (Velev, 2010). Initially SaaS was primarily adopted by SMEs as they did not have the capital to invest in large data centres, infrastructure and bloated IT teams. There was low adoption from large enterprises which could not justify writing-off significantly invested in data centres, infrastructure, application software and human resources.

By mid-2000s, Velev (2010) suggests that the second Wave II i.e. SaaS 2.0 (2005-2010) occurred when SaaS became more established with capabilities to integrate business processes (including limited

<sup>1</sup> “SaaS” appears to have been patented in the USA pre-2000s; date and entity are undetermined from reviewed literature.

customisations to cater for specific organisational needs). SaaS Wave III (2008-2013), is deemed the ‘ubiquitous stage’ due to the prominent adoption of SaaS as it focused more on business transformation, and service providers offered customisable SaaS driven by automated workflows. However, SaaS has only in the last decade, during the Cloud Computing ‘Wave IV’, gained more interest from IS researchers and practitioners for assorted reasons. Over the last two decades, SaaS technologies have gradually become vital contributors to the effective and efficient achievement of operational and strategic objectives in organisations across the board.

Earlier deployments of SaaS were predominantly for non-core business capabilities such as Financial Management (2013), Human Capital Management (Chu et al., 2014; Kissane, 2016), Supply Chain Management (Schrödl, 2012), Marketing and Sales (Chu et al., 2014; Kissane, 2016) as well as IT and Cybersecurity (Coyle et al., 2009; Gao et al., 2013; McLellan, 2015). Clemmons et al. (2012) predicted that SaaS will be the future of the IT landscape and the increase in mergers and acquisitions that will occur as service providers aimed to improve SaaS product competitiveness (e.g. SAP with Success Factors for better human resource management and Oracle with RightNow for enhanced customer relationship management).

After 2010, Internet advances coupled with the maturity of other enabling technologies (e.g. SOA and web services), more large enterprises and governments opted for SaaS solutions. Additionally this period saw the growth in service providers offering vertical or mission critical SaaS solutions to accommodate different needs of industries such as Oil and Gas (Accenture, 2012), Automobile (He et al., 2014), Media (Prakash et al., 2013; Wu et al., 2015), Telecommunications (Zhou et al., 2017), Financial Services (de Meijer & Brown, 2014), Real Estate (Mladenow et al., 2015), Metals and Mining (Global Business Report, 2019), Manufacturing (Gould, 2018) and Health Care (Reitzel, 2019).

To-date SaaS offerings have matured to enable end-to-end business capabilities (Velev, 2010). According to Kraft (2018), SaaS had 68.7% of the overall market share in 2018, led by private sector whilst public sector, especially, governments were lagging behind. Furthermore, SaaS is attributed as the backbone for numerous new trends; however there is also focus on improving some of the barriers to adoption and post assimilation challenges.

---

### 2.2.3 SAAS DEFINITIONS AND CHARACTERISTICS

---

SaaS has several though aligned definitions which are presented in the literature reviewed as part of this study. Hung et al. (2018) advance a simple definition illustrating SaaS as cloud-based applications which are managed (including installed on service provider's infrastructure) as well as supported by the service provider and accessed by subscribers via the Internet. In IS literature, SaaS is further credited as a growing technology that can lead to operational and financial benefits for an organisation. "SaaS is a service which provides the customer with access to vendor-supplied application systems (e.g., Microsoft Office 365, Concur expense reporting, and Salesforce.com customer relationship management systems) running on the vendor's off-premise infrastructure" (Gonzalez & Smith Jr., 2014: p127). Benlian and Hess (2011) posit that SaaS is well positioned to mitigate deficiencies of the traditional application deployment model i.e. on-premise software; this is aligned with how the providers of SaaS publicise it. According to Gartner, Inc. SaaS is a delivery method for software that is owned and remotely managed by one or more providers; its functions are accessed through a network, the Internet or web based services (Velev, 2010). "SaaS is becoming an increasingly viable choice for organizations looking for the accessibility and versatility of software solutions and data analysis tools and without the need to rely on installing and running applications on their own computer systems and data centres" (Durcevic, 2018, p:1). This latter definition is the chosen one for this research.

The key characteristics of SaaS include the fact that the software is rented or leased by the organisation, it is fully owned and managed by the service provider, hosted on multitenant architecture, used by organisational subscribers via networks such as the Internet and Virtual Private Network (VPN). SaaS software usage (e.g. users, computing resources, transactions or volumes) is typically paid for on a subscription based or utility Pay-as-you-Go (PAYG) model (Kraft, 2018). The two common varieties of SaaS are Vertical SaaS for specific industries and Horizontal SaaS for enterprise functions or capabilities. Mell and Grance (2009) suggest key SaaS characteristics to include broad access via digital devices as well as infrastructure and application management by service provider(s). Furthermore, SaaS can be institutionalised in four deployment models i.e. Private for a single organisation, open for Public use, reserved for a Community of users, and a Hybrid combination of the afore-mentioned models. In instances where the organisation has not migrated all software to the cloud landscape, the hybrid SaaS deployment model will also include on-premise software. Durcevic (2019) highlights characteristics such as flexible pricing or payment options, effortless scalability, mobility of access from any digital device and location, lean IT operations, and strengthened collaboration (including with external organisational ecosystem).

---

## 2.2.4 SAAS BENEFITS, RISKS AND CHALLENGES

---

SaaS technology has a wide set of key benefits and challenges as well as risks that need to be carefully considered when any organisation is faced with the decision to adopt and assimilate such an innovative cloud computing service model; this is where the existing and future literature can be of value.

The following key benefits of SaaS are widely propagated by SaaS service providers, implementing consultants, industry associations, and companies where assimilation has been successful:

*2.2.4.1 Initial cost:* Kraft (2018) proposes that initial SaaS costs are minimised as the organisation does not need to acquire new infrastructure and related application costs (e.g. implementation services and software licenses); all that is required from the organisation is uninterrupted network connectivity. According to Benlian and Hess (2011) the strongest motivation for IT Executives to consider SaaS opportunities is the cost advantage. Deloitte (2012) argues that although the upfront costs of SaaS are generally lower, over a five-year term the infrastructure and license costs of on-premise solutions are often less expensive than SaaS subscriptions; especially for organisations with established and well-run IT operations.

*2.2.4.2 Convenience and time to value:* refers to the quick delivery of business enabling solutions as compared to the time-consuming on-premise implementations (Benlian & Hess, 2011); this also includes the frequent feature or functionality updates done by the service provider which the organisation has immediate access to as opposed to delayed yearly upgrades or releases (Gangwar et al., 2015; Tweneboah-Koduah et al., 2014).

*2.2.4.3 Access to new technologies:* this is due to the continuous drive by service providers to augment SaaS with emerging and innovative technologies to satisfy the needs of organisations and industries (Martins et al., 2016).

*2.2.4.4 Configuration and customisation:* Latest SaaS offerings especially when hosted on a private cloud are easy to adapt through setting common parameters and non-programmed features (Seethamraju, 2014).

*2.2.4.5 Technical resource:* Less internal IT employees are required for SaaS, in comparison with the on-premise model which requires infrastructure, applications and more resources on the ground (Trope, 2014). Additionally, with the SaaS model, organisations have immediate access to service provider experts and their knowledge versus internal specialists who are difficult to retain (Benlian & Hess, 2011; Gibson et al., 2012; Loukis et al., 2019).

2.2.4.6 *Innovation and focus on core business*: with SaaS both business and IT focus less on daily ‘firefighting’ (e.g. addressing data or business problems caused by systems) and managing cumbersome IT functions. Their focus is on business innovations and ensuring shareholder value. With the private SaaS model, service providers can integrate innovation immediately and not wait for future versions (Kraft, 2018).

2.2.4.7 *Mobility*: SaaS is deemed ‘ubiquitous’ as it can be used anywhere, anytime, on business approved networks and by authorised internal as well as external organisational stakeholders (Velev, 2010).

2.2.4.8 *Reduced IT infrastructure and application management*: with no infrastructure and applications onsite the organisation fully relies on the service provider for related functions such as installation, maintenance and support including 24/7 services (Gibson et al., 2012).

2.2.4.9 *Scalability and flexibility*: SaaS can be scaled up (e.g. adding memory, disk, storage on multiple machines or locations) and scaled out (e.g. across machines or locations) dynamically (Trope, 2014). This allows the SaaS environment to be flexibly adjusted in response to business needs (e.g. change in business operating model, spikes in the volume of transactions or users) as well as to the capacity needs of all tenants, without service interruption (Ducervic, 2019).

Deloitte (2018) posits that more CIOs are recognising SaaS as a means to transforming IT from being reactive to protective; however cautions that the journey from legacy on-premise environment to cloud-based software is not without challenges worth considering. Key SaaS risks and challenges which are notable at the organisational level include the following:

2.2.4.10 *IT governance, security and privacy*: Since the emergence of SaaS, one major risk highlighted by organisations, has been security threats and potential breaches on data or information (Benlian & Hess, 2011). Macy (2009) suggests that security and privacy issues have been addressed with the maturity of the private cloud model, which is preferred by organisations with complex data and private information such as military departments, banks, and investment brokers. The increased adoption of SaaS, even by previously sceptical industries, may be an indicator that service providers have embedded additional information security controls in SaaS technologies. IT Governance is another concern raised by organisations as service providers do not always align with relevant company policies, processes and standards, in addition to industry (e.g. Financial Intelligence Centre Act) or country specific legislation (e.g. Protection of Personal

Information (POPI) or General Data Protection Regulation (GDPR)). Issues of unguaranteed business continuity (including disaster recovery) and data storage (e.g. country of location) are dominant in both academic and practise literature.

2.2.4.11 *Legal*: Lock-in with one service provider is a real concern as this makes it difficult to switch from current to another provider at contract termination; this also links with the difficulty to integrate with other cloud or on-premise solutions (Kraft, 2018). Difficult establishment and management of SaaS contracts and Service Level Agreements (SLAs) is raised by adopting organisations. For instance, on-premise software SLA parameters such as incident response and resolution times are often not directly replicated to SaaS provider SLAs due to standard parameters (e.g. uptime) across multiple customers. Managing the risk of back-to-back agreements between the SaaS provider and third parties, as well as the exit strategy are contentious issues making SaaS contracts risky. Liquidation of a SaaS provider could render an organisation unable to conduct critical business processes, and in certain industries, with dire effects (e.g. a bank could lose the banking license if unable to process all customer transactions due to a SaaS application failure).

2.2.4.12 *Integration*: SaaS adopting organisations encounter difficulties when attempting to integrate the SaaS solution with on-premise business applications or with other cloud-based applications; this complicates end- to-end business processes and enterprise architectures. For instance, even with non-mission critical requirement within human capital management (HCM) solutions, no single vendor can enable all business capabilities in one SaaS offering (Macy, 2009).

2.2.4.13 *Loss of control*: as IT service management is mostly relinquished to the service provider, the organisation loses control over software availability. For instance, in the event of a critical priority incident where all users in the organisation have no access to the SaaS solution, the organisation (including internal IT resources) cannot do anything except to wait for the service provider to restore the software or switch to a failover environment (where available). Additionally software management lifecycles (e.g. patching and releases of software updates or versions) are totally outside the organisation's control, and in most instances the organisation has no choice but to allow deployment of all SaaS provider initiated software changes and align business processes accordingly.

2.2.4.14 *Networking and SaaS performance*: reliance on the networks (e.g. Internet and virtual private network) means that when a user does not have reliable connectivity then the use of SaaS

software is hindered hence an interruption to business activities. SaaS solution performance may be degraded due to various reasons such as remote processing (e.g. organisation to SaaS provider location), atomic or micro services which may be processed by the SaaS solution across geographically dispersed locations; user experience is negatively impact by such occurrences.

2.2.4.15 *Cost management*: Once off costs and primary subscriptions (e.g. flat rate, Pay as You Go or Pay Per User/Group) are fairly predictable; though concerns regarding reducing users is not ordinarily accommodated by services providers. The bigger concern pertains to hidden and sometimes unknown cost for example, abandoning perpetual licenses, integration with other business applications and switching costs. Budgeting for SaaS technologies challenges organisations due to the high elasticity of the commercial model.

In the next section the current SaaS trends, globally and within SA, are outlined.

## 2.3 SAAS TRENDS – WORLDWIDE

---

SaaS has been trending since early 2000s, remains a ‘hot topic’ for practitioners and IS researchers, and the SaaS market is predicted (mostly by practitioners) to continue to grow in market adoption well into the 2020s (Durcevic, 2018). BetterBuys (2016) reports that the SaaS industry expenditure in the USA is expected to reach \$55 billion by 2026. Forbes (2018) predicted that SaaS public cloud, business services and applications are expected to reach \$236 billion by 2020. Heiser and Santoro (2018) suggested that the global public cloud service market will total \$206.2 billion in 2019 which is 17.3% growth from \$175.8 billion in 2018. In 2018, 73% of surveyed organizations stated that almost all of their applications will be SaaS-powered by 2020 (Durcevic, 2018). This is supported by Reisinger (2018) who speculated that SaaS solutions will focus on applications and system infrastructure software. Gartner (2018) suggest that the SaaS market will rise to \$113.1 billion in 2021, up by almost double from the 2017 profits of \$58.8 billion. Blissfully (2019) studied over 1,000 companies globally and found that SaaS spending and adoption will continue to grow quickly in 2018 across all company sizes. Global company spending on cloud computing and SaaS is on the rise based on these forecasts as well as annotated in public financial statements. In 2018, the average USA company spent \$343,000 on SaaS, a 78% increase from the 2017 (Blissfully, 2019).

*South Africa Information Technology Report - Q3 2019* (2019) forecasts are similar for South Africa as the enterprise adoption rate for SaaS is expected to grow with broadband infrastructure progression, especially networking bandwidth such as the fibre capacity and undersea cables (e.g. SEACOM and EASSy). Although growth has extended to all sectors, the SME sector is still noted as the leader in adoption. The provision of more IaaS datacentres (e.g. Microsoft and AWS) located in South Africa is also expected to boost the SaaS market share. Strategix (2018) advances that surveyed South African Chief Information Officers (CIO) had hybrid cloud and SaaS as their top priority in 2018; with the hybrid cloud anticipated to grow at a compound annual rate of 22.5% by 2021.

According to recent data from IDC (2019), which comes from an analysis of 20 industries across 47 countries, SaaS is a leading cloud computing model with SaaS spending expected to increase from \$229 billion in 2019 to an estimated \$500 billion worldwide in 2023 Furthermore, over half of SaaS

acquisitions by organisations in 2019, are expected to predominantly be in business applications (i.e. SaaS) followed by infrastructure software.

Additionally, the SaaS market ecosystems reflects an increase in strategic partnerships and collaboration as providers enrich their offerings in response to market needs and availability of innovative technologies. Furthermore the SaaS Hype Cycle (Gartner, 2018) in Figure 3 below reflects the expected prevalence of SaaS and its incremental innovations which are expected in less than 2 years (e.g. cloud office and digital commerce SaaS), 2 to 5 years (e.g. security rating services and digital experience monitoring), 5 to 10 years (e.g. distributed ledgers and cloud data backup) and so forth.

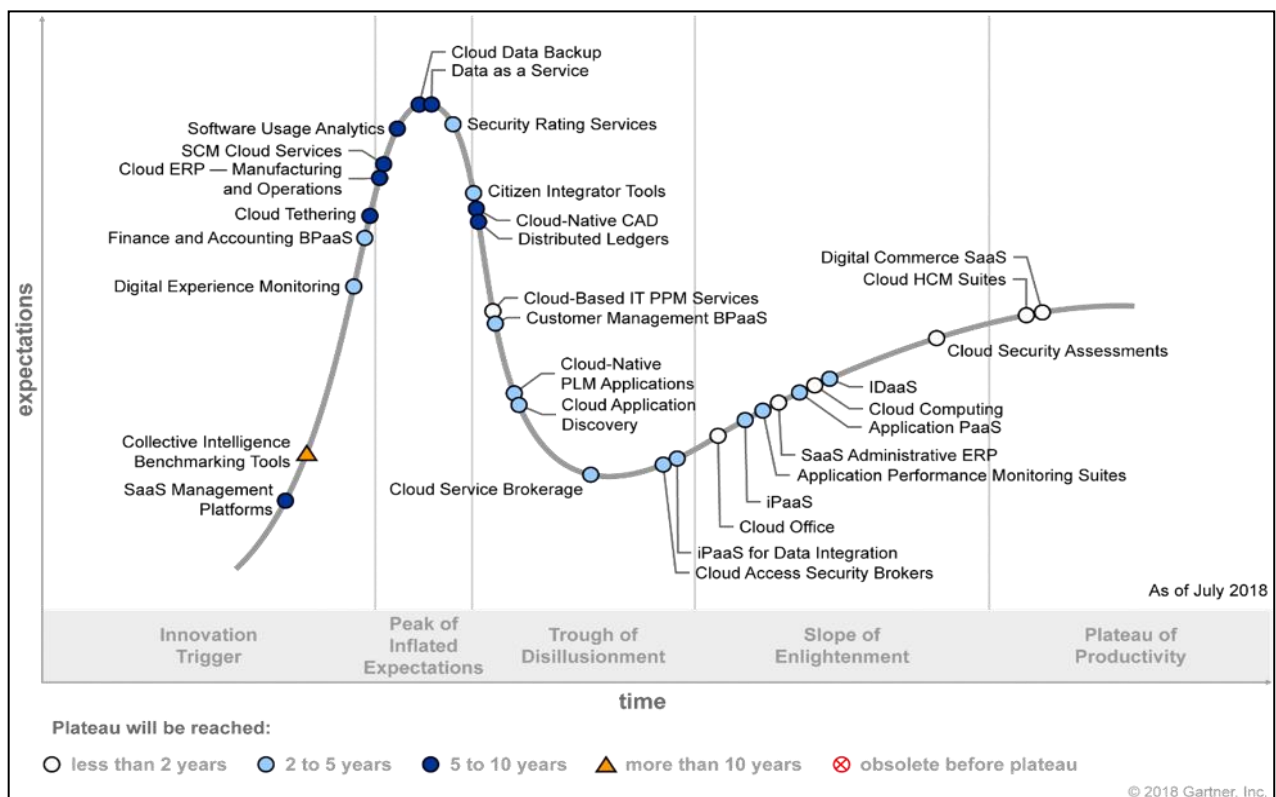


FIGURE 3: GARTNER HYPE CYCLE FOR SAAS (HEISER & SANTORO, 2018)

All projections on the continued growth of SaaS are supported by the Nasdaq (2019) outlook on SaaS markets up to 2023; the use of AI-enabled SaaS is expected to rise significantly and stimulate the SaaS market growth. The researcher anticipates that Covid-19 will affect the projections presented in this study; however exponential growth in SaaS adoption is expected as companies have been forced to enable ‘work from home’ models for employees. Based on the actual and projected growth of SaaS, it

appears that SaaS will remain a dominant cloud computing model within the next few years as it is further enriched with emerging technologies.

---

## 2.4 UNDERSTANDING ADOPTION OF TECHNOLOGY

---

“These days, information technology (IT) is universally regarded as an essential tool in enhancing the competitiveness of the economy of a country. It is commonly accepted today that IT has significant effects on the productivity of firms” (Oliveira & Martins, 2011, p. 1).

Consequently, the study of specific factors or elements worth considering prior to or during the adoption of SaaS is important in order to minimise the effects of adoption challenges in organisations (Safari et al., 2015). The adoption process, for technological innovation in organisations, is a sequence of stages which start from Initiation, followed by the Adoption Decision and concluded with the Implementation (Oliveira & Martins, 2011).

This paper focuses on the “Adoption Decision” which is at the organisational level and the pertinent technological innovation adoption considerations (e.g. characteristics of the innovation, organisation and environment). Oliveira et al. (2019) highlight the popular theories which have been previously used to investigate innovation diffusion and adoption as the Diffusion of Innovation (DOI) theory, TOE Framework, INT theory, Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT).

It is important to study the adoption phenomenon at the organisational level as the technological innovation, if implemented, has to meet performance expectations and ultimately achievement of operation and strategic goals of an organisation.

---

## 2.5 STATE-OWNED COMPANIES

---

In this research, a state-owned company is seen as an institution that is under the control of Government or in which the state is a major shareholder. State-owned companies form part of the public sector and play a significant role in any country, irrespective of economic standing, especially in terms of service delivery to citizens. Thus, the need to improve how state-owned companies deliver service is crucial and in order to do so IS plays a significant role.

South Africa, the locality of this research, has one-hundred and twenty nine state-owned companies which are managed in different portfolios including the Department of Public Enterprises and other ministries. By way of example, state-owned companies include Eskom, Denel, Transnet, South African Post Office, Development Bank of South Africa, Road Accident Fund, Land Bank and Agriculture Bank of South Africa and South African Airways (South African Government, 2021). In South Africa, the state-owned companies are significant contributors to the national income on SaaS spend, and are also adopting SaaS technologies to enable the achievement of their mandates. Therefore the researcher chose to study SaaS adoption within this sector.

“Although the public sector is normally the largest player when it comes to IT spending, the short term sees the expenditure reducing to counteract the increasing debt from the economic downturn and the COVID 19 pandemic” (International Trade Administration, 2020, p. 1).

Liang et al. (2017) suggest that the adoption of cloud computing technology such as SaaS brings resounding outcomes for governments, such as efficiency, provision of superior quality service, enabling transparency and transformation of functions widely.

“UN's report of cloud-computing economy in developing countries advised policymakers at national level to consider following issues in order to translate the potential advantages of CC into tangible development gains: (a) assess the cloud-readiness of the country; (b) develop a national cloud strategy; (c) address the infrastructure challenge; (d) address relevant legal and regulatory issues related to cloud adoption; and (e) Address the need for human resources” (Hung et al., 2018: p152).

eGovernment (Al-rawahna et al., 2018) is emerging as a new cloud computing delivery model which represents electronic services (including IaaS, PaaS and SaaS), for entities and citizens, in the government domain. “Compared to a large number of studies on cloud computing adoption in private sector, and e-Gov adoption from citizen and government sides, there are relatively few studies investigated cloud computing adoption in the context of public sectors, despite the significance of e-Gov cloud” (Liang et al., 2017: p482).

It seems that SaaS adoption is very challenging for organizations especially when there are no specific attributes to be considered in moving to SaaS. Therefore, investigating affecting factors for the adoption of SaaS is of great importance (Safari et al., 2015).

## 2.6 OVERVIEW OF EXISTING LITERATURE – CLOUD COMPUTING/SAAS ADOPTION

---

Once the researcher had established the IT artefact to be investigated as SaaS and the phenomenon of interest as adoption of innovative technology, as studied through the lens of the TOE framework and the Institutional theory, a systematic review of existing body of knowledge was undertaken. This section highlights the two literature reviews which were conducted to determine the state of existing knowledge related to the organisational adoption of cloud computing, particularly SaaS, studied with the TOE framework and the Institutional theory.

Firstly, to systematically identify relevant and existing literature in the SaaS adoption, studied with the TOE framework, within Public Sector (including state-owned companies) the following adapted from a methodology by Okoli and Schabram (2010) as illustrated in Figure 4 below, were performed:



FIGURE 4: LITERATURE REVIEW METHODOLOGY (OKOLI & SCHABRAM, 2010)

In the first literature review, SaaS and TOE framework were used as they were the primary abbreviations that reflect in references on the study's IT artefact and theory respectively. The initial search string was 'SaaS AND Adoption AND TOE AND "Public Sector" y:[2009-2019]', however further combinations expanding SaaS and TOE were used. Additionally, Public Sector was substituted with searches for 'government' and 'state owned institution/enterprise/company) to broaden the search.

The second literature review was conducted using insights from the first review. The key difference was the addition of studies that used both the TOE framework and the INT theory to study SaaS in organisations; this was done because the researcher had decided to develop an integrated conceptual framework with the Environment context enhanced with the INT theory pressures. The second literature review also searched for recent articles i.e. from 2019-2020.

Both literature reviews were conducted on academic journals (e.g. MIS Quarterly, Journal of Information Systems, European Journal of Information Systems, Government Information Quarterly and Journal of Enterprise Information Management), databases (e.g. EBSCOHost, ProQuest Central, JSTOR, ScienceDirect and SCOPUS), Google Scholar and SA sources (e.g. Sabinet and SA Government Gazette), to find existing literature on SaaS adoption in government organisations globally.

The bibliographic search for SaaS during the past 10 years, using search criteria with a combination of the terms “SaaS”, “Software as a Service” and “Cloud Computing”, revealed an upward growth of SaaS literature over the years. It is worth noting that without the year restriction, selected articles on SaaS date back to the late 1990s.

The searches were restricted with additional criteria such as only studies that are peer reviewed English papers, focusing on organisational adoption of cloud computing (including SaaS). Overall the initial searches yielded 440 items which through subsequent analysis (including removal of duplicates, reviewing abstracts of articles and ultimately the full text) were reduced to 23 relevant papers.

---

## 2.7 EXISTING LITERATURE CONTEXTS, MODELS AND FRAMEWORKS

---

The reviewed literature revealed that various adoption models and frameworks have been used to study and better understand the adoption phenomenon within organisations. Oliveira et al. (2019) highlighted the popular theories which have been previously used to investigate innovation diffusion and adoption as the Diffusion of Innovation (DOI) theory, TOE Framework, INT theory, Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT) and the Lacovou model. Additional insights from the 23 reviewed studies indicated that only 9 papers (39%) were inductive or based on an interpretivist paradigm, 6 papers (26%) conducted case study research, 5 studies (22%) were conducted in South Africa, 18 papers

(78%) used the TOE framework and only 8 (35%) papers focused specifically on SaaS; this is further justification for the proposed research and conceptual framework.

Despite addressing the topic of innovative technology adoption i.e. cloud computing and/or SaaS, the 23 selected reviewed papers put forward mostly similar as well as contradictory arguments and findings. They presented different contexts (e.g. sector, industries and countries), theories, models and conceptual frameworks. However, a shortcoming related to the scarcity of studies and empirical evidence that can contribute to understanding specifically SaaS adoption in state-owned organisations within SA was noticed.

“Furthermore, it was discovered that very limited research has been undertaken regarding the adoption of cloud computing within the South African context” (Trope, 2014, p. 38). The researcher did not locate research using the TOE framework and Institutional Theory to investigate adoption of cloud computing withing a state-owned company in the South African context. Oliveira et al. (2019) posit that due to the fundamental differences in the primary focus of cloud computing technologies i.e. IaaS for Infrastructure of IT Operations’ teams, PaaS for Developers and SaaS for End Users, it is necessary to have studies that focus on SaaS adoption and the different factors considered when organisations decide to implement such innovations.

Another shortcoming noted in existing research was the focus on developed countries where the availability of infrastructure, SaaS technologies, cultural environment, government regulations and adoption rates of SaaS are different from developing countries. In the study by Mokwena and Hlebela (2018) it is highlighted that the SaaS adoption rate in South Africa is fairly low when broadly compared with other countries.

A significant number of the reviewed papers studied the adoption of cloud computing and/or SaaS using the TOE framework to explain the Technology, Organisation and Environment contexts in terms of the qualities of the innovative technology.

---

## 2.8 SUMMARY OF CHAPTER

---

Overall, the previous literature was found, by the researcher, to be very helpful in better understanding organisational adoption of cloud computing as well as SaaS. Although literature on the latter was

limited; the studies on cloud computing had foundational insight which could be applied in the study of SaaS adoption within the organisational level. Many developing economy governments (including South Africa) are dealing with critical matters (e.g. telecommunications, localisation of data and cross-country transaction requirements) that hinder adoption of multi-country located cloud offerings (Liya, 2014). This is another reason why the researcher selected to focus on SaaS as the IT artefact and a state-owned institution as the unit of analysis.

In the next chapter the theoretical background of the research and the integrated TOE-INT conceptual framework for the study are presented.

---

## CHAPTER 3: THEORETICAL BACKGROUND AND RESEARCH FRAMEWORK

---

---

### 3.1 INTRODUCTION

---

The aim of this chapter is to provide insight on the theoretical background of this research and the integrated TOE-INT conceptual framework that was proposed before data analysis stage. Additionally, the framework's technology, organisation and environment factors that are deemed to have an influence on SaaS adoption are developed.

The TOE framework (Tornatzky et al., 1990) is prominently used to study adoption of technological innovations at the organisational level. Other reviewed studies used integrated models or frameworks such as those that combine TOE with INT (Alsanea & Wainwright, 2014; Martins et al., 2016; Oliveira et al., 2019), DOI (Martins et al., 2016; Safari et al., 2015), and Transaction Cost Theory (Gangwar et al., 2015; Ray, 2016) to study adoption at the organisation level.

This study utilised the TOE framework as the primary lens to study factors that influence SaaS adoption in a South African state-owned company, with the environment context supplemented by INT theory factors.

---

### 3.2 THE TECHNOLOGY ORGANISATION ENVIRONMENT (TOE) FRAMEWORK

---

This study explored SaaS adoption at the organisational level through the lens of the TOE framework because it has strong theoretical literature backing and suggests different sources of influences without specifying factors; this allows adaptability during data collection in the study of the complex adoption phenomenon and IT artefact (i.e. SaaS). Furthermore, as noted by Oliveira et al. (2019), despite its

adaptability the TOE framework still has a sound theoretical foundation which over time has been supported by empirical results. In this research, the emphasis of the environment context was critical due to the nature of the context (i.e. the public sector) that is controlled by the Government which directly influences SaaS adoption decisions in state-owned institutions.

The TOE framework posits that Technology Adoption depends on three key influencing factors i.e. Technology, Organisation and Environment Contexts (Tornatzky et al., 1990).

---

### 3.2.1 TECHNOLOGY CONTEXT

---

The Technology context entails internal and external technologies (including processes) of relevance to the organisation, those that can stimulate technology adoption and are in use, or those in the market place but not presently operational within the organisation (Abrahams et al., 2015; Dwivedi et al., 2012; Gutierrez et al., 2015; Oliveira & Martins, 2011).

---

### 3.2.2 ORGANISATION CONTEXT

---

The Organisation context includes the attributes of an organisation such as size, degree of formalisation, internal communication processes, organisational design and degree of centralisation (Abrahams et al., 2015; Dwivedi et al., 2012; Gutierrez et al., 2015).

---

### 3.2.3 ENVIRONMENT CONTEXT

---

Finally, the Environment context accounts for the macroeconomic, industry structures, availability of technology providers, regulatory framework and competition that the firm operates under (Abrahams et al., 2015; Dwivedi et al., 2012; Gutierrez et al., 2015; Oliveira & Martins, 2011).

Together the above-mentioned TOE aspects represent issues (i.e. limitations and opportunities) for technological innovation adoption in organisations.

---

### 3.3 THE INSTITUTIONAL (INT) THEORY

---

The INT theory suggests that organisations are in an environment that changes as a result of institutional pressures and similarly organisations shape the behaviours and cognition of its employees (Martins et al., 2016) . Furthermore, organisational decisions are driven by external cultural and social factors, therefore when an organisation decides to adopt technological innovation it is influenced by the environment where it operates (Martins et al., 2016). The INT theory identifies three environmental pressures, namely Mimetic, Coercive and Normative.

---

#### 3.3.1 MIMETIC PRESSURES

---

Mimetic pressures result from an organisation imitating other organisations in response to uncertainty (Abrahams et al., 2015; Liang et al., 2007; Martins et al., 2016; Oliveira et al., 2019). Trope (2014) suggests that mimetic pressures cause the organisation to gradually change to be similar to other organisations in its environment, and when adopting a technology an organisation will follow peers to assimilate favourable technological innovations.

---

#### 3.3.2 COERCIVE PRESSURES

---

Liang et al. (2007) and Oliveira et al. (2019) posit that Coercive pressures result when an organisation succumbs to pressure from the external organisations they depend on as well as the societal expectations within their ecosystem; examples are pressure as a result of government regulatory environment, and from the broader industry (e.g. professional associations and networks).

---

#### 3.3.3 NORMATIVE PRESSURES

---

Normative pressures result from professional beliefs, norms, methods and rules which legitimise occupations (Liang et al., 2007; Oliveira et al., 2019). Furthermore, the interchange of employees amongst industry players, with similar education and professional experience, leads to reshaping of organisational behaviour in line with the new employee entrenched methods (e.g. ‘best practise’).

The INT theory has been found to be suitable to study different IS technologies in organisational contexts. According to Trope (2014) this theory has been extensively applied in over two decades within social sciences, political sciences and IS research; it is useful for understanding internal and external influences on organisations that are involved in change programmes with technological

innovation as the enabler (e.g. ERP and EDI). Consequently, this research produced an integrated conceptual framework that considers mimetic, coercive and normative institutional pressures, and describes how these pressures can be utilised to better understand organisational adoption of the SaaS technology.

### 3.4 INTEGRATED TOE-INT CONCEPTUAL FRAMEWORK

Oliveira and Martins (2011) posit the importance of using an integrated theoretical model or framework to better understand the complex adoption process of technological innovation. Therefore, this research aimed to contribute to knowledge by developing the integrated TOE and INT conceptual framework (Figure 5) to study SaaS adoption in South African state-owned organisations. This conceptual framework illustrates that Technology, Organisation and Environment contexts are considered by organisations to inform the decision to adopt or not to adopt SaaS technology. All factors have drivers/benefits and barriers/inhibitors of which the net effect results in the organisational decision.

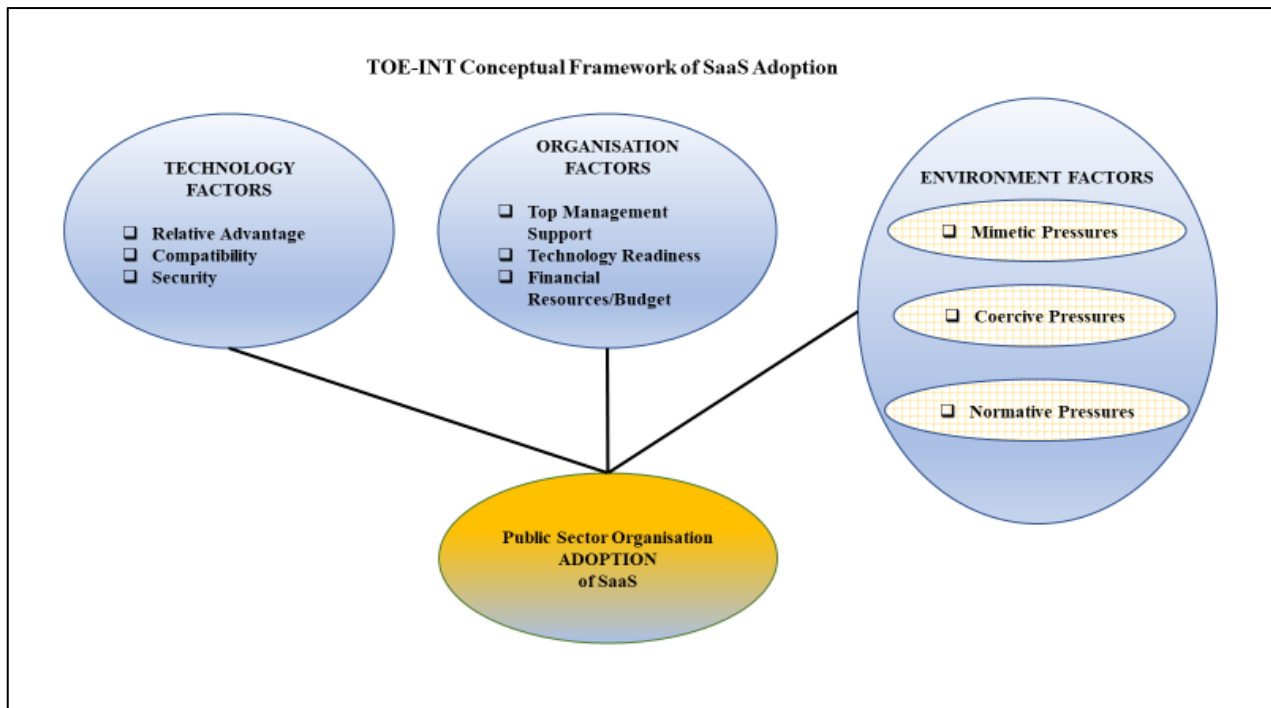


FIGURE 5: PROPOSED INTEGRATED TOE-INT CONCEPTUAL FRAMEWORK

Based on prominent and empirically researched factors from the literature reviewed, nine factors were found relevant to better understand cloud computing and SaaS adoption, and therefore were included in the integrated TOE-INT conceptual framework. These are Relative advantage, Compatibility, Security, Top management support, Technology readiness, Financial resources/budget as well as

Mimetic, Coercive and Normative pressures. The following sub-sections present the selected factors included in the proposed TOE-INT conceptual framework.

---

### 3.4.1 TECHNOLOGY CONTEXT

---

3.4.1.1 *Relative Advantage*: According to Rogers (1983), relative advantage means the degree to which a technology is recognised as providing value to organisations. Greater organisational benefit may encompass how the technological innovation could result in IT total cost of ownership reduction, ease of collaboration of the organisation with its ecosystem, and so forth. This aspect needed to be understood better in terms of the real benefit for government institutions.

3.4.1.2 *Compatibility*: Rogers (1983) explained compatibility as the degree to which a technological innovation is recognised to be attuned to the adopting firm's principles, practices and business requirements. In cloud computing, it is critical to understand if the new technology will be compatible with existing organisational technology architecture (Gangwar et al., 2015). This needed to be explored more with state-owned organisations in relation to SaaS adoption.

3.4.1.3 *Security*: Defined as “how organisations feel about security systems in cloud services and whether they are willing to store their data in these systems irrespective of concerns” (Senyo et al., 2016, p. 511). Martins et al. (2016) highlight SaaS security concerns pertaining to user access and identity management which are controlled by the SaaS provider hence the organisation may not be in touch with related security breaches nor vulnerabilities if not notified by the provider. Governments have a huge responsibility to protect state and citizens' data as well as information; exploring this factor would reveal insights on how this responsibility influences the decision to adopt SaaS.

---

### 3.4.2 ORGANISATION CONTEXT

---

3.4.2.1 *Top management support*: Top management support is essential for the decision making process, adoption and assimilation of new technologies in an organisation, and is credited in academic as well as practice knowledge as a key contributor to achievements of IT initiatives (Oliveira et al., 2019). This includes the leadership direction and commitment provided by management to establish the desired environment for the adoption of SaaS (Martins et al., 2016). Leadership in organisations is responsible for resolving bottlenecks, provision of

resources and ensuring conducive culture and climate for the adoption and implementation of new technologies (Gangwar et al., 2015).

3.4.2.2 *Technology readiness*: Senyo et al. (2016) posit technology readiness as the degree to which organisational resources (i.e. competent human and ‘fit for purpose’ infrastructure) are necessary to support technological innovation adoption. The organisation needs to be predisposed and employees willing to adopt the technological innovation such as SaaS.

3.4.2.3 *Financial resources/budget*: financial resources (e.g. budget for capital and operational expenditures) refers to the availability of funding for direct and indirect costs of adopting the technological innovation throughout its lifecycle in the organisation (i.e. from adoption to assimilating to decommissioning). Government spending is a critical component of running a country; studying this aspect would provide insights on how SaaS cost models are factored in the SaaS adoption decision.

---

### 3.4.3 ENVIRONMENT CONTEXT

---

The *Mimetic pressures*, *Coercive pressures* and *Normative pressures* as previously defined in Section 3.3 above, were included as the Environment factors in the integrated conceptual framework. State-owned organisations are also exposed to environmental influences (e.g. government regulations, trading partners, professional associations) which needed to be examined, across mimetic, coercive and normative pressures, in order to better understand how they inform the decision to adopt or not adopt SaaS technologies.

---

### 3.5 SUMMARY OF CHAPTER

---

This chapter provided the theoretical background of this research and proposed an integrated TOE-INT conceptual framework that was developed before data analysis stage. The next chapter presents the research methodology, the research context, qualitative evaluation criteria as well as ethical issues to be considered throughout the study.

4.1 INTRODUCTION

This chapter presents the methodology employed in this research by unpacking key aspects such as the research philosophy, approach, the related research strategy and the chosen design as well as the procedures for data collection and analysis. Additionally, the research context (i.e. single case site), sampling approach, qualitative evaluation criteria as well as ethical issues that were considered throughout the study are discussed. The researcher also explains the reasons for the selected research paradigm and design, as well as the appropriateness of the chosen methodology in line with the research objective and questions.

Scientific inquiry requires a researcher to be clear on the research paradigm or the philosophical perspective (including the related assumptions, values, scientific and academic ideas) of choice for each study. This is important as the research paradigm informs the research process and particularly the research design as illustrated in the guiding research onion (Figure 6) suggested by Saunders et al. (2016)

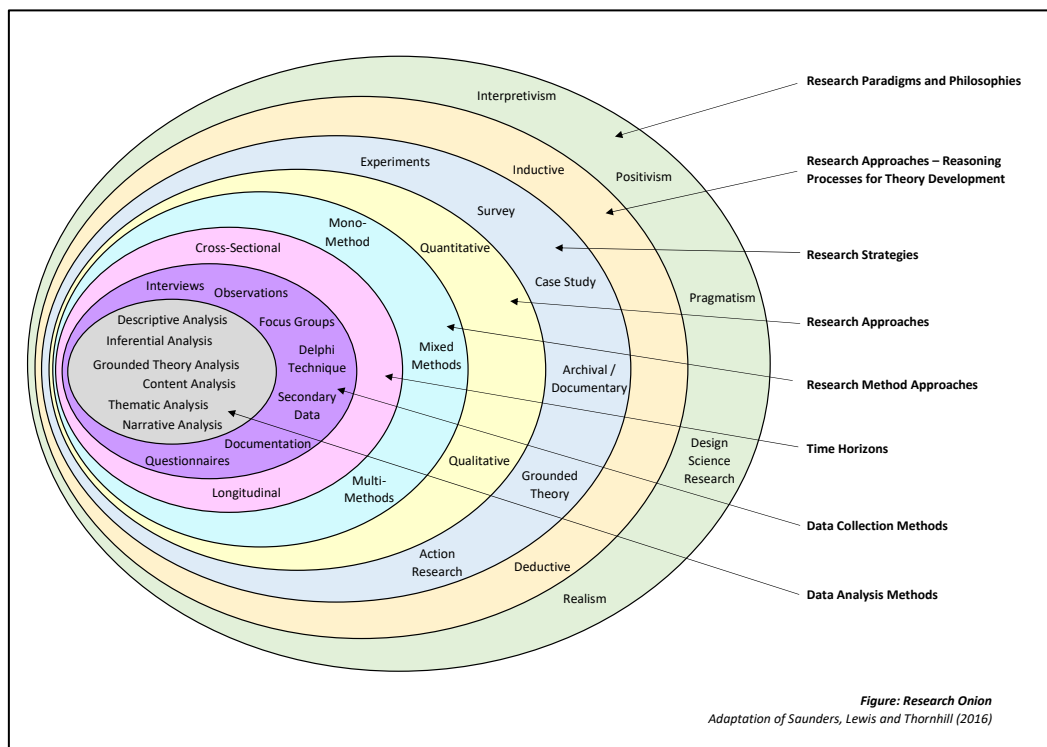


FIGURE 6: THE RESEARCH ONION (SAUNDERS ET AL., 2016)

## 4.2 RESEARCH PARADIGM, APPROACH AND DESIGN

---

The interpretivist approach was selected for this study as it supports the intention to gain in-depth insights through the analysis of qualitative data such as the experience, opinions and feelings of participants pertaining to SaaS adoption in the selected government institution. Also, this paradigm selection was informed by the characteristics of the research questions (e.g. ‘what?’ and ‘how?’). The researcher intended to interact on a one-on-one basis with government employees (i.e. participants) within the state-owned company in a short period of time in order to uncover in-depth insight on the key issues and concerns pertaining to SaaS adoption, as well as how these issues are addressed in the real-life situation. It was expected that the participants’ beliefs, perceptions and experiences would impact the knowledge of reality in this research and these would guide the researcher’s process towards identifying, logically analysing and understanding the relevant SaaS adoption factors.

The selected paradigm is aligned with the key assumptions of Interpretivism, which is founded on the belief that reality consists of people’s experiences within the social context and will change based on the natural or contextual setting (Bhattacharjee, 2012; Oates, 2005; Orlikowski & Baroudi, 1991; Saunders et al., 2016). Interpretivist research is subjective in nature, open to interpretation or reasoning by the embedded researcher. Orlikowski and Baroudi (1991) suggest that in such studies, the phenomenon of interest is inferred through the meaning that is articulated by the people involved. (i.e. meaning assigned by participants). Interpretivist research is deemed useful to evaluate and refine interpretive theories as well as to generate new theory (Bhattacharjee, 2012). Unlike positivism, interpretivism does not seek to generalise findings to a population, the intent is to formulate deeper understanding of meaning assigned by people to the phenomenon within its natural setting (Saunders et al., 2016). Consequently, interpretivist data collection techniques are often primarily qualitative (e.g. interviews) but do benefit from including quantitative data (Bhattacharjee, 2012). Interpretive research is predominantly conducted in-depth and on smaller samples compared to positivist research. This research was inductive (i.e. theory building) in nature with a partial deductive element since concepts adopted from existing literature were applied in the context of the study.

The positivist approach was not appropriate for this study as the purpose of the investigation was not to test theory (Bhattacharjee, 2012), was not relational in nature, did not seek to collect quantitative data nor test hypothesis and relationships between variables. A positivist approach does not consider social views (e.g. opinions) which was the cornerstone of this research. The critical research approach

was also not appropriate as this study had a limited time frame hence could not study SaaS over a period of time in order to unpack the complex ‘totality’ of SaaS and its multiple social realities and influences (i.e. wholistic context).

#### 4.3 RESEARCH METHODOLOGY ALIGNMENT WITH OBJECTIVE AND QUESTIONS

---

Overall the chosen methodology was appropriate and aligned to meet the research objective and to answer the exploratory questions i.e. ‘What are the key factors that are considered by a state-owned company in South Africa when faced with the decision to adopt SaaS technology?’ and ‘How do these factors influence the decision to adopt or not to adopt SaaS in a state-owned organisation?’. The key assumption was that in order to effectively understand and unpack the SaaS adoption factors in South African state-owned organisations, it is better to directly engage participants, and understand their feelings, thoughts and opinions towards SaaS adoption within their organisational setting. Therefore, it follows that epistemologically, the social reality can only be interpreted through interaction with the natural social setting. This study assumed that in order to better understand SaaS adoption in the selected South African state-owned organisation, the researcher needed to be within the phenomenon’s natural setting whilst engaging the participants; this is in line with the epistemological belief of interpretivists (i.e. one must be inside the setting to understand the social processes). Therefore, the research strategy was a case study which was deemed to be appropriate to answer the research questions, to determine the relevance of the proposed conceptual framework and to gain in-depth understanding of the real-life context of the research (Kin, 2003). “This method is well-suited for studying complex organizational processes that involve multiple participants and interacting sequences of events, such as organizational change and large-scale technology implementation projects” (Bhattacharjee, 2012, p. 105).

Bhattacharjee (2012) suggests the following strengths and weaknesses of case research:

CASE RESEARCH: STRENGTHS	CASE RESEARCH: WEAKNESSES
<p>Can be utilised for theory building or theory testing, unlike positivist methods.</p> <p>The factors of interest do not need to be identified prior to the research as they can emerge from the data.</p>	<p>Lacks experimental controls hence internal validity is weak.</p>
<p>Allows for flexibility in the research question/s which can be altered during the course of the study i.e. if found to be irrelevant or inadequate.</p>	<p>The value of the reasoning depends significantly on the experience of the research (e.g. junior researcher may miss case data themes and patterns).</p> <p>Findings are very subjective.</p>
<p>Captures a wealth of contextual data which can help with the interpretation of the phenomenon of interest.</p>	<p>Due to the contextualisation. Aspects of case studies, the interpretations cannot to generalised to other organisations or contexts.</p>
<p>The phenomenon being investigated can be done with multiple participants and at different analysis levels (e.g. organisational and individual).</p>	

TABLE 1: KEY STRENGTHS AND WEAKNESSES OF CASE RESEARCH

#### 4.4 RESEARCH CONTEXT – SINGLE SITE

This study was conducted in a single financial services institution which is wholly owned by the government of the Republic of South Africa. This organisation was established in accordance with an Act and ranks amongst the leading financial services providers in Africa. The institution is located in Pretoria, South Africa. One of this organisation’s strategic goals is to ensure availability of ‘Optimal Information Technology’ which implies that adoption and assimilation of innovative technologies is paramount to the success of this organisation. This organisation was selected by the researcher since it represents a state-owned company, has previously had to and continues to make decisions to adopt SaaS, hence it has the potential to provide the insights necessary for the study. Furthermore, the researcher is employed in the selected state-owned company hence it was convenient for the researcher

(time and resources) to access potential participants in order to study SaaS adoption in a natural setting and to obtain top management approval to conduct the study therein. The researcher anticipated that this exploratory research will be the basis for future studies on SaaS adoption in state-owned institutions, by other academics or self.

---

#### 4.5 RESEARCH SAMPLING – NON-PROBABILISTIC

---

Given that the research strategy is a case study which is focused on in-depth insights, the ideal participants needed to be selected from the employees of the case site through sampling. Sampling for this research followed the purposive (non-probabilistic) sampling approach which Oates (2005) suggests is appropriate when the researcher knows the suitable participants who are most likely to provide valuable data to meet the purpose of the research. Potential participants were selected, before embarking on data collection, according to predetermined criteria such as length of time (i.e. minimum 6 months) within the selected government institution, working in a department involved in SaaS adoption decisions and actively involved in SaaS implementations. This method was considered more appropriate than probabilistic sampling (e.g. random) which could have selected participants who do not have the required insight on SaaS adoption within the institution. Due to the limitations of conducting the research within a single site, the researcher targeted to interview a minimum of ten participants from senior specialist to senior management levels as these are the roles that typically partake in IT decision making processes and committees. However, the final number of participants increased to fifteen due to the positive responses.

---

#### 4.6 RESEARCH DATA COLLECTION PROCEDURES

---

Data collection for this cross-sectional study was conducted over a period of approximately three months between August and October 2020. Multiple data collection techniques (including semi-structured interviews and documentation reviews) were used to collect data from empirical and non-empirical sources. To explore what factors are deemed pertinent and appropriate by participants and how they have dealt with them, this study collected data primarily through interviews that were initially intended to be conducted at the single case study site. However, due to Covid-19 restrictions (e.g. lockdown) all participants were working from home, hence the interviews were conducted virtually through the company's Microsoft Teams platform. Matandela (2017) suggests that one key advantage

of conducting interviews is that they reveal what is happening in the actual setting (e.g. in practise) and directly from the participants who are involved in the phenomenon of interest.

The selected participants (i.e. Business and IT representatives) who are decision makers or involved in SaaS implementations were interviewed on a one-on-one basis. Since this was an exploratory study, semi-structured interviews were conducted using themes (e.g. based on the integrated TOE-INT conceptual framework) and predefined probing questions (i.e. from existing literature) whilst allowing for flexibility depending on the flow of the interactions as suggested by Oates (2005). The interview schedule (Appendix C) was structured into three parts covering the company overview, participant background and SaaS adoption questions. Participants were able to address factors or issues that were not covered in the prepared questions; this assisted to also address potential bias to the selected factors and to enhance the proposed TOE-INT conceptual framework. Secondary data from company documents, media reports, practise research and the Internet were also considered, where appropriate, to collaborate what was said by participants.

As the researcher anticipated, the twofold interviews took between 45 and 60 minutes each, with follow up sessions as and when needed to completely address questions in the interview schedule. The shortest time, to complete the two interviews per participant, was 75 minutes and the longest 120 minutes. All interviews were conducted via video conferencing at a time that was suitable for each participant. Permission from the organisation and participants' consent to partake was requested prior to the interviews and during the interview. Data collected through interviews was recorded using MS Teams which were pre-approved by the participants. Transcripts of interview recordings were extracted from the MS Teams recordings and cleansed (where inaccurate) to match what was said by participants. Data collection procedures ensured the use of multiple sources of evidence; for example where a participant mentioned a certain business case that informed SaaS adoption then the researcher would request the same for cross referencing. In line with recommendations from Kin (2003), the collected data and the chain of evidence from the study was maintained in an encrypted laptop and backed-up in cloud storage that is protected by two-factor authentication.

The interview schedule (Appendix C), was developed prior to data collection and reviewed by experienced researchers who provided commentary of the content in relation to the aims of the research. The schedule contained semi-structured questions that were asked during the interview and were related to the elements of the conceptual framework as well as to address the research objective.

The interview schedule was kept constant throughout the study as it was found to be appropriate based on the first three interviews. Additionally, the same order of the questions was also maintained throughout all interviews. Key differences were in the responses by participants; some participants responded to all questions and some opted to skip certain questions.

The researcher initially sent out invites to thirty potential participants and received twenty-six responses. Due to the excessive number of respondents willing to participate in the case study the researcher decided to enrol the first fifteen respondents for the study. The aim was to prevent focus on participants from the IT department but to also have participants from business units who partake in SaaS adoption processes within the case site.

During the data collection process, the researcher started transcribing interview content, consolidating data in an electronic matrix, and conducting data analysis (e.g. identifying key themes) as and when the two interview sessions were concluded for each participant. “Data collection, data analysis and the development and verification of propositions are very much an interrelated and interactive set of processes” (Saunders et al., 2016, p. 288).

---

#### 4.7 RESEARCH DATA ANALYSIS - THEMATIC

---

The raw data collected through the interviews was analysed mainly using qualitative data analysis, though quantitative analysis was applied (e.g. percentage response per interview question) where practical. Oates (2005) posits that qualitative data analysis aims to extract from collected data themes (i.e. aural, verbal and visual) and patterns which are deemed crucial for the research topic. The study used an iterative thematic analysis process i.e., reading through all data, coding abstracting pertinent themes, grouping these into categories (e.g. from existing theory or raw data), as well as identifying and establishing the meanings of the patterns in order to determine the pertinent SaaS adoption factors within a state-owned company in South Africa.

The researcher used Microsoft Word and Excel for the transcripts and analysis (including coding) respectively. The transcribed data was transferred to Microsoft Excel where during analysis; themes were coded and patterns emerged iteratively. Initially themes that emerged were from the factors of the integrated conceptual framework of this study, however additional themes were also identified.

The data analysis process was, as expected by the researcher, complex, time consuming and iterative. “Thematic Analysis can be used to analyse large qualitative data sets, as well as smaller ones. Leading to rich descriptions, explanations and theorising” (Saunders et al., 2016, p. 606).

The main steps of the Thematic framework that were followed in this study are detailed below (Saunders et al., 2016):

Step 1: Read and comprehend participant’s narratives.

Step 2: Integrate similar data drawn from the transcripts.

Step 3: Identify key themes or patterns for further exploration.

Step 4: Develop or enhance the conceptual framework based on patterns.

Step 5: Reach and verify conclusions.

This process gradually brought about findings and interpretations, aimed at answering the research questions, which were validated with participants prior to the finalisation of the research report.

During the data analysis process the researcher reflected on own biases, perceptions and knowledge in order to avoid unintended misrepresentation of data, hence it was important to have methods to be used to evaluate the quality of the research from an interpretivist perspective. From an interpretivist perspective, the notion of validity and reliability of research studies is not the focus for assessing the quality of the study; Bhattacharjee (2012) supports this with the argument that such studies approach research by simplifying the social reality, and are aimed at interpreting this social reality with subjective viewpoints of the subjects in the natural setting (i.e. context). Consequently, interpretivist findings naturally are less generalisable in the same manner as in the positivist research.

---

#### 4.8 RESEARCH QUALITY

---

The quality of this study was evaluated across the aspects which are comparable to the positivist reliability and validity. Of utmost importance is the element of Trustworthiness (Kin, 2003; Liya, 2014) which the researcher endeavored to ensure across the entire research process. Authentic results (i.e. valid and true) that can be trusted to contribute, be referenced and reusable in future studies was ensured as follows:

---

#### 4.8.1 CONFIRMABILITY

---

Confirmability (Bhattacharjee, 2012; Kin, 2003) which is comparable to positivist objectivity, reflects transparency of all research aspects is critical e.g. with auditable raw data, summaries, analysis and detailed research notes. The researcher maintained the raw audio recordings (with unique identifiers) from all interviews and these fed the transcripts as well as the data analysis spreadsheet. The research data speaks for itself, is traceable, and is not based on biases of assumptions of the researcher. Triangulation of data (i.e. from participants, interviews and documentation) plus detailed explanations of research procedure was performed to ensure convergence of evidence as suggested by Kin (2003).

---

#### 4.8.2 DEPENDABILITY

---

Dependability (Bhattacharjee, 2012; Kin, 2003) which is comparable to positivist reliability, indicates how well research is recorded (especially data collection and analysis procedures) and data documented in great detail. The processes that were documented and followed in the study could enable replicability or traceability of the research process in another similar context study yielding similar results or conclusions.

---

#### 4.8.3 CREDIBILITY

---

Credibility (Bhattacharjee, 2012; Kin, 2003) which is comparable to positivist internal validity, shows that the subjects are accurately identified and described, data well managed and triangulated, plus findings presented in a credible manner. The interpretations and conclusions must be believable to the reader. The researcher spent time to set a mixture of appropriate methods to reconcile evidence collected and sourced peer reviews from supervisor and academic experts. Additionally, the researcher ensured to match the reality of participants' understanding of SaaS adoption by getting the captured interview data and analysis thereof checked by all participants. The data collected was also securely stored for future references, on request.

---

#### 4.8.4 TRANSFERABILITY

---

Transferability (Bhattacharjee, 2012) which is comparable to positivist external validity, ensures that findings are transferrable to another case or settings (i.e. not generalisability). The research methodology, context and participants were described in great depth as well as the important interpretivist research assumptions and limitations such that the setting can be recreated for another study.

---

#### 4.9 RESEARCH ETHICAL CONSIDERATIONS

---

Due to the nature of the study, i.e. case study which involved interviewing and reviewing documentation, it was important to consider ethical implications. The selected participants were requested to voluntarily participate, and their informed consent was crucial. To this end, all participants completed a consent form (Appendix E) prior to the researcher commencing with the interview. Anonymity and confidentiality of participants was assured and applied in all research procedures (including data processing and archival); their right to privacy was upheld and compliance with relevant country and university regulations ensured. Research data was only used for research purposes and not used as a bias at participants' workplace or elsewhere.

The researcher applied for ethical clearance before conducting data collection at the selected state-owned institution. The Ethics Clearance Certificate is contained in Appendix A. Participants were also furnished with a letter from the School of Business Sciences Ethics Committee at the Wits University assuring them of due process to be followed and permission granted to conduct the study. Furthermore, written permission was sourced and the permission letter (Appendix D) obtained from the acting Chief Executive Officer of the case study site.

Prior to conducting and during interviews, the researcher provided comprehensive details regarding the research for the participants to familiarise themselves with the study and coverage. Throughout the process participants were reminded of their right to withdraw from the study if not at ease with the questions or any other research related aspects. The participants were also allowed to opt out of answering questions which they did not wish or were unable to respond to. The study report was

validated and made available to participants, the government institution plus remain under the custody of the Wits University.

The research adopted guidelines from Rosenthal (1994) to ensure ethical quality throughout the qualitative case study. For instance, whilst conducting the research, the researcher followed the appropriate IS professional code of conduct as well as the rules that were stipulated by the School of Business Sciences Ethics Committee at the Wits University. Data analysis and recording was done without data dropping and exploitation. Safe keeping and treatment of data was in line with applicable South African regulations (e.g. Protection of Private Information Act 4 of 2013) as well as applicable conditions stipulated for research conducted in state-owned entities. When reporting results, the researcher guarded against misrepresentation of findings, citations, and self-censoring, whilst upholding anonymity and confidentiality of the participants and organisation.

Overall, in this study the researcher endeavoured to be objective and to behave in a professional and ethical manner that is expected within the IS research field; as well as to guard against interfering with the rights of those involved particularly, the participants, the organisation and university. Due to the interpretivist nature of this study, familiarity with the case site and participants, as well as the complexity of interpreting the multiple realities of the participants, the researcher was continuously aware of their positionality in this research, particularly during data collection (e.g. conduct of interviews) and analysis to ensure that the research outcome was unbiased.

---

#### 4.10 SUMMARY OF CHAPTER

---

This chapter detailed the research methodology employed in this qualitative and single site case research by unpacking key design aspects (including justification), research evaluation and ethical considerations.

The next chapter presents the empirical data collected and the related findings.

### 5.1 INTRODUCTION

---

This chapter presents the analysis of the data collected from fifteen participants during interviews, as well as the review of case site documentation. In line with what was highlighted in Chapter 4 this study employed a qualitative data collection method (i.e. semi-structured interviews) and thematic analysis to understand the data. Furthermore, this chapter discusses the results as well as interpretation of the findings in relation to the literature reviewed. The results were used to refine the proposed conceptual framework to include significant factors which were found in the study; this revised framework is presented at the end of this chapter.

### 5.2 PARTICIPANTS

---

The process of data collection was primarily through semi-structure interviews with case site employees who have been involved in SaaS adoption decision making and/or initiatives. At the start of the data collection process, the researcher sent email correspondence (including internal approval memo and permission letters approving the research) to thirty employees across business and IT units who met the study criteria, requesting their participation in study. Out of the thirty emails sent, the researcher received twenty-six responses within a period of one week; all respondents were keen to participate in the study. The researcher intended to proceed with ten participants however, due to the avid interest accepted the first fifteen respondents in order to work with a manageable number of participants and related qualitative data.

After profiling the respondents' areas of employment within the organisation, it was found that the 60% were from the IT department and 40% from various business units (i.e. core business and support functions). Table 1 shows the 15 participants according to the high-level business area.

<b>IT Participants</b>	<b>Business Participants</b>	<b>Total</b>
9 (60%)	6 (40%)	15

TABLE 2: PARTICIPANTS BY AREA OF FUNCTION

Furthermore, the participants were profiled according to their role level within the organisation. Participants within senior and middle management were well represented, comprising of 80% of the total sample. Senior specialist were 20% of the total participants. Table 2 shows the split of the 15 participants according to the level of their roles in the organisation. This split in terms of role level implied that there was good representation of SaaS adoption experience across different role levels.

<b>Role Level</b>	<b>Number of Participants</b>	<b>% of Participants</b>
Senior Management	6	40%
Middle Management	6	40%
Senior Specialist	3	20%
	<b>15</b>	

TABLE 3: PARTICIPANTS BY ROLE LEVEL

Participants were profiled by their years of employment in the organisation. Participants with an excess of ten years of experiences dominated at 27%. 60% of the participants had over 4 years and up to 10 years of experience in the organisation. All participants had over 6 months of experience with the lowest number of experience at 2 years; thus all participants were considered to be appropriate for the study. Table 3 provides the breakdown or the number of participants based on years of employment at the state-owned institution.

<b>Approximate Years in Org</b>	<b>Number of Participants</b>	<b>% of Participants</b>
0..2	1	7%
>2..4	1	7%
>4..6	3	20%
>6..8	3	20%
>8..10	3	20%
>10	4	27%

TABLE 4: PARTICIPANTS BY YEARS IN THE ORGANISATION

In summary, the participants' characteristics presented above reflect that the sample of this study provides appropriate representation of SaaS adoption role players across IT and business departments. The sample consisted largely of employees who have been in the organisation for over 5 years which was in line with the targeted participants i.e. with the relevant experience making and/or influencing SaaS decisions within the organisation.

### 5.3 INTERVIEW QUESTIONS PROFILE AND RESPONSE RATE

---

The semi-structure interview questions were split into three sections as illustrated in Appendix C. In total the study had 42 questions with 31 (74%) dedicated to the Main research questions; this illustrates that there were sufficient questions posed to source from participants their insights in relation to the phenomenon of interest. Out of the 42 questions, 26 (62%) questions had a 100% response rate (i.e. all 15 participants chose to answer). The overall average response rate was 96%; this was deemed to be excellent by the researcher. Refer to Table 5 below for the split in interview questions.

<b>Section</b>	<b>Number of Main Interview Questions</b>	<b>Average Response Rate</b>	<b>Number of questions with 100% responses</b>
1: Background of State-Owned Company	5	97%	4
2: Participant's Background	6	100%	6
3: Main Research Questions	31	91%	16
Total	42	96%	26

TABLE 5: OVERALL INTERVIEW QUESTIONS AND RESPONSE RATE

The response rate in Section 3: Main Research Questions is illustrated in the Table 6 below. 16 (52%) questions had a 100% response rate. 12 (90%) questions with a response rate between 50 to 100% and 3 (10%) questions) with a response rate below 50%. The researcher noted that the participants answered with ease most of the questions that were internally facing i.e. pertaining to their experience within the state-owned company. Several participants chose not to respond or had no answer to questions related to adoption of SaaS in the external environment (e.g. clients and stakeholders), to the comparison of state-owned company's approach to SaaS adoption compared with other government institutions, and when asked if they have any additional factors that were not included in the study (i.e. factors missing from the proposed integrated conceptual framework). The semi-structure questions posed to the participants were appropriate for the study.

<b>Section: 3: Main Research Questions</b>	<b>Count</b>	<b>Related Interview Schedule Question/s</b>
<b>Number of questions with 100% response rate</b>	16	Q3.1, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.10, 3.11, 3.12, 3.14, 3.16, 3.27, 3.28, 3.29, 3.30
<b>Number of questions with 75..99% response rate</b>	11	Q3.2, 3.9, 3.13, 3.15, 3.17, 3.18, 3.19, 3.20, 3.21, 3.23, 3.24
<b>Number of questions with 50..74% response rate</b>	1	Q3.25
<b>Number of questions with 25..49% response rate</b>	3	Q3.22, 3.26, 3.31
<b>Number of questions with 0..24% response rate</b>	0	N/A
<b>Total</b>	31	

TABLE 6: MAIN RESPONSE QUESTIONS – RESPONSE RATE

#### 5.4 DOCUMENTS REVIEWED

During the interview process participants mentioned, relevant and official company documentation, which the researcher requested for review and triangulation with insights shared by the participants. Most of the documents were provided based on the approval from the acting Chief Executive Officer. All documents were received via email from the interviewed. The researcher referenced each document to the participant and related question/s. Each document was analysed to validate its relevance to the participant’s response to the question posed. A total of twenty-one documents were reviewed and out of the total number reviewed 90% were deemed valid based on the researcher’s assessment; see illustration in Table 7.

<b>Documents valid for question &amp; response</b>	<b>Documents invalid for questions &amp; Response</b>	<b>Total</b>
19 (90%)	2 (10%)	21

TABLE 7: DOCUMENT CONFIRMATION

## 5.5 ANALYSIS OF QUALITATIVE DATA

The process of data analysis was deductive in nature as the proposed integrated conceptual framework was based on knowledge and factors found in existing research. The key adoption themes that emerged from the data collected were categorised into the SaaS Adoption contexts of this study, namely Technology, Organisation and Environment. The participants were found to have the required tenure within the SOC as well as the related experience in SaaS adoption and assimilation of such innovative technology. All participants had a good understanding of cloud computing, especially SaaS, and could provide examples of their involvement in decision making for SaaS adoption within the SOC.

Most participants indicated that the adoption of SaaS predated their employments and that this started pre-2010. For instance, Participant #4 said, “...and I think largely some of the solutions like the data feeds, such as Bloomberg predated me, particularly as the research platforms. I think at that time people were not aware what sort of model consumption it was and it didn’t have a name. You just bought and subscribed, and you log onto your website and the service was there.”

Overall, four major themes emerged and twenty-one sub-themes were identified from the data collected through interviews and documentation reviews. Each theme was further coded and had sub-codes to illustrate different aspects of the phenomenon being studied. The total of embedded codes was one hundred and forty four; these were aligned with the themes as illustrated below (Table 8):

Theme Name	Sub-Themes	No of Embedded Codes	Initial Source of Theme (Interview or Literature)
ADOPTION	Adoption Decision	15	Interview
	Adoption Concerns	19	Interview
	Adoption View	2	Interview
	Adoption Driver	1	Interview
	Adoption Caution	1	Interview
	Adoption Timeframe	1	Interview
	Adoption Issues	13	Interview
	Adoption Lessons	10	Interview
TECHNOLOGY	Relative Advantage	19	Literature
TECHNOLOGY	Security	7	Literature
TECHNOLOGY	Trust	1	Interview

TECHNOLOGY	Characteristics	3	Interview
TECHNOLOGY	Data	5	Interview
TECHNOLOGY	Compatibility	12	Literature
ORGANISATION	Financial Resources/Budget	3	Literature
ORGANISATION	Top Management Support	10	Literature
ORGANISATION	Technology Readiness	12	Literature
ENVIRONMENT	Mimetic	4	Literature
ENVIRONMENT	Coercive	3	Literature
ENVIRONMENT	Normative	3	Literature
TOTAL:		144	

TABLE 8: SUMMARY OF THEME ANALYSIS

Based on Table 7 the data collected revealed that participants had significant insights pertaining to the Adoption theme (43%), followed by Technology (33%), then Organisation (17%) and lastly Environment (7%). Dominant factors fell into sub-themes related to SaaS Adoption that emerged included Security, Relative Advantage, Adoption (Concerns, Decision, Issues and Lessons), Compatibility, Technology Readiness and Top Management Support. One highlight noted from the data by the researcher was the new Technology factor pertaining to SaaS Characteristics which was touched on by fourteen participants when emphasizing the key considerations for SaaS adoption within the SOC.

The Adoption theme was broadly highlighted by participants and revealed the following dominant insights, of which some are linked back to TOE factors in the sub-sections below:

5.5.1 *Adoption Concerns* – eleven participants mentioned that SaaS could result in the loss or lower degree of control particularly on data and system management. Participant #4 indicated that, “The disadvantage is, loss of control, you know. I mean most of us would like to say, if you say where’s my data, I can walk you downstairs and say, there’s your computer, your data is there.” Participants also raised concerns pertaining to forced upgrades which the SOC would have to accept to avoid maintaining an unsupported SaaS solution.

5.5.2 *Adoption Decision* – Nine participants highlighted that the decision to adopt involves consideration of whether the SaaS technology aligns with the organisation’s strategy as well as meets business requirements (including information security and regulatory compliance)

amongst many factors. Participant #1 said, *“Key consideration, is the fact that it's cloud-based, as this relates to the strategy statement; and then meets business requirements (including information security requirements) and regulatory compliance.”*

5.5.3 *Adoption Issues* – Nine participants raised key challenges pertaining to SaaS adoption within the SOS, such as unmet expectations, unfavourable support and maintenance (service levels, turnaround times), as well as foreign currency contracts. They also indicated that SaaS decisions were overturned when there are unresolvable issues (e.g. contract or information security). Several participants related an instance where a SaaS solution was migrated back to the SOC’s premises due to deficient security controls and poor management of the application by the service provider. As said by Participant #9, *“I was fortunate to do an assessment which found information security and IT controls gaps. When we adopted the solution, it was not mature. But then, you sort of give service providers time for them to remediate, but then after a specific time and when we noted that the controls were really weak, that’s when the application was brought back.”*

5.5.4 *Adoption View* - Seven participants shared that they perceived the SOC as keen and comfortable to adopt SaaS. Participant #3 responded, *“So, I would say the Company is actually quite keen and we are adopting the software as a service for most of the solutions in the environment.”*

In the next sub-sections, the researcher unpacks the other three themes in relation to the research questions.

---

#### 5.5.1 ‘WHAT ARE THE KEY FACTORS THAT ARE CONSIDERED BY A STATE-OWNED COMPANY IN SOUTH AFRICA WHEN FACED WITH THE DECISION TO ADOPT SAAS TECHNOLOGY?’

---

There are many key factors considered by the South African state-owned company which were mentioned by participants in their responses to the questions posed by the researcher. In relation to the Technology, Organisation and Environment Contexts, the importance of Security, Technology Readiness, SaaS Characteristics, Normative Pressures, Mimetic Coercive Pressures, Financial Resources, Top Management Support and Relative Advantage were frequently mentioned by the participants.

#### 5.5.1.1.1 *Relative Advantage*

All of the participants discussed that the SOC considers the potential benefits of adopting a SaaS solution versus an existing / new on-premise business application. Rogers (1983) confirms that relative advantage is one of the attributes of technology innovations which may lead to easier adoption and quicker dissemination. Ten participants indicate that the SOC views SaaS as a strategic enabler which allows alignment of technology with business strategy, improves the competitive advantage of the SOC within its competitive industry, and that SaaS architecture is aligned with the company's cloud strategy.

Eleven participants mentioned that SaaS adoption was also considered as it frees up resources (i.e. lightened load) to do strategic activities and focus on important activities. As pointed out by Participant #9, *“Company views cloud computing or SaaS as it's a key IT strategic enabler. The Company is a lean organization, ..... you'll find that one resource has multiple roles at the same time. So, SaaS model allows the organization to focus on other strategic activities, so they are seeing it now as a key strategic enabler.”*

#### 5.5.1.1.2 *Compatibility*

Six of the participants emphasized that for SaaS to be considered for adoption within the SOC, the application (including processes and data) must meet different facets of business requirements. The SaaS must align with the requirements of the company's standard operating procedures. It is important to consider whether the innovative technology will work with existing organisation systems and processes (Ray, 2016; Safari et al., 2015).

Participant #11 illustrated, *“So, from start of initiative we document most of the systems, skills and process requirements as non-functional requirements when going out to procure a solution. Then, during contracting, like I said, the IT team is extremely on par with their due diligence. They go and do site visits and they make sure that the things that are important are contractually written down to suit the processes of the Company.”*

### 5.5.1.1.3 Security

Information Security (IS) was highlighted as the most important factor considered by the SOC when making a decision to adopt or even retain SaaS technology. All fifteen participants mentioned information security as well as in relation to data privacy and protection during the interviews. Participants mentioned that SaaS must meet organisational IS requirements pertaining to confidentiality, availability and integrity, as well as comply with the company's IS standards (including the adopted ISO 27001). Seven participants mentioned that security aspects or concerns are further managed within contractual agreements after the decision to adopt SaaS is made. For instance, SaaS contracts ensure that the SOC has the Right to Audit or receives annual audit reports (e.g. SOC 2, ISAE 3402) from the SaaS provider. Five participants indicated that the SaaS provider must guarantee the protection of the SOC's data. Security is a concern which organisations have in terms of the security systems provided by innovative technology (e.g. SaaS) provider/s which is informed by each company's willingness to store data (i.e. a company asset) in the cloud, despite the uncertainty (Senyo et al., 2016).

The key security requirements as pointed out by participants #9 and #3 respectively were as follows

*“So, one of them is security certification like SOC2, certification, your ISO 27001 certification, ISAE 3402 certification, and also making sure that security requirements are embedded in contracts, including a section around security breaches and notifications. That we also have a right to audit, in case we want to audit anything. The right to perform penetration testing and vulnerability scans.”*

*“Security for us will always be first on the list. So, information security will have a number of items that they would need to ensure that they're in place. Obviously, in terms of how secure your data is, in terms of how secure is that environment that you're hosted, in terms of who else has access to that environment.”*

Furthermore, the researcher noted that when discussing security the *Data Protection* sub-theme emerged from five participants who emphasized that due to the nature of the SOC's business (i.e. financial services) ensuring confidentiality, integrity and availability of data was imperative. The participants revealed that the SOC expects the SaaS provider to guarantee data protection and consequently, data protection clauses are embedded in the SaaS contract should a decision be made to adopt such a technology. For instance the SOC considers that the SaaS provider will ensure daily

backups with frequent return of data to the SOC at pre-determined intervals. Data residency was also mentioned as a key factor, with South African based data centres preferred for data location. Overall data ownership was a factor that was critical as the SOC is mandated to own all company data.

Participant #5 indicated, *“So, specifically what I’ve just mentioned, access to data, ownership, deletion of data if necessary and also just to ensure that if it’s on their cloud platform, we also make sure that they comply with certain standards.”*

Participant #11 explained one of the concerns raised by top management, *“I say this because the main concerns that they usually raise is in terms of data ownership. And if the data is safe and if we stop using the service, can we get our data back.”*

#### *5.5.1.1.4 SaaS Characteristics*

SaaS characteristics were also highlighted by fourteen participants as crucial for SaaS adoption decisions in the SOC under study. Key considerations for application adoption include characteristics such as cloud based (i.e. SaaS); meet business requirements (e.g. mobility, collaboration, data access), improved application performance; favourable contractual agreements; good connection / network speed; easy to implement and integrate with other solutions; and, user friendliness (incl. for people with disabilities). Tweneboah-Koduah et al.(2014) found that technology characteristics are key factors which can be barriers to cloud adoption in government agencies.

Participant #9 pointed out, *“We look at many aspects of SaaS including, the data centre, OS, database, application, data layer, network, appropriate certifications, etc.”*

The researcher noted this factor as one that was not included in the study’s proposed integrated conceptual framework, even though it was addressed in some of the reviewed literature (Ray, 2016; Trope, 2014; Tweneboah-Koduah et al., 2014).

---

### 5.5.1.2 ORGANISATION CONTEXT

---

#### *5.5.1.2.1 Top Management Support*

The participants had slightly different views in terms of the degree (from no understanding to very aware) of knowledge which top management within business divisions has on SaaS benefits and risks.

Most participants agreed that IT top management is highly knowledgeable on these aspects and has been playing the educator role for Business top management. All participants indicated that top management leadership, involvement and support in SaaS adoptions is critical within the SOC. In literature it was found that top management has a very important role to play in the adoption of innovative technologies and their involvement is a critical success factor for technology projects (Oliveira et al., 2019).

Participant #8 responded, *“I think they play a critical role because if you don't have their blessing, system can take years to implement. If you get their buy in early and quickly, things tend to move smoothly.”*

#### 5.5.1.2.2 Technology Readiness

All fifteen participants mentioned the importance of the readiness that is ensured in terms of human (including willingness) and technology resources to enable SaaS adoption. Change management was mentioned by several participants who indicated that it is critical for technology readiness. Some of the human resource interventions employed by the SOC for SaaS adoption readiness include detailed customised training, continuous self-upskilling, attendance of conferences, webinars, knowledge transfer by service providers and learning from industry peers. For technology capabilities participants mentioned the importance of keeping the existing technology up-to-date (e.g. upgraded) and testing in order to ensure readiness for SaaS adoption. Senyo et al. (2016) found that technology readiness is significant in determining the success of cloud computing adoption in an organisation.

Participants #7 and #1 respectively, expanded on the activities taken to ensure technology readiness as follows:

*“A project team comprised of various team members, formed by the project office, ensures that all the boxes are ticked. The team members then ensure that the existing technology can still support software as a service. Testing, e.g. of ‘SaaS X’ ensured that in the cloud, the application can still work with existing technologies within Company.”*

*“So through our change management process, there must be detailed training that the Company employees, in general, are taken through, in order to be able to, then, come back and use the solution efficiently and / or support the solution effectively as well.”*

### 5.5.1.2.3 Financial Resources/Budget

Twelve participants shared that SaaS adoptions in the SOC are funded from the SOC's centralised IT capital expenditure or operational expenditure budget. They indicated that funding is approved as part of the decision making process (e.g. IT strategy or business case approval entails financial requirements). Three participants added by highlighting that funding has to be approved in line with Public Finance Management Act (PFMA) prescripts before the SaaS adoption can proceed, and that funding is provisioned for strategic initiatives such as the adoption of cloud technologies. Liang et al. (2017) confirmed that it is most probable that government agencies with abundant financial resources will venture into adopting IT innovations.

Sharing how mentioned initiatives were funded, Participant #1 said, *“I believe these were funded from the company's capex budget, which has to be approved in line with the demand plan, and all the PFMA regulations, because we are a state owned entity, so we have to align ourselves to PFMA; we have to make sure that our demand plan is approved, all the way, by the management, and also by national treasury.”*

---

## 5.5.1.3 ENVIRONMENT CONTEXT

---

### 5.5.1.3.1 Mimetic Pressures

“It is possible that an organisation considering the adoption of cloud computing may therefore look to other similar organisations within their environment and make their cloud computing adoption determination in order to imitate other organisations in their immediate environment” (Trope, 2014, p. 94). Twelve participants indicated that the SOC, to a certain extent, mimics similar organisations in the private sector in terms of adopting SaaS technologies for strategic benefits. However, as a state entity the SOC follows more rigorous processes due to strict requirements (including audit checks and delegation of authority approvals) and the PFMA regulations.

In terms of SaaS adoption approach in private sector, Participant #4 indicated, *“I would think, their decision-making processes are a little bit easier than ours. They don't have the onerous PFMA side, so they can react quickly....”*

#### 5.5.1.3.2 Coercive Pressures

Twelve participants indicated that the industry within which the SOC operates requires the use of SaaS hence the company has to consider SaaS adoption in order to effectively compete (i.e. do what other industry players are doing). However, the participants had different views on whether there is pressure from the government or clients for the SOC to adopt or not to adopt SaaS. For instance, five participants indicated that Clients put pressure on the SOC to adopt SaaS yet six other participants believed that the clients simply need results and do not entice the SOC to adopt SaaS. Participants also mentioned that Service providers have roadmaps that indicate discontinuance / stopping development of on-premise applications in the long run and focus on SaaS offering; this forces the SOC to adopt SaaS.

Participant #9 elaborated, *“I think most of the discussions that we’ve had with providers, they say they will continue with the on-premise solutions, but they will stop supporting it in the next two to five business year period, depending on how big the application is. And then also, they won’t do any changes or customizations or configurations to those systems.”*

#### 5.5.1.3.3 Normative Pressure

Ten participants shared that the SOC participates in various professional or business associations which promote and even debate topics such as the adoption of cloud computing service models (e.g. SaaS). Additionally, participants highlighted the relevance of SaaS adoption for the SOC to survive as a financial services’ company.

Participant #10 shared the discussions in professional arenas, *“So, in a way, although they’re not brand specific or anything like that, I think a lot of the information, you know, is moving towards the direction where we’re seeing software as a service as the future.”*

“Hence, in the context of IT adoption, the normative pressures that an organisation faces regarding the adoption of cloud computing are heightened when cloud computing has been adopted amongst its suppliers, customers and by its participation in professional, trade, or business organisations that endorse the adoption of the IT infrastructure” (Trope, 2014, p. 95).

---

#### 5.5.1.4 OTHER FACTORS

---

At the end of their interviews, participants were requested to indicate if they have any other factors that may have been missed by the researcher in the proposed integrated conceptual framework, which they believe should be included in the study. Ten participants indicated that the key SaaS adoption factors were already covered in the study. Additional factors that were mentioned by five participants as additional factors that could be added to the framework were as follows:

##### 5.5.1.4.1 Leadership Style

Two participants highlighted that the leadership style is a factor that informs SaaS adoption within the SOC. This factor did not stand out in the research reviewed by the researcher; however, this does not mean that the factor is not relevant in SaaS adoption within organisations. An organisation with leadership that embraces innovation opportunities is likely to support SaaS adoption (Asatiani, 2015).

Participant #4 and #13 respectively elaborated with the following points:

*“So, you need leadership that has foresight, that has a strategic view in nature saying, I want to gear the organization towards better things.”*

*“And, our top management as well. I mean, I would like to see a day one day when, perhaps maybe our CEO and a few of our executives also, you know, speak with authority around such solutions. And not just the solutions in their areas, but all solutions as a whole. I think that would really instil something in our culture, technology-wise, irrespective of whether it’s SaaS or whatever it is.”*

##### 5.5.1.4.2 Culture

Two participants noted that the organisational culture is another factor that informs SaaS adoption in the SOC. In particular they indicated that the SOC was previously change averse to moving to cloud; this has changed in the recent years. Al-Ruithe et al. (2017) suggested that large government companies in Saudi Arabia have slow adoption rate of cloud computing partly due to the fact that cloud is not part of the organisation’s culture. Participant #9 and #11 expanded as follows:

*“So, culture where we are change averse. It took a lot for the majority of the SaaS applications to be adopted. It took many very difficult discussions for that. So, the culture of the organization, the tone at the top, that is being set by the CEO, which then influences culture.”*

*“The reason that I say this is the Company as an organization is deeply entrenched in processes. And to change a process takes an enormous amount of effort and energy because process is entrenched in the culture and the way that the actors within the business interact.”*

#### 5.5.1.4.3 Organisational Structuring and Positioning of IT

One participant raised the positioning of the IT department in the organisational structure as a factor in SaaS adoption. The organisation structure was found to be one of the relatively important factors associated with cloud computing including SaaS (Alsanea & Wainwright, 2014).

Participant #4 shared a historic issue on IT reporting line: *“Part of the challenge that the Company had was the fact that the IT organization reported to a financial person....to leadership that didn't care about innovation.”*

---

#### 5.5.1.5 SUMMARY OF CHAPTER

---

The conclusion from the researcher was that there are many factors which are considered by the SOC when faced with a SaaS adoption decision. The key factors mentioned above were repeatedly mentioned by different participants and span across the Technology, Organisation and Environment aspects. In some instances, what varied was that a factor (e.g. information security) could be mentioned as a critical SaaS adoption consideration, a concern, an issue or a benefit by different participants. A new factor that was identified from the data pertains to the importance of the SaaS characteristics when the SOC makes the decision to adopt or not to adopt SaaS. Overall, all the key factors mentioned by the participants aligned with factors that were observed in the literature reviews which was conducted at the beginning of this study. The findings above are consistent with what was found in the literature reviewed for this study. Overall, participants mentioned all of them with the significant addition of SaaS Characteristics in the Technology Context.

---

## 5.5.2 'HOW DO THESE FACTORS INFLUENCE THE DECISION TO ADOPT OR NOT TO ADOPT SAAS IN A STATE-OWNED ORGANISATION?'

---

Based on what the participants stated, the key factors mentioned in Section 5.5.1 were noted to have an influence in the SOC's decision to adopt or not to adopt SaaS. TOE factors can either hinder or drive the adoption of cloud services as identified in content-based analysis by Haag & Eckhardt (2014). Some factors that required due diligence and care may also delay the decision for SaaS adoption, as per the experience of some participants.

Examples of factors that can hinder or drive the adoption of SaaS are as follows:

---

### 5.5.2.1 TECHNOLOGY CONTEXT

---

#### 5.5.2.1.1 *Relative Advantage*

The study found that perceived relative advantage which may be realised by adopting SaaS appears to encourage a positive decision to acquire and implement such innovative technologies. Considering that SaaS is deemed as a strategic enabler within the SOC, participants indicated that SaaS technologies are considered with ease due to the alignment with the company's 'cloud first' strategy. This implies that as long as the SaaS technology is assessed and found to have the potential to enable the achievement of strategic objectives and to improve competitive advantage of the SOC within the financial services industry then the decision to adopt SaaS is endorsed.

Participant #7 shared insight on one SaaS solution which was deemed to offer additional mission critical capabilities, *"I think at the time when they moved to the cloud environment, they showed us a whole lot of things that they could, that, so basically they showed us what we are currently using and what we will be using moving to the cloud and additional things that we could use, if we're interested."*

Participant #14 indicated that *"Covid-19 forced Office 365."*, as the solution was believed to enable key business requirement i.e. to work from home and deliver against company objectives. Consequently the decision to adopt and expedite the assimilation of Microsoft Office 365 in the SOC was made.

#### 5.5.2.1.2 Compatibility

The study found that compatibility of the SaaS technology with the SOC's existing systems, processes, data and skills may lead to a favourable decision to adopt the innovative technology. Participants indicated that if the SaaS solution is assessed and found that it will work within the organisation and add value to business capabilities, then the decision to adopt it is favourable.

Participant #1 highlighted that *"So it's a mandatory requirement, it's a, must have, requirement, that the SaaS solutions that we are procuring and implementing, are able to integrate with any other Company solutions or systems that we have in place."*

Participant #7 indicated that *"all the stakeholders are sort of invited into the project team to make sure that whatever that's intended in the solution and is taken care of. So, the project team, because it's made up of various team members, it makes sure that everything is addressed and system is fit for the purpose."*

#### 5.5.2.1.3 Security

The study revealed that information security (including data protection) of the SaaS solution is the most important aspect of the SaaS adoption decision. This factor can hinder or drive the decision to adopt. In the event that the SOC cannot implement all the necessary security tools to secure an on-premise application, then a SaaS option is sourced. On the other hand, if a SaaS solution does not have the required information security controls, then the SOC may decide not to adopt or even terminate an existing SaaS solution. Participant #6 mentioned that one SaaS solution *"was brought back from cloud to on-premise due to security gaps"*. This was elaborated on by Participant #9 *"Because the information security issues were significant the Company couldn't sustain the risk of keeping that application under the control of the service provider."*

The TOE factors, such as security, can also make the company re-evaluate the adoption process as indicated by Participant #9 *"Now there is much more emphasis placed on the information security team looking at the certification. I have seen more due diligence being performed by the other teams as well. So, whereas where we had thought, you know what, information security hasn't looked at the ISO certificate and they give their endorsement, then that's fine. But now we realize that even each of*

*the other IT teams, they have to look at the components that affect them. So, that they can also assess if that is covered.”*

*Participant #4 “Delayed decision making due to data residency concerns and debates.”* Meaning that resolution of security related aspects with the potential SaaS service provider have delayed the decision making process; this is due to the rigour the SOC has put in place to ensure that information security is robust in a potential SaaS solution.

#### *5.5.2.1.4 SaaS Characteristics*

The study also revealed that the characteristics of a SaaS solution influence the decision to adopt or not to adopt the innovative technology. Where the SaaS characteristic/s (e.g. good connectivity, easy to integrate with other SOC solution and user friendly) deemed important by the SOC are not available in the solution or arrangements with the service provider, the participants indicated that the SOC would reconsider and potentially not adopt the SaaS technology.

*Participant #2 highlighted, “So, you find that maybe we’re battling with a certain application in terms of its availability, due to our infrastructure, or resources as well, that are involved in terms of supporting that internally....that will be the hardware and everything as well as that application. So, with that business gets to be influenced or we’re more inclined to adopting software as a service”*

The study revealed that the opportunity for favourable contracts are also critical for a decision to adopt a SaaS technology. Participants revealed that the SOC puts emphasis on the contractual obligations of such contracts and where there is a deadlock due to critical / non-negotiable clauses (e.g. service level turnaround hours), the decision to adopt a solution can be rescinded.

*Participant #5 shared some of the contentious contracting issues, “Maintenance and support (service levels), that is always a deal breaker.....We always engage them to indicate that look, the contract might not necessarily go through if this is not done.”*

### 5.5.2.2.1 Top Management Support

The participants presented different views on top management support for SaaS adoption within the SOC. Some participants indicated that top management (business only) within the SOC is not very knowledgeable on SaaS as well as benefits of such technologies; therefore they may not support the decision to implement SaaS technologies. However, some participants indicated that top management (business and IT) is knowledgeable on SaaS and understand SaaS benefits hence they endorse and champion the decision to adopt SaaS technologies. The researcher understood that recently top management understands and believes that the SaaS will benefit the SOC, hence they support and champion the adoption of SaaS technologies. This is also evident in the “cloud first” strategy that is approved by senior management and the board. Participants #6, #7 and #12 respectively commented as follows on their view of top management’s support:

*“I would say there are some where they would sort of show interest that they would sort of need this kind of software to assist in performing people’s duties. And the others might not be showing the interest but, more like there would be others who would say yes to it, some would not even say anything. And then, some would just be neutral. So, it’s like you don’t know if they don’t know if they should decide to say yes or no.”*

*“The current TM, willing to adopt SaaS and previous regime was cautious.”*

*“Based on my observation, there’s actually no support, in terms of the new softwares. So, my observation is basically based on what I’ve just observed, in my department and various departments, and more especially attending meetings for different departments. Even though they do have the appetite of adopting new software, there is that element of resistance. I think it’s a matter of uncertainty.”*

### 5.5.2.2.2 Technology Readiness

The study revealed that technology readiness is deemed important by all participants. They emphasized that when the people and technology resources are ready this may result in a decision to adopt SaaS. In the event that the people and technology resources are not ready to enable successful SaaS adoption,

the SOC puts in place initiatives (e.g. training of resources and upgrading the existing systems / networks) before reconsidering the decision to adopt, or the SOC decides not to adopt the SOC.

Participant #11 pointed out, *“The key here is to have a good knowledge of the on-premise systems and their limitations and the capabilities that they have for integration. And, when procuring a SaaS solution, we put those integration requirements as a must have, non-functional requirement. So, if the system cannot support or integrate or speak to in any manner, to the ones we currently have, the solution is not viable.”*

#### *5.5.2.2.3 Financial Resources/Budget*

SaaS adoptions are funded from a centralised IT budget within the SOC. The budget has stringent and regulated processes that need to be followed before a SaaS adoption decision can be made. The researcher concluded that if the budget is not appropriately approved (e.g. National Treasury and internally delegated individuals/committees), then the SOC would decide not to adopt SaaS as there would be no allocated funding. On the contrary, if the approvals are all in order then funding would be allocated and the decision to adopt the SaaS would be endorsed and followed by the acquisition and contracting processes. The researcher noted that the value (i.e. expensive or cheap) of the SaaS was not highlighted by the participants; they focused on the approval of the funding based on the business requirements of the SaaS technology. Participants #3, #10 and #11 respectively mentioned the following SaaS financing aspects:

*“Obviously depending on how much it is, the process of allocating such budget would’ve been discussed at the relevant forums. Be it with the finance team, the CFO or at board level. That will just depend on the amounts that we’re dealing with and that type of initiative at hand.”*

*“So, we are in the fortunate position of having a very strong balance sheet, so as much as possible, most of our, although it’s classified as Capex for the purposes of accounting reporting, our operational budgets cater for such acquisitions. In other words, we don’t borrow, it’s all cash, from our budget.”*

*“Most of these systems – well, all of the ones that I’ve mentioned, were financed through our procurement process which entails you to have the item added to the demand-plan, which then goes through formal committee approval, and then that is your budgeted amount for the year. So, as long*

*as your item links to an item on the demand-plan, then we can follow the procurement process and you can get your solution.”*

---

### 5.5.2.3 ENVIRONMENT CONTEXT

---

#### 5.5.2.3.1 *Mimetic Pressures*

The study revealed that the SOC observes the SaaS adoptions by similar industry players and uses this insight to make decisions on whether to adopt or not to adopt SaaS. The participant also indicated that the SOC does this through benchmarking and also as part of procurement processes they evaluate (including through site visits) the SaaS technology at another company. Participants indicated that many similar companies have adopted SaaS hence the SOC also adopts similar technologies as long as they meet business requirements. The participants related the SOC to private sector companies and not with government institutions. The researcher concluded that mimetic pressure (particular competitor success or failure) influences the SaaS adoption decision.

Commenting on SaaS adoption in other government institutions, Participant #1 and #4 said the following:

*“I think, for other state owned entities that I’ve worked in, I think there’s somewhat of a fear, to go SaaS; I don’t know what encourages the fear to be there, but there is that fear, especially in areas that handle personal information.”*

*“I think that as a Company, when we start now comparing ourselves to others on this adoption and how we probably go about things, we are in some instances ahead of our fellow state owned counterparts, I think primarily because we are - my term that I normally use where I have - a very schizophrenic organization; we have got multiple personalities. In one moment, we are state owned entity. One moment we are a private sector functioning entity, which is what we function like mostly.”*

#### 5.5.2.3.2 *Coercive Pressures*

The study revealed different views on whether the clients (i.e. the investors) of the SOC or government (i.e. the shareholder) requires the use of SaaS. Participants who indicated that SaaS was a requirement from either stakeholder, believed that the certain decisions to adopt SaaS are approved on that basis. Furthermore, the study revealed that in some instances services provider product roadmaps (i.e.

discontinuing on premise applications in favour of SaaS) have resulted in the decision to adopt SaaS. Additionally, the study revealed the SOC aims to comply with the applicable country laws, hence when considering to adopt a SaaS technology, compliance to SA laws is a key factor. If there is an element of non-compliance to certain prescripts then the SOC decides not to adopt the SaaS technology.

Participant #1 indicated *“I think we have, mainly, addressed the legal one, the laws of the land; solutions have to adhere to the laws of the land. If they can't, or they can't even provide the assurance that we mentioned, then we can't implement those solutions.”*

In terms of service provider pressure to adopt Saas, Participant #4 and #7 respectively said the following:

*“For instance, if a solution provider discontinues certain things and you are going to a mode where you are unsupported, there is nothing but to move.”*

*“What I've seen that leads to a decision to adopt would be, for example, if the service providers is moving to the SaaS environment.*

For compliance with external regulations, Participant #9 and #11 mentioned the following:

*“In the cloud policy, if I can recall, we do mention that you must have due diligence and the critical things to consider is privacy, which ties back to POPIA. So, POPIA now being made, in effect, that is going to be a critical go or no-go decision for cloud adoption.”*

*“We have got the PMFA which we need to adhere to. As such we are not allowed to exclude a best of breed solution, just because they do not fit into a strategy that we prefer. So, in the case where we go out on procurement and the best system that meets the business requirements at the lowest cost, is hosted on-prem, even though we have got a strategy that says we want to go to cloud, we will have to take that on-premise solution.”*

#### 5.5.2.3.3 Normative Pressure

The study revealed that normative pressure, particularly from the professional or business associations of the SOC, has led to the adoption of SaaS primarily for the achievement of business goals or for the SOC to survive as a financial services' company. For instance, where the SOC employees hear (e.g. in

industry conferences of user groups) and observe (e.g. new efficiencies) that many users of a certain on-premise business application have moved to the SaaS version then this prompts the decision to adopt that SaaS technology. When asked what would happen if the SOC did not adopt SaaS, Participant #1, #7 and #11 respectively mentioned the following:

*” I think the Company, definitely, has placed itself in a position to be able to compete with the best in the..... industry, and as such, we cannot afford to be left behind, and I believe the adoption of the SaaS strategy, enables us to really compete, even if we’re a state owned entity, we're not a private entity”*

*“I think Company would lag behind because I think the future would be driven by this cloud, by the companies that are in this.”*

*“I think Company would lose any edge that it had within the market. The thing is, what we need to consider is all of our competitors in the market, basically run most of the same systems. When they are on a SaaS platform, they get access to newer products, benchmarks, new ways of thinking, and if we remain stagnant on our on-premise solutions, we’re missing out on a lot of those key benefits.”*

---

#### 5.5.2.5 CHAPTER CONCLUSION

---

Overall, this study found that the TOE factors discussed in this section are all considered within the SOC when a decision is being made to adopt or not to adopt SaaS. In other works, all factors can hinder or drive the decision to adopt SaaS. This result aligns with the results of the literature reviewed as part of this study. Based on what the participants shared, information security (including data protection) is the most important factor. However, the participants did not overly emphasize the significance of Mimetic and Normative pressures as illustrated by the less than 50% participants indicating the criticality of these factors in their responses (refer to Table 9).

---

### 5.5.3 'WHAT ARE THE KEY BENEFITS AND RISKS OF SAAS IN THE CONTEXT OF A STATE-OWNED ORGANISATION WITHIN SOUTH AFRICA?'

---

The participants revealed that there are both benefits to capitalise on and risks to mitigate when adopting SaaS which apply in the SOC; the key ones are presented below:

---

#### 5.5.3.1 BENEFITS

---

##### 5.5.3.1.1 *Time to Business Value*

According to some of the participants interviewed, a key benefit of adopting SaaS is the quick delivery against business requirements and expected value as compared to the time-consuming on-premise implementation. This is aligned with the benefit of faster delivery as suggested by Martins et al. (2016). Participants #4 and #11 respectively mentioned the following:

*“Top of mind is the ability to quickly deliver on business requirements.”*

*“Systems can be operational within a week, even less. I think that is the biggest benefit that I see around SaaS.”*

##### 5.5.3.1.2 *Efficiency and Productivity*

Participants indicated that SaaS makes doing their work easy and they are able to achieve more (including automation). In terms of efficiency or productivity, Participant #5, #7, #9 and #12 mentioned the following:

*“... it just simplifies your life, you know. It's efficient.”*

*“In terms of O365, the meetings are more attended, more fruitful with these Teams than like in the office because even the attendance in the office has become poor. But when using the Teams, I've seen almost 100% attendance except when people are double booked. And, it's flexible, the way I've seen it“*

*“...because we are public sector, we were sort of stuck in a lot of manual processes, so the key advantage is that it has really accelerated the modernization of many manual processes.”*

*“... it actually also eliminates this thing of actually having manual records. So basically, we’re actually now going to be having everything stored electronically.”*

Yang et al. (2015) confirmed that one of the reasons SaaS is thought of the most promising cloud service model is because of the tangible benefits pertaining to improved IT performance.

#### *5.5.3.1.3 Mobility*

All participants highlighted the fact that they are able to work from anywhere through SaaS as a significant benefit. Participant #1 and #10 respectively indicated the following:

*“I think one of the key benefits is enabling business to work from anywhere, at any time; with the nature of business we have, we need to enable business to really perform their transactions, or their processes, without the limitations of having to come into the office to do those work, and mobility is very important to this.”*

*“In my department specifically, I would say firstly, the flexibility of being able to work anywhere and get support, regardless of where you are located. So, whether I’m working at home, I’m on the road, I’m at the office, the system is not only available, but if I need assistance in terms of support, it’s also readily available to for me. So, that for me is a huge thing. That’s a game-changer.”*

Velev (2010) posited that SaaS is deemed ‘ubiquitous’ because it can be used anywhere and anytime by authorised internal and external stakeholders.

#### *5.5.3.1.4 Initial Cost*

Some participants highlighted that one of the benefits of SaaS is that the initial investment costs are lower than those for an on-premise application. Kraft (2018) suggested that the initial costs are lower as they exclude elements such as infrastructure, data centre and other costs that are typically considered for the traditional onsite applications.

*Participant #1 pointed out “we are a state owned entity, so costs are part of the things that are very important for us to manage. So for the IT space, we need to ensure that we manage our costs, and SaaS solutions provide us with lower initial costs and faster deployments; so the longer you stay in the*

*implementation cycle, deployment costs may escalate; so with SaaS solutions, we're, at least, able to lower the initial investment costs."*

#### *5.5.3.1.5 Total Cost of Ownership (TCO)*

"On-premise software development focuses on customization—adding features, even at the expense of increasing total cost of ownership (TCO). By contrast, SaaS reduces TCO by restricting the offered software's elasticity and thereby saving maintenance costs" (Bibi et al., 2012, p. 87). Participant #3 confirmed what reviewed literature indicated, *"I think in general even the cost, if you look at the cost internally when you look at cost of ownership on the infrastructure, be it the servers, storage and networking components. Be it cost of ownership of dedicated resources to maintain the environment."*

#### *5.5.3.1.6 Architecture & Integration*

Some participants indicated one benefit as the fact that SaaS fits the target architecture of the SOC. Additionally, as indicated in literature reviewed the other benefit pertains to the ease of integration or interfacing the SaaS solution with existing systems (Lin, 2010). Participant #10 and #11 respectively shared the following:

*"I find that software as a service is more aligned to that sort of architecture as opposed to the on-premise sort of services."*

*"So, the pre-built connectors, integration, information sharing flows, make implementing these from an enterprise architecture perspective, a lot easier."*

#### *5.5.3.1.7 Innovation and Focus on Important Business*

Some participants shared that with SaaS implemented both business and IT resources turn to strategic or value-added matters as opposed to "firefighting" issues as is the case when managing on-premise applications. Additionally, in SaaS technologies innovation can be utilised immediately when published by the service provider without waiting for future application versions (Kraft, 2018).

Participant # 1 stated that, *"Also it enables people to focus on more important things within the organization, because now you don't have to focus on a server being broken somewhere, you focus on*

*the things that generate alpha for the organization, or that enable the organization to be what it is today.”*

Participant #12 added that, *“So, the adoption of SaaS seeks to do away with the tedious admin which leads to having efficient service delivery by the human resources business partners; they are able to partner basically with the organization to achieving its mandates.”*

#### *5.5.3.1.8 Technical Management of Applications and Infrastructure*

All the participants from IT indicated that SaaS comes with the benefit of reducing the ongoing administration, support and maintenance tasks expected from technical resources when compared to on-premise applications. Klug (2014) mentioned the same finding in an institution that adopted a SaaS solution (Google Apps) and saved significantly on costs of ongoing maintenance as well as staffing.

Participant #2 said, *“Benefits for the IT department and in my role, the benefit is less stress of things like having to worry about storage for that particular service. Networking for that service, the OS, patches and the licenses. All that I don’t necessarily even have to worry about, they’re all taken care of by the service provider. And then, that then gives me as well enough time then to focus on certain areas.”*

Participant #14 illustrated in terms of an existing SaaS solution, *“Right now, we don’t need to upgrade, it has been upgraded, I think every month there’s an upgrade on it, but as the Company security team, we don’t even have to stay late at night upgrading that environment, because the SaaS provider does everything for us.”*

#### *5.5.3.1.9 Agility*

Participants shared that with SaaS they could move quickly and adapt the solution in response to business and IT needs as well as changes in the SOC’s external environment. Participant #2 mentioned that, *“It’s the agility, I would say, for other teams. For instance, applications. It’s easier or quicker for the team to get an up to date version of that system.”* Loukis et al. (2019) posited that SaaS offers high levels of achievements such as the organisation’s agility that are innovative in nature.

#### 5.5.3.1.10 Scalability and flexibility

Gangwar et al. (2015) proposed that cloud computing (including SaaS) can afford an organisation flexibility and scalability. Participant #3 and #10 respectively mentioned the following:

*“Another thing is that in terms of scalability if you now need to grow your environment.”*

*“So, I find that with cloud technology, it works very well with software as a service, as opposed to on-premise. Plus flexibility and the ease to scale up and scale down.”*

#### 5.5.3.1.11 Availability

Some participants mentioned that SaaS offers better availability (e.g. 24/7) compared to internally managed applications. Wang & Lo (2016) suggested the availability factor can influence the decision to adopt SaaS. Participant #9 mentioned that, *“One of the benefits is in terms of meeting internal SLAs so from that IT SLA perspective, that is one of the key SLAs, in terms of on-premise applications and some of those targets we will not be able to meet. But with SaaS, you are guaranteed a higher percentage of service availability. So, that’s one of the key benefits of SaaS adoption.”*

#### 5.5.3.1.12 Technical resource

Participants were of the view that SaaS helps the IT department which is resourced thinly. Trope (2014) suggests that innovative technology allows for the IT resources to be extended with the resources of the cloud computing service provider. In terms of IT resourcing, Participant #3, #4 and #11 respectively pointed out the following:

*“I think for the Company one of the first advantages is resourcing. In my view the Company IT division is considerably stretched so, having some of these applications hosted and managed elsewhere, releases some of that overhead and allows the resources that are available to focus on other business priorities.”*

*“The SaaS solutions allow us to scale at levels in terms of resources, that we cannot ordinarily bring through on-premise solutions.”*

*“The same applies from an IT-perspective – what I meant with lightening the burden on IT is because it’s a software as a service solution, we don’t need to have the necessary technical resources on-site to support the application, we are not responsible for doing development, we do some integration, we do some user-management, but we are also not responsible for the DR office systems or the back-up office systems because we pay someone else to do that.”*

---

### 5.5.3.2 RISKS

---

#### 5.5.3.2.1 IT Governance

Governance mechanisms are critical for SaaS benefits to be realised without putting the organisation at risk (Loukis et al., 2019). The participants also mentioned the importance of IT governance considering that the SOC had observed that SaaS service providers do not always align with the company’s policies, processes and standards. Participant #3 and #9 respectively indicated that:

*“... so in the organisation I think we’re quite strong on governance. I think obviously added with the number of audits that we undergo, so there’s a number of considerations that we always ensure that are in place.”*

*“My biggest concern is, we don’t have the right governance artifacts for the management of cloud. So, somewhere between the adoption of cloud strategic initiatives, we moved quite quickly in the adoptions, the clouds, the separate cloud strategy, a separate cloud governance framework and a cloud policy, that foundation was not there. So, those are my concerns, is that we moved ahead to implement but forgot certain foundational elements in terms of SaaS adoptions.”*

#### 5.5.3.2.2 Security and Privacy

Information security and privacy issues are raised in most academic literature. Benlian et al. (2009) found that many organisations are concerned that SaaS adoption may lead to security threats and potential breaches of company data and information. The risks related to information security and especially data protection was emphasized by all interviewed participants.

Participant #9 and #12 respectively indicated the following pertaining to the security and privacy:

*“.... information security is quite critical, when you look at the POPIA regulations, it is quite critical. It has a huge reputational impact on the Company.....In the cloud policy, if I can recall, we do mention that you must have due diligence and the critical things to consider is privacy, which ties back to POPIA. So, POPIA now being made, in effect, that is going to be a critical go or no-go decision for cloud adoption”*

*“I would say that there’s a whole lot of uncertainty in terms of security, of having our personal information managed externally, how secure are these people because nobody in our organization would be at a level where they would go at that organization to test their security measures. There’s a lot of cyber bullying or cyber-attacks that could place the organization at a disadvantage because employees’ personal information would be actually leaked and then we would actually have no control over that.”*

There is recognition that security on a SaaS technology may be on the other hand be a benefit due to the investments made by SaaS service providers to secure their cloud computing environments. Participant #4 pointed out that, *“The next one is, the SaaS and cloud environments have quite matured and then, we used to think our security internally was better, but I think if you have the likes of Microsoft..., they have something to lose in making sure that their security is better.”*

#### *5.5.3.2.3 Legal*

Another risk related to legal aspects including lock-in into the SaaS product and/or agreement with the provider. According to Janssen and Joha (2011), this arises when a company decommissions its own on-premise application and relies on the SaaS service provider for the migrated capabilities. Participant #2 and #10 respectively added comments on the lock-in risk as follows:

*“However, we might also find ourselves that we are so much locked in, ..... that it’s kind of difficult for us to even get out because we’ve got almost all our services within ....”*

*“The one other drawback I have with software as a service, you find yourself owned by the package, right, in that you, it’s almost like now you dependent, you can’t go anywhere.”*

Participants also raised the risks pertaining to contracting and management of the SaaS provider for the term of the agreement. Participant #5 raised *“....the main issue is mostly during contracting. Most*

*of these services are offered by multinational entities and they always come with an attitude. I don't know if it's mostly to do with us as a country or continent? It's a take it or leave it attitude. And later when you try to negotiate, they tell you no, this is standardized..."*

Participant #13 mentioned some of the clauses that are normally contentious, *"In addition to Security, KPIs, SLAs (turnaround times), I think exit management as well. It's worth noting and mentioning. So, we usually want to be able to exit and have assistance during that."*

#### *5.5.3.2.4 Integration*

In this study the participants mentioned a risk pertaining to inadequate or difficult integration of the SaaS technology with existing on-premise or other cloud-based applications; this is said to impact the business architecture and end-to-end processing. Gangwar et al. (2015) also found that the challenging integration with on-premise application as a critical potential risk for organisations considering to adopt innovative technologies. Participant #11 highlighted that, *"From an EA perspective, my biggest concern is integration. Because of the structure of the business processes in finance-related activities – expanded across all of them – you have front-office, middle-office and back-office; and usually these 3 tiers within business uses different systems because they are for different processes. The problem is the 3 systems need to talk to one another. So, that means there's a lot of data that will have to be shifted, translated, exported into different places for these systems to consume and talk to one another."*

Participant #10 also added to other risks that, *"...plus one has to look at integration with existing systems."*

#### *5.5.3.2.5 Networking and SaaS Performance*

This study revealed that SaaS performance relies on uninterrupted and adequate connectivity (e.g. Internet or virtual private network) capacity; if the network is inadequate then the SaaS solution performance is degraded. "Network stability and high speeds are key for cloud computing usage" (Matandela, 2017, p. 74). Participants raised this as a potential risk which is considered by the organisation when making the decision to adopt SaaS.

Participant #2 and #6 respectively pointed out the following:

*“Performance of whatever you accessing, is affected; these services are dependent on Internet connectivity. So, if you’ve got a slow connection or challenges with connectivity, your performance is impacted as well.”*

*“For me it’s the connection, the speed. Ja, it’s something that I think they would have to really look into. I don’t know, I’m not a technical person in terms of systems and what not but it has sometimes been frustrating in just trying to extract like a simple report. Where it takes a while .... Especially when you are pressed for time, there’s deadlines and stuff.”*

#### 5.5.3.2.6 Cost Management

The study revealed that the management of SaaS costs is a risk due to the unpredictable nature of the running costs such as fluctuating resource consumption and scaling costs which makes budgeting also complex. There is a discourse in literature in terms of SaaS adoption and the related costs. Loukis et al. (2019) posited that SaaS introduces cost efficiencies but may on the other hand lead to the risk of cost overruns if this aspect is not managed. For the SOC, cost management is a very important aspect of the PFMA regulation as well.

*Participant #9, #10 and #13 respectively raised the following on SaaS costs:*

*“I don’t know if the organization is ready for the cost implications of SaaS and what it means. I don’t know if it’s a disadvantage or if it’s because of our readiness. I think, as we mature, perhaps other departments, particularly finance, their readiness in terms of what it means. And PFMA as well. How to factor in PFMA in terms of SaaS adoption.”*

*“.... what we always look at from a procurement side, is the support and maintenance aspect because we don’t want to end up with what we will call in the public sector, fruitless and wasteful expenditure. So, you need to make sure whatever it is, can you have support and maintenance to be able to use that system for the duration that you have it for.”*

*“How SaaS solutions are costed or their cost structures. It’s something that we, as well as the Company, we’re still trying to get to grips with, because apparently one needs to have a specific set of negotiation skills, specifically for that type of contract.”*

#### 5.5.3.2.7 Loss of Control and Availability

Some participants raised the risk pertaining to loss of control which also disempowers the SOC to address availability incidents quickly as is the case with applications that are located on company premises. Janssen and Joha (2011) suggested loss of control as another risk that an organisation may contend with when transferring the management of an application to a third party (e.g. SaaS service provider).

Participant #1 shared that, “...I believe, the organization would like to have a bit more control on what goes on in the SaaS solutions. So in-house software applications give business a higher degree of control than hosted solutions; so with SaaS solutions, we don't have such control as we would like to have.”

In relation to loss of control that impacts availability, Participant #13 indicated that, “With the on-premise solutions our engineers onsite can actually access and try to troubleshoot and if possible, before even escalating to the third party, try to resolve whatever the issue is.”

---

#### 5.5.3.3 CHAPTER CONCLUSION

---

Based on the insights shared by the participants, the researcher concluded that SaaS adoption has both risks and benefits which are considered by the SOC to inform SaaS adoption decisions. The benefits and risks mentioned in this study were aligned with what is presented in academic and practitioner literature. It is also evident that some aspects such as Security and Cost feature as benefits as well as risks; this is a continuous discourse in academia and practice.

---

#### 5.5.4 'CAN THE TOE-INT CONCEPTUAL FRAMEWORK BE APPLIED TO BETTER UNDERSTAND SAAS ADOPTION IN LOCAL STATE-OWNED INSTITUTIONS?'. ---

The researcher utilised existing literature to formulate an integrated TOE-INT conceptual framework (including relevant factors) which was used to study the adoption of SaaS in a state-owned company.

The conceptual framework was validated using a single site case study strategy within a state-owned institution. Based on the data collected and analysed, the study revealed that the TOE factors in the proposed framework were identified as relevant within the context of the study. The participants mentioned all the factors as critical for considering when making a decision to adopt or not to adopt SaaS. Table 9 below illustrates the criticality assigned by participants to the initially proposed conceptual framework.

SAAS FACTOR CRITICALITY	TECHNOLOGY			ORGANISATION			ENVIRONMENT/INSTITUTIONAL		
	3.30.1 Relative Advantage	3.30.2 Compatibility	3.30.3 Security	3.30.4 Top Management Support	3.30.5 Technology Readiness	3.30.6 Financial Resources	3.30.7 Mimetic Pressures	3.30.8 Coercive Pressures	3.30.9 Normative Pressures
Participant #1	Critical	Critical	Critical	Critical	Critical	Critical	Partially Critical	Critical	Critical
Participant #2	Critical	Critical	Critical	Critical	Critical	Critical	Partially Critical	Partially Critical	Partially Critical
Participant #3	Critical	Critical	Critical	Critical	Critical	Critical	Partially Critical	Critical	Partially Critical
Participant #4	Critical	Partially Critical	Critical	Critical	Critical	Critical	Partially Critical	Critical	Partially Critical
Participant #5	Critical	Critical	Critical	Critical	Critical	Critical	Critical	Critical	Critical
Participant #6	Critical	Critical	Critical	Critical	Critical	Critical	Critical	Critical	Critical
Participant #7	Critical	Critical	Critical	Critical	Critical	Critical	Critical	Critical	Partially Critical
Participant #8	Partially Critical	Critical	Critical	Critical	Critical	Critical	Partially Critical	Critical	Partially Critical
Participant #9	Critical	Partially Critical	Critical	Critical	Critical	Critical	Critical	Critical	Critical
Participant #10	Critical	Partially Critical	Critical	Partially Critical	Partially Critical	Partially Critical	Not Critical	Not Critical	Partially Critical
Participant #11	Partially Critical	Critical	Critical	Partially Critical	Partially Critical	Partially Critical	Critical	Not Critical	Not Critical
Participant #12	Critical	Critical	Critical	Critical	Critical	Critical	Critical	Partially Critical	Partially Critical
Participant #13	Critical	Critical	Critical	Critical	Critical	Critical	Partially Critical	Partially Critical	Critical
Participant #14	Critical	Critical	Critical	Critical	Critical	Critical	Partially Critical	Critical	Partially Critical
Participant #15	Critical	Critical	Critical	Critical	Critical	Critical	Critical	Critical	Critical
<b>Total: CRITICAL</b>	<b>87%</b>	<b>80%</b>	<b>100%</b>	<b>87%</b>	<b>87%</b>	<b>87%</b>	<b>47%</b>	<b>67%</b>	<b>40%</b>
<b>Total: PARTIALLY CRITICAL</b>	<b>13%</b>	<b>20%</b>	<b>0%</b>	<b>13%</b>	<b>13%</b>	<b>0%</b>	<b>47%</b>	<b>20%</b>	<b>53%</b>
<b>Total: NOT CRITICAL</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>7%</b>	<b>13%</b>	<b>7%</b>

TABLE 9: SAAS FACTOR CRITICALITY

Based on what emerged from the data, the Security factor was deemed absolutely Critical by all fifteen participants. Five factors (i.e. Relative Advantage, Compatibility, Top Management Support, Technology Readiness, Financial Resources) were deemed critical by 80-90% of the participants and one factor (Coercive Pressures) identified as critical by 67% of the participants. Two factors i.e. Normative and Mimetic Pressures in the Environment context were ranked as critical by less than half of the participants at 40% and 47% respectively; these two factors were noted as mostly partially critical by the participants.

Data revealed Leadership Style, Culture, and Organisational Structuring & Positioning of IT as additional factors which were noted in literature reviewed but not included in the framework with the exception of SaaS Characteristics within the Technology context of the framework. SaaS Characteristics was identified as worth adding to the resultant integrated conceptual framework as this factor was identified as significant in the data.

Overall, based on the research findings and table 9, the researcher concluded that the TOE-INT conceptual framework can be applied to better understand SaaS adoption South African state-owned institutions.

## 5.6 FINAL CONCEPTUAL FRAMEWORK FOR SAAS ADOPTION

The conceptual framework proposed in Chapter 3 was enhanced based on the findings from the interview process and the significance of additional factor (i.e. SaaS Characteristics) mentioned by the participants. Figure 7 below illustrates the resultant integrated conceptual framework which was informed by the data analysed in this study.

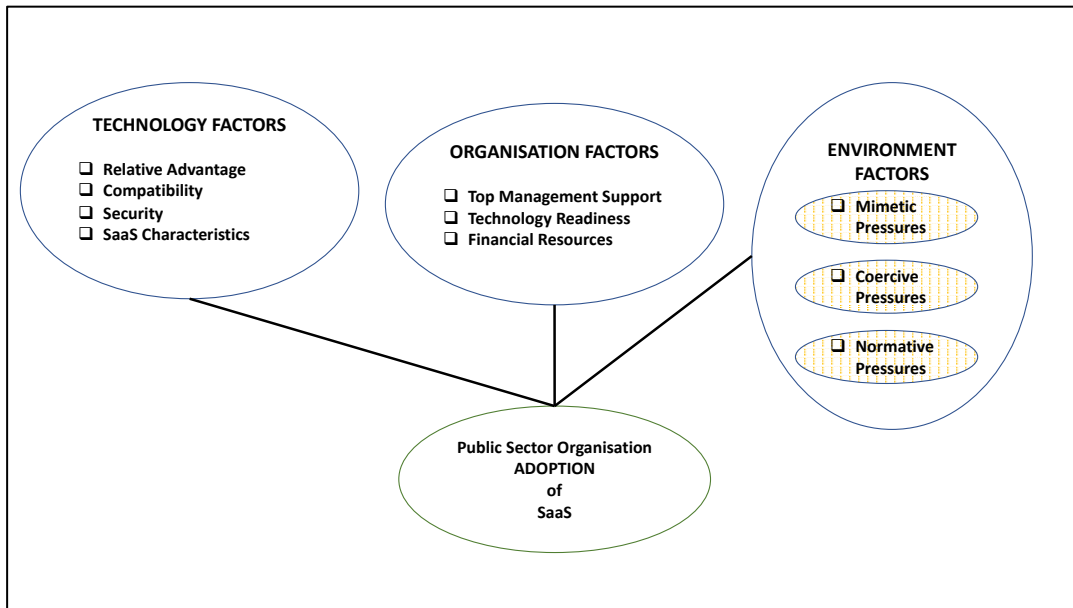


FIGURE 7: FINAL INTEGRATED CONCEPTUAL FRAMEWORK

As illustrated in Table 9, overall for Technology and Organisation factors, the majority of participants (varying from >80%) indicated that these factors are critical. However for Environment factors, less than half of the participants indicated that Mimetic and Normative pressures were partially critically. +67% indicated that Coercive Pressure are significant; this was a highest response within the Environment factors. When combining the responses for Critical and Partly critical both Mimetic and Normative pressures added up to over 80% hence these environment factors were retained in the conceptual framework. The SaaS Characteristics' factor which was highlighted by interviewed participants was added in the Technology Context.

The study revealed, as discussed in detail in this Chapter that all the depicted Technology, Organisation and Environment factors are considered in the SaaS adoption process within a state-owned company.

---

## 5.7 SUMMARY OF CHAPTER

---

In this chapter, the researcher presented the findings from the interviews conducted with fifteen participants from the state-owned company that was studied. These findings were interpreted and used to inform answers to the primary and secondary questions of the research. Finally, the findings were used to enhance the integrated conceptual framework of this research. In the next chapter, the study will be evaluated in terms of the achievement of research objectives.

---

## CHAPTER 6: EVALUATION OF THE RESEARCH

---

This chapter presents a reflection on the research and whether the objectives were met as well as the main and secondary questions answered. The research aimed to understand SaaS adoption factors which are considered in a state-owned company in South Africa. The chapter will also present recommendations for future research and limitations of the study.

---

### 6.1 OVERVIEW OF CHAPTERS

---

---

#### 6.1.1 CHAPTER 1

---

Chapter 1 presented the introduction of this research, with particular emphasis on the research rationale, objectives, design, questions, contributions (i.e. theoretical and practical), and limitations. The chapter also outlined the organisation of the remainder of this report.

---

#### 6.1.2 CHAPTER 2

---

Chapter 2 introduced cloud computing whilst positioning SaaS, presented an overview of previous research and findings stemming from a systematic literature review of academic journals and practitioner publications on the adoption of cloud computing and SaaS, at the organisational level. 23 out of 440 academic literature articles were found appropriate to utilise in this study. Additionally, this chapter introduced the gaps identified in reviewed literature which are partially addressed in this study.

---

### 6.1.3 CHAPTER 3

---

In this chapter the theoretical underpinnings of the research and the integrated TOE-INT conceptual framework for the study were presented. Additionally, the nine initial or proposed technology, organisation and environment factors that were deemed to have an influence on SaaS adoption were developed. This study utilised the Technology, Organisation and Environment (TOE) framework as the primary lens to study factors that influence SaaS adoption in a South African state-owned company, with the environment context supplemented by Institutional (INT) theory factors.

---

### 6.1.4 CHAPTER 4

---

This chapter described the methodology that was used to conduct this research. It presented the research philosophy, the related research strategy and the chosen design as well as the procedures for data collection and analysis. Additionally, the research context, qualitative evaluation criteria as well as ethical issues that were considered throughout the study were discussed.

---

### 6.1.5 CHAPTER 5

---

Chapter 5 presented the empirical data collected and the related findings stemming from the analysis of the data which was collected from fifteen (15) participants through interviews. In addition, the chapter provided the interpretation of the findings in relation to the literature reviewed. The research results were used to refine the proposed conceptual framework to entail ten significant factors which were found to be significant in SaaS adoption within the studied state-owned company.

---

## 6.2 RESEARCH OBJECTIVE

---

This study investigated SaaS adoption factors which are considered by a state-owned company within South Africa.

The main objective of the study was to review existing literature in order to formulate an integrated TOE-INT conceptual framework (including relevant factors) for the adoption of SaaS in state-owned organisations.

To this end data was collected from the single case study site; fifteen participants from business and IT units were interviewed. Data was analysed in order to achieve the research objective and answer the research questions as detailed in Chapter 5.

Overall, all research questions were answered. Ten TOE factors that align with the reviewed academic literature were validated and found to be considered by the studied state-owned entity when considering whether to adopt or not to adopt SaaS. The relevant factors found were Relative Advantage, Compatibility, Security, SaaS Characteristics, Top Management Support, Technology Readiness, Financial Resources/Budget, Mimetic Pressures, Coercive Pressures and Normative Pressures. These factors were found to influence the decision to adopt SaaS in a state-owned organisation; they hinder or drive the decision. The key benefits and risks of SaaS in the context of a state-owned organisation within South Africa were unpacked. Based on the findings, the study formulated a TOE-INT conceptual framework (including relevant factors) which can be applied to better understand the adoption of SaaS in local state-owned organisations.

---

## 6.3 CONTRIBUTIONS OF THE STUDY

---

---

### 6.3.1 LIMITATIONS OF THE STUDY

---

The study had some limitations which may be useful to direct future research. SaaS adoption was studied within a single SA state-owned institution and did not study other public sector or private sector organisations. The case study site is located in the Gauteng province within South Africa, therefore the findings may not be applicable to other provinces in South Africa or in another country. Additionally, the research focused specifically on one cloud computing service model i.e. SaaS and not others (e.g. IaaS and PaaS). The sample size (i.e. 15 participants) was also limited due to the single site coverage; positivists could argue lack of generalisability; however, this interpretive study was not designed and did not strive to generalise findings to state-owned entities in SA or globally (i.e. in developed and developing countries). This study investigated SaaS adoption factors at the organisation level without the individual level of analysis. Additionally, the research was a cross-sectional study which does not provide a historic or longitudinal perspective of the phenomenon.

The participants were limited to the internal business and IT representatives who have prior involvement in SaaS adoption; this implies that the study missed other different perspectives from excluded employees and perhaps external stakeholders (e.g. former employees, consultants, suppliers and so forth) who were involved or consulted in SaaS related decision making within the selected case study site.

Finally, a bias could have been introduced by the researcher whose sole interpretation of the data based on the researcher's view, and the researcher's limited proficiency in interpreting qualitative data.

---

### 6.3.2 FUTURE RESEARCH

---

Future research should consider enhancing the integrated TOE-INT conceptual framework developed in this study in order to further advance knowledge in the IS field. Other similar studies could conduct the research in multiple state-owned entities in South Africa or in another country. Other cloud service models (e.g. PaaS) could be the IT artefact of interest in future studies. Quantitative studies (e.g. a survey) could be conducted to test the findings of this study and develop a theoretical model to better understand SaaS adoption in organisations.

Studies at the individual level (e.g. perceptions of corporate or social users) would also enhance IS knowledge on SaaS adoption.

A study on the factors that are deemed critical post the Covid-19 pandemic may bring new insights to the IS field.

---

### 6.3.3 CONTRIBUTIONS

---

The integrated TOE-INT conceptual framework could advance the IS field upon its application by academic researchers, particularly in South African state-owned organisations. The TOE-INT conceptual framework presents a novel mix of factors drawn from theories obtained in the literature reviewed in this study. This unique approach, coupled with the different public sector focus, to the researcher's knowledge, is different to any extant reviewed literature. The study entails appropriate contexts to investigate technology, organisation and environment factors that need to be considered by

public sector practitioners, over and above the cost factor, when faced with the decision to adopt SaaS technologies in order to improve service delivery and performance against the needs of citizens. When applied in further studies, this conceptual framework could uncover new factors that can help researchers and practitioners better understand SaaS adoption at the organisational level. The study presents empirical evidence for SaaS adoption decision makers to plan SaaS adoption initiatives and enhance the related processes for successful implementation of SaaS in state-owned entities.

#### *6.3.3.1 For Researchers*

Reviewed literature suggested that IS researchers need to contribute to literature and practise by conducting more studies with deep insights particularly on SaaS solutions; this was the intent of the research. This study advances IS Researchers' knowledge of SaaS adoption in state-owned entities and validates ten TOE factors in a developing country. This research contributes towards closing the literature gap of studies focusing on SaaS technologies in a developing economy. The researcher believes that there is also an opportunity for academia to improve collaboration with industry practitioners by researching the future of SaaS through unpacking "What is the future of Cloud Computing (including SaaS) – What Next"? The development of new or enhancements of IS theories to cater for Cloud technologies such as SaaS would contribute significantly and assist practitioners as well as researchers to better understand SaaS technologies and their impact not only on organisations but also on individuals and the society at large.

#### *6.3.3.2 For SaaS Service Providers*

Findings based on this conceptual framework could be useful for SaaS services providers to refine their offering as well as services in order to be more attractive to South African state-owned institutions or other organisations in order to boost the adoption rate. As responsible stakeholders, SaaS service providers need to collaborate more in resolving persistent concerns (e.g. security of data), new challenges (e.g. multi-cloud integration) and closing gaps that are deemed as barriers in SaaS technologies.

#### *6.3.3.3 For Governments*

For governments, studies of SaaS adoption within state-owned entities could elevate issues within the government's control that hinder or promote adoption of cloud computing technologies. Consequently, this would result in new policy positions that could improve the regulatory environment to be more supportive whilst protecting the state as well as its entities (including data and information). This study highlights areas (e.g. governance processes, information security and legal) the government may consider to define practical frameworks or establish a supportive regulatory environment for SaaS adoption.

#### *6.3.3.4 Practitioners*

Practitioners need to consider the various factors presented in this research, not just costs prior to making the SaaS adoption decision, and monitor all factors during assimilation within organisations. SaaS adoption may no longer be a choice in a few years as software service providers mostly have product road maps that focus on building SaaS offerings and decommissioning on-premise or legacy offerings. Consequently organisations need to craft multi-cloud computing strategies and cautious roadmaps (i.e. phased and correct software pools) to address the future of their IT landscape, sooner than late. This needs to be done with detailed assessments of SaaS offerings that are aligned with the business strategy as well as taking into account the outcome of due diligence exercises on each potential SaaS provider. Organisations will need to upskill both technical and business resources to understand the technology shift and new operating models that come with such innovations. To prevent impact due to regulatory non-compliance and security or privacy breaches, organisations need to strengthen IT governance and find innovative ways to continuously review the state of their SaaS service provider/s.

## CHAPTER 7: CONCLUDING REMARKS

---

Given the potential benefits and opportunities offered by SaaS, it is an innovative technology that deserves the attention from researchers and practitioners in order to better understand the key and relevant SaaS adoption factors that need to be considered by impacted stakeholders in organisational ecosystems. This research is crucial for impacted stakeholders (i.e. academia, practitioners, service providers and policy makers) to consider the key factors that may drive or hinder the adoption of SaaS in state-owned institutions. SaaS technologies are maturing, the study revealed the importance of these innovative technologies in a South African state-owned company.

The value of this research is in enhancing the body of knowledge in IS, particularly on the SaaS Adoption factors considered by a State-Owned Company in the South African context. The study developed an integrated conceptual framework (with ten key factors), based on the TOE framework and Institutional theory, which can be used to better understand and perhaps guide SaaS adoptions in other state-owned companies or even private sector organisations. Although the framework was tested using a single site case study strategy, the researcher believes that it has potentially global benefits. The practical implications of this research are applicable for researchers, governments, practitioners and SaaS service providers.

Future studies are recommended to enhance the integrated conceptual framework presented in this study and to conduct similar research in multiple organisations for broader applicability.

## REFERENCES

---

- Abrahams, O., Ophoff, J., & Mwalemba, G. (2015). Cloud computing adoption for business development: A TOE perspective. *Proceedings of the 9th IDIA Conference*, 463–476.
- Accenture (2012). *A new era for energy companies: Cloud computing changes the game*. Retrieved from [https://www.accenture.com/t00010101T000000\\_\\_w\\_\\_frfr/\\_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Technology\\_2/Accenture-New-Era-Energy-Companies-Cloud-Computing-Changes-Game.ashx](https://www.accenture.com/t00010101T000000__w__frfr/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Technology_2/Accenture-New-Era-Energy-Companies-Cloud-Computing-Changes-Game.ashx).
- Al-rawahna, A. S. M., Hung, C. W., & Chen, S. C. (2018). Readiness of Government Organizations for Cloud-Computing Age: An Empirical Evidence from Jordan. *Journal of Business and Management Sciences*, 6(4), 152–162.
- Al-Ruithe, M., Benkhelifa, E., & Hameed, K. (2017). Current State of Cloud Computing Adoption - An Empirical Study in Major Public Sector Organizations of Saudi Arabia (KSA). *Procedia Computer Science*, 110(2), 378–385.
- Alsanea, M., & Wainwright, D. (2014). Identifying the Determinants of Cloud Computing Adoption in a Government Sector – a Case Study of Saudi Organisation. *International Journal of Business and Management Studies*, 6(2), 29–43.
- Asatiani, A. (2015). Why cloud? - A review of cloud adoption determinants in organizations. *23rd European Conference on Information Systems, ECIS 2015, 2015-May*, 1–17.
- Benlian, A., & Hess, T. (2011). Opportunities and risks of software-as-a-service: Findings from a survey of IT executives. *Decision Support Systems*, 52(1), 232–246.
- Benlian, A., Hess, T., & Buxmann, P. (2009). Drivers of SaaS-Adoption – An Empirical Study of Different Application Types. *Business & Information Systems Engineering*, 1(5), 357–369.
- Bhattacharjee, A. "Social Science Research: Principles, Methods, and Practices," 2012, Open Access Textbooks. Book 3. [http://scholarcommons.usf.edu/oa\\_textbooks/3](http://scholarcommons.usf.edu/oa_textbooks/3).
- Bibi, S., Solutions, S., Katsaros, D., & Bozanis, P. (2012). Business Application Acquisition: On-Premise or SaaS-Based Solutions?. *Ieee Software*, 29(3), 86-93.

- Clemmons, P., Geller, J., & Messer, A. (2012). *Cloud Hits the Enterprise*. Issue 11. Retrieved from [https://www2.deloitte.com/content/dam/insights/us/articles/cloud-hits-the-enterprise-the-scoop-on-software-as-a-service/US\\_deloitte\\_review\\_Cloud\\_Hits\\_The\\_Enterprise\\_Jul12.pdf](https://www2.deloitte.com/content/dam/insights/us/articles/cloud-hits-the-enterprise-the-scoop-on-software-as-a-service/US_deloitte_review_Cloud_Hits_The_Enterprise_Jul12.pdf)
- de Meijer, C., & Brown, A. (2014). Transaction banking in the cloud: Towards a new business model. *Journal of Payments Strategy & Systems*, 8(2), 206–223.
- Ducervic (2018). The 6 Key SaaS Trends You Should Watch Out For In 2019. Retrieved from Datapine <https://www.datapine.com/blog/saas-trends/>
- Dwivedi, Y., Wade, M., & Schneberger, S. (2012). *Information Systems Theory: Explaining and Predicting Our Digital Society, Vol. 1*.
- Gangwar, H., Date, H., & Ramaswamy, R. (2015). Understanding determinants of cloud computing adoption using an integrated TAM-TOE model. *Journal of Enterprise Information Management*, 28(1), 107–130.
- Gibson, J., Rondeau, R., Eveleigh, D., & Tan, Q. (2012). Benefits and challenges of three cloud computing service models. *Proceedings of the 2012 4th International Conference on Computational Aspects of Social Networks, CASoN 2012*, 198–205.
- Global Business Report. (2019). The Future of Mining: Innovative solutions transforming a traditional industry. *Engineering & Mining Journal (00958948)*, 220(4), 60.
- Gould, L. S. (2018). Managing Manufacturing Ops with Software-as-a-Service. *Automotive Design & Production*, 130(8), 50.
- Gutierrez, A., Boukrami, E., & Lumsden, R. (2015). Technological, organisational and environmental factors influencing managers. *Journal of Enterprise Information Management*, 28(6), 788–807.
- Haag, S., & Eckhardt, A. (2014). Organizational cloud service adoption: a scientometric and content-based literature analysis. *Journal of Business Economics*, 84(3), 407–440.
- He, W., Yan, G., & Xu, L. Da. (2014). Developing vehicular data cloud services in the IoT environment. *IEEE Transactions on Industrial Informatics*, 10(2), 1587–1595.
- Heiser, J., & Santoro, J. (2018). *Hype Cycle for Software as a Service, 2018*. Retrieved from

<https://www.gartner.com/en/documents/3884674/hype-cycle-for-software-as-a-service-2018-Gartner>.

- International Trade Administration. (2020). *South Africa - Country Commercial Guide*. Retrieved from <https://www.trade.gov/knowledge-product/exporting-south-africa-market-overview/>.
- Janssen, M., & Joha, A. (2011). Challenges for adopting cloud-based software as a service (SAAS) in the public sector. *19th European Conference on Information Systems, ECIS 2011*.
- Kin, R. (2003). Case Study Research: Design and Methods. In *Sage Publications* (Vol. 5, p. 94). Sage Publications.
- Klug, W. E. (2014). The Determinants of Cloud Computing Adoption by Colleges and Universities. *ProQuest Dissertations and Theses*, 2(April), 186.
- Kraft, C. (2018). What is SaaS and How Can It Help Build Our Profession? *Journal of Government Financial Management*, 67(2), 26–31.
- Liang, H., Saraf, N., Hu, Q., & Xue, Y. (2007). Assimilation of Enterprise Systems: The Effect of Institutional Pressures and the Mediating Role of Top Management. *MIS Quarterly*, 31(1), 59–87.
- Liang, Y., Qi, G., Wei, K., & Chen, J. (2017). Exploring the determinant and influence mechanism of e-Government cloud adoption in government agencies in China. *Government Information Quarterly*, 34(3), 481–495.
- Lin, P. (2010). SaaS: What Accountants Need to Know. *CPA Journal*, 80(6), 68.
- Liya, X. (2014). Readiness Assessment of Cloud-Computing Adoption within a Provincial Government of South Africa. In *4th International Conference on Design, Development & Research*. University of the Western Cape.
- Loukis, E., Janssen, M., & Mintchev, I. (2019). Determinants of software-as-a-service benefits and impact on firm performance. *Decision Support Systems*, 117(December 2018), 38–47.
- Macy, J. (2009). Software-as-a-Service : The HCM Perspective. *IHRIM Journal*, XIII(2), 10–19.
- Martins, R., Oliveira, T., & Thomas, M. A. (2016). An empirical analysis to assess the determinants of SaaS diffusion in firms. *Computers in Human Behavior*, 62(1), 19–33.
- Matandela, W. (2017). *Determinants Influencing Adoption of Cloud Computing by Small Medium*

*Enterprises in South Africa*. University of the Witwatersrand.

- Mell, P., & Grance, T. (2009). The NIST definition of cloud computing. *National Institute of Standards and Technology*, 53(6), 50
- Mladenow, A., Novak, N. M., & Strauss, C. (2015). Mobility for ‘Immovables’ – Clouds Supporting the Business with Real Estates. *The 6th International Conference on Emerging Ubiquitous Systems and Pervasive Networks (EUSPN 2015)/ The 5th International Conference on Current and Future Trends of Information and Communication Technologies in Healthcare (ICTH-2015)/ Affiliated Workshop*, 63, 120–127.
- Mokwena, S., & Hlebela, C. (2018). Factors Affecting the Adoption of Software as a Service in South African Small Medium Enterprises. *2018 Open Innovations Conference, OI 2018*, 134–139.
- Oates, B. (2005). *Researching information systems and computing*. Sage.
- Okoli, C., & Schabram, K. (2010). *A guide to conducting a systematic literature review of information systems research*.
- Oliveira, T., & Martins, M. F. (2011). Literature Review of Information Technology Adoption Models at Firm Level. *Review of Economics Studies*, 14(1), 110–121.
- Oliveira, T., Martins, R., Sarker, S., Thomas, M., & Popovič, A. (2019). Understanding SaaS adoption: The moderating impact of the environment context. *International Journal of Information Management*, 49, 1–12.
- Orlikowski, W. J., & Baroudi, J. J. (1991). Studying Information Technology in Organizations : Research Approaches and Assumptions. *Information Systems Research*, 2(1), 1–28.
- Prakash, R., Lamdharia, S., & Chandra, D. G. (2013). Scope of cloud computing in television broadcasting industry:A study. *Proceedings - 2013 International Conference on Communication Systems and Network Technologies, CSNT 2013, April*, 371–375.
- Ray, D. (2016). Cloud Adoption Decisions: Benefitting from an Integrated Perspective. *The Electronic Journal Information Systems Evaluation*, 19(1), 3–21.
- Reisinger, D. (2018). *Cloud Spending Will Soar as Enterprise Reliance on SaaS Grows: IDC. EWeek*. Retrieved from <http://0->

[search.ebscohost.com/innopac.wits.ac.za/login.aspx?direct=true&db=f5h&AN=127597799  
&site=eds-live&scope=site](http://search.ebscohost.com/innopac.wits.ac.za/login.aspx?direct=true&db=f5h&AN=127597799&site=eds-live&scope=site)

- Reitzel, D. (2019). *Grant Thornton: Guiding Organizations Through Cloud-Based ERP Adoption. Hfm (Healthcare Financial Management)*. Retrieved from [http://0-search.ebscohost.com/innopac.wits.ac.za/login.aspx?direct=true&db=f5h&AN=135146006  
&site=eds-live&scope=site](http://0-search.ebscohost.com/innopac.wits.ac.za/login.aspx?direct=true&db=f5h&AN=135146006&site=eds-live&scope=site)
- Rogers, E. M. (1983). *Diffusion of Innovations* (Third Ed.). The Free Press.
- Rosenthal, R. (1994). Science and Ethics in and Reporting Psychological Research. *Psychological Science*, 5(3), 127–134.
- Safari, F., Safari, N., & Hasanzadeh, A. (2015). The adoption of software-as-a-service (SaaS): ranking the determinants. *Journal of Enterprise Information Management*, 28(3), 400–422.
- Saunders, M., Lewis, P., & Thornhill, A. (2016). *Research methods for business students* (Seventh). Pearson Education Limited.
- Seethamraju, R. (2014). Adoption of SaaS Enterprise Systems - A comparison of Indian and Australian SMEs. *International Conference on Advances in ICT for Emerging Regions (ICTer)*, 179–184.
- Senyo, P. K., Effah, J., & Addae, E. (2016). Preliminary insight into cloud computing adoption in a developing country. *Journal of Enterprise Information Management*, 29(4), 505–524.
- Fitch Solutions (2019). *South Africa Information Technology Report - Q3 2019*. Retrieved from <https://store.fitchsolutions.com/app-products/south-africa-information-technology-report/>.
- South African Government. (2021). *National Government Directory - State-Owned Enterprises (SOEs)*. <https://www.gov.za/about-government/contact-directory/soe-s/>.
- Tornatzky, L. G., Fleischer, M., & Chakrabarti, A. K. (1990). *The process of technology innovation*. MA: Lexington Books.
- Trope, J. (2014). *Adoption of cloud computing by South African Firms: An institutional theory and diffusion of innovation theory perspective*. University of the Witwatersrand.
- Tweneboah-Koduah, S., Endicott-Popovsky, B., & Tsetse, A. (2014). Barriers to Government Cloud Adoption. *International Journal of Managing Information Technology*, 6(3), 1–16.

- Velev, D. G. (2010). Current and Future State of the SaaS Business Models. *Economic Alternatives*, (1), 43–50.
- Wang, H. J., & Lo, J. (2016). Adoption of open government data among government agencies. *Government Information Quarterly*, 33(1), 80–88.
- Wu, J., Yuen, C., Cheung, N. M., Chen, J., & Chen, C. W. (2015). Enabling Adaptive High-Frame-Rate Video Streaming in Mobile Cloud Gaming Applications. *IEEE Transactions on Circuits and Systems for Video Technology*, 25(12), 1988–2001.
- Yang, Z., Sun, J., Zhang, Y., & Wang, Y. (2015). Understanding SaaS adoption from the perspective of organizational users: A tripod readiness model. *Computers in Human Behavior*, 45, 254–264.
- Zhou, W., Xiao, Y., & Shen, Y. (2017). *Application of Cloud Computing in Telecom Operators*. 14–23.

## APPENDIX A: ETHICS CLEARANCE CERTIFICATE

---



**SCHOOL OF BUSINESS SCIENCES ETHICS COMMITTEE**  
**CONSTITUTED UNDER THE UNIVERSITY HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)**

**CLEARANCE CERTIFICATE**

**PROTOCOL NUMBER: CBUSE/1598**

**PROJECT TITLE**

Adoption of Software as A Service: A Qualitative Case Study in A State-Owned Company in South Africa

**INVESTIGATOR**

Ms Vukile Dlamini

**SCHOOL/DEPARTMENT OF INVESTIGATOR**

School of Business Sciences

**DATE CONSIDERED**

5 August 2020

**DECISION OF THE COMMITTEE**

Approved unconditionally

**RISK LEVEL**

LOW RISK

**EXPIRY DATE**

31 December 2020

**ISSUE DATE OF CERTIFICATE**

6 August 2020

**CHAIRPERSON**

A handwritten signature in black ink, appearing to read 'Neetu Ramsaroop'.

(Neetu Ramsaroop)

cc: Supervisor: Neetu Ramsaroop

---

**DECLARATION OF INVESTIGATOR**

To be completed in duplicate and **ONE COPY** returned to the Chairperson of the School/Department 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/we undertake to resubmit the protocol to the Committee.

A handwritten signature in black ink, appearing to read 'Vukile Dlamini'.  
\_\_\_\_\_  
Signature

Date

14, 08, 2020

**PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES**

Internal Use Only

UNIVERSITY OF THE  
WITWATERSRAND,  
JOHANNESBURG



## **Adoption of Software as a Service: A Qualitative Case Study in a State-Owned Company in South Africa**

**Name of researcher: Vukile Dlamini (2290811)**

### **PARTICIPANT INFORMATION SHEET**

Commerce, Law and Management (Business Science)  
1 Jan Smuts Avenue  
Braamfontein  
Johannesburg  
2000

<Participant Name>  
<Participant Position>  
<Participant Address>

<Date>

Dear Sir/Madam,

### **RE: Research Cover letter for Interview**

My name is Vukile Dlamini, and currently, I am pursuing a Master of Commerce Degree in Information Systems at Wits University. To fulfil a crucial requirement of the Master's programme, I have to undertake an academic research project under the supervision of Ms. Neetu Ramsaroop. I have selected to study the factors which influence SaaS Adoption within a state-owned company in South Africa. The main objective of the study is to develop an integrated conceptual framework that can be used to investigate key factors (i.e. technology, organisational and environmental) which influence the decision to adopt or not to adopt SaaS.

SaaS, one of the prominent and evolving service models of cloud computing, is a phenomenon that has only in the last decade seen more interest from researchers and business leaders who need to understand the adoption of Internet provisioned applications, for academic and organisational reasons respectively. SaaS allows organisations to offer internal and external stakeholders access to the cloud-based applications via the Internet. Importantly, SaaS directly enable business users to perform mission critical and non-core business capabilities which contribute to the achievement of organisational goals.

This research paper is a unique attempt, to study SaaS adoption within a state-owned institution in South Africa (SA), through the lens of an integrated TOE-INT conceptual framework, which could advance the Information Systems (IS) field. Furthermore the conceptual framework could present practical implications; for practitioners it will highlight key factors to consider when faced with the decision to adopt SaaS, for the SA Government it could generate insights for creating a conducive regulatory environment (including national cloud adoption policies), and for SaaS service providers it could produce useful information for packaging SaaS solutions that are suited to state-owned entities in SA.

In your capacity as an IT decision maker or as someone who contributes to technology decisions for your organisation, I humbly request that you please spare me 45 – 60 minutes of your time to participate in this study through an interview process. With your permission, I would also like to record the interview (optional). The interview is structured into three sets of mostly semi-structured questions which cover your company's demographics, your tenure and experience with SaaS adoption and finally, factors (e.g. technology, organisation and environment) that affect your company's decision process to adopt or not to adopt SaaS technologies.

There will be no personal costs to you if you participate in this project. You will not receive any direct benefits from participation but there are no disadvantages or penalties if you do not choose to participate or if you withdraw from the study. You may not answer any question if you do not want to. Please note that the company data, your personal information and responses from the interviews will be strictly confidential, anonymous and will only be used for research purposes. All research data provided by yourself will be held securely and not disclosed to anyone else, and you will be granted access to it whenever required.

Please note that this is a voluntary research process and you are by no means compelled to participate; furthermore, you will be permitted to stop the interview or withdraw should you feel uncomfortable at any stage of the process.

Permission to conduct this research as well as the interviews has been approved and granted by the Wits University Ethics Committee, as well as the Chief Executive Officer of your company.

Thank you in advance for your participation, should you have any queries or concerns, please do not hesitate contact either myself at [2290811@students.wits.ac.za](mailto:2290811@students.wits.ac.za) alternatively send an email to my supervisor: email [neetu.ramsaroop@wits.ac.za](mailto:neetu.ramsaroop@wits.ac.za), telephone +27 (11) 717 8154.

Yours Sincerely,

Vukile Dlamini  
+27 (82) 970 3535

Master of Commerce: Information Systems School of Economic and Business Sciences University of the Witwatersrand, Johannesburg

UNIVERSITY OF THE  
WITWATERSRAND,  
JOHANNESBURG



## **Adoption of Software as a Service: A Qualitative Case Study in a State-Owned Company in South Africa**

**Name of researcher: Vukile Dlamini (2290811)**

### **INTERVIEW SCHEDULE**

The questions included in this interview primarily address aspects pertaining to the adoption of SaaS in a state-owned institution in South Africa. Written consent must be provided by you (participant) that you voluntarily took part in the interviews. The following questions will be asked during the interview conducted with you. The interview consists of three sections and all questions will be asked during the interview that will take approximately an hour.

---

#### **SECTION 1: BACKGROUND OF STATE-OWNED COMPANY**

---

- 1.1 What is the background of your company?
- 1.2 Share the vision, mission, values and strategic objective primary objectives.
- 1.3 What is your company's staff complement? Discuss the high-level organisational structure.
- 1.4 What is the role of your department?
- 1.5 How is your department involved in SaaS related decisions and initiatives? (*ADOPTION*)

---

#### **SECTION 2: PARTICIPANT'S BACKGROUND**

---

- 2.1 Share a brief career history (public and private sector) and your tenure in this organisation.
- 2.2 What is your role and related responsibilities?
- 2.3 Who are your key stakeholders and what are their expectations?
- 2.4 What is your understanding of cloud computing and specifically SaaS?
- 2.5 What experience do you have in terms of SaaS as a decision maker, implementer or user?
- 2.6 How long have you been involved in any SaaS related activity within the organisation

---

### SECTION 3: MAIN RESEARCH QUESTIONS

---

- 3.1 What is your company's view on cloud computing service models, particularly SaaS? (**TECH-RELATIVE ADVANTAGE**)
- 3.2 How does your company approach SaaS decisions in comparison with on-premise applications? (**ADOPTION**)
- 3.3 What are the key considerations for any application adoption? Please share specifics based on recent SaaS related decision making. (**ADOPTION**)
- 3.4 What SaaS solutions were adopted and financed by your company in the past 12 months? How were the indicated SaaS acquisitions funded? (**ORG-FINANCIAL RESOURCES/BUDGET**)
- 3.5 Which one(s) were you involved with? Share the key factors that led to the adoption of the SaaS solution(s)? (**ADOPTION**)
- 3.6 Are there specific concerns that you had or have pertaining to previous, current or planned SaaS adoptions? Please explain each concern. (**ADOPTION**)
- 3.7 What do you believe is top management's role and view of SaaS adoption in the company? What have you observed in this regard? (**ORG-TOP MANAGEMENT SUPPORT**)
- 3.8 How knowledgeable is top management in terms of the benefits and risks of SaaS? (**ORG-TOP MANAGEMENT SUPPORT**)
- 3.9 What is the extent of SaaS utilised to support current business needs? Please name the SaaS offerings currently in place. (**TECH-COMPATIBILITY**)
- 3.10 How does your company ensure that a SaaS solution is consistent with the company's existing processes, systems and skills? (**TECH-COMPATIBILITY**)
- 3.11 What do you think are the key benefits of SaaS adoption, in relation to your role and/or department? (**TECH-RELATIVE ADVANTAGE**)
- 3.12 What would you say are the advantages and disadvantages for your company's adoption of SaaS compared to on-premise applications? (**TECH-RELATIVE ADVANTAGE**)
- 3.13 How does your company validate if existing technology will support a SaaS offering? (**ORG-TECHNOLOGY READINESS**)
- 3.14 What information security measures and expertise does your organisation require from SaaS solutions and provider respectively? (**TECH-SECURITY**)
- 3.15 If there are information security gaps or issues identified in a SaaS solution, how are these addressed? Please give examples. (**TECH-SECURITY**)

- 3.16 What interventions are utilised to train and upskill employees for SaaS adoption and implementation? **(ORG-TECHNOLOGY READINESS)**
- 3.17 What are the external factors (including stakeholders) that lead to a decision to adopt or not to adopt SaaS? **(ENVIRONMENT)**
- 3.18 What are the key issues that the organisation has encountered with SaaS adoption? How were these issues addressed? **(ADOPTION)**
- 3.19 How did the encountered issues influence or hinder the decision to adopt or not to adopt SaaS? **(ADOPTION)**
- 3.20 What would you say are the key lessons you or the company has learnt from SaaS adoption decisions? **(ADOPTION)**
- 3.21 What is the extent of SaaS adoption by other state-owned organisations? What is your view of the publicised SaaS implementations in public sector institutions? **(ENV-MIMETIC)**
- 3.22 What is different about your company's approach to SaaS adoption when compared with other government institutions? **(ENV-MIMETIC)**
- 3.23 What is different about your company's approach when compared with similar private sector organisations? **(ENV-MIMETIC)**
- 3.24 Do clients or key stakeholders require the organisation to use SaaS e.g. for transactions or collaboration? Please share the reasons for the requirement. **(ENV-COERCIVE)**
- 3.25 Does the government or your company's shareholders require your organisation to adopt SaaS? Please provide the motivation for this requirement. **(ENV-COERCIVE)**
- 3.26 To what extent is SaaS adopted by the organisation's clients or key stakeholders? **(ENV-NORMATIVE)**
- 3.27 To what extent do the engaged SaaS services providers have SaaS product roadmaps? What do they indicate in terms of continued development of their on-premise application software? **(ENV-COERCIVE)**
- 3.28 What happens in your organisation's industry if you do not adopt SaaS? **(ENV-NORMATIVE)**
- 3.29 Does your organisation participate in professional or business associations that promote SaaS adoption? Please share highlights on SaaS related conversations and debates from these forums. **(ENV-NORMATIVE)**
- 3.30 How critical are the following factors for the adoption of SaaS? **(ADOPTION)**

SaaS Adoption Factor	Critical	Partly Critical	Not Critical	Participant's Comment
<b>3.30.1 TECHNOLOGY</b>  3.30.1.1 Relative Advantage 3.30.1.2 Compatibility 3.30.1.3 Security				
<b>3.30.2 ORGANISATION</b>  3.30.2.1 Top Management Support 3.30.2.2 Technology Readiness 3.30.2.3 Financial Resources				
<b>3.30.3 ENVIRONMENTAL</b>  3.30.3.1 Mimetic Pressures 3.30.3.2 Coercive Pressures 3.30.3.3 Normative Pressures				

Table 1: Criticality of SaaS Adoption Factors

3.31 What other SaaS adoption factor(s) would you add, and why? (ADOPTION)

## APPENDIX D: INTERVIEW TRANSCRIPT TEMPLATE

UNIVERSITY OF THE  
WITWATERSRAND,  
JOHANNESBURG



### **Adoption of Software as a Service: A Qualitative Case Study in a State-Owned Company in South Africa**

**Name of researcher: Vukile Dlamini**

#### **INTERVIEW TRANSCRIPT**

	Participant: XXX Interviewer: Vukile Dlamini Date of Interview: ddmmYYYY                      Time: hh.mm Location of Interview: XXX	
Interviewer		
Participant		
Interviewer		
Participant		
Interviewer		
Participant		
Interviewer		
Participant		
Interviewer		
Participant		

## APPENDIX E: ILLUSTRATION OF TRANSCRIBED INTERVIEW AND CODING

3. MAIN RESEARCH QUESTIONS				
Question	3.1 What is your company's view on cloud computing, particularly SaaS?	3.2 How does your company approach SaaS decisions in comparison with on-premise applications?	3.4 What SaaS solutions were adopted and financed by your company in the past 12 months? How were the indicated SaaS acquisitions funded?	3.7 What do you believe is top management's role and view of SaaS adoption in the company? What have you observed in this regard?
High-Level THEME	TECH-RELATIVE ADVANTAGE	ADOPTION	ORG-FINANCIAL RESOURCES/BUDGET	ORG-TOP MANAGEMENT SUPPORT
Themes	TechRA	Ado	OrgFR	OrgTMS
Codes	-P#1, P#3, P#4, P#9, P#10; P#11, P#13, P#14, P#15: SaaS acceptable - Part of IT Strategy ("Cloud First"); a strategic enabler -> <b>TechRAStr</b> -P#2, P#12: Business wants to move into a cloud with reservation due to historic security concerns, data leakage, data protection and residency issues. -> <b>TechSCon</b>	-P#1: Alignment to IT Strategy -> <b>AdoDecStra</b> -P#1: RFP condition -> <b>AdoDecRfp</b> -P#1, P#4, P#15: Meets compelling business reqs (incl functional and technical reqs) -> <b>AdoDecBR</b> -P#1, P#11: Regulatory compliance -> <b>AdoDecCom ent</b> -> <b>AdoDecDD</b>	-P#1, P#4, P#5, P#9, P#10, P#13: Funded from the company's capex and opex budget -> <b>OrgFRBu</b> -P#1, P#11, P#13: Approved (by National Treasury) in line with the demand plan, and all the PFMA regulations, -> <b>OrgFRAp</b>	-P#1, P#6: Business - support if solutions meet requirement (incl. divisional or portfolio); -> <b>OrgTMSBR</b> P#5, P#7, P#9, P#13, P#15: Open minded, understand SaaS and willing to adopt -> <b>OrgTMSVie</b>
Referenced Documentation	<i>INFORMATION TECHNOLOGY (IT) STRATEGY - FY2020-22 (DR2)</i>	<i>SECURITY REQUIREMENTS CHECKLIST - APPLICATIONS (DR7)</i>	<i>IT FINANCE REPORT (DR6)</i>	
Participant 1 - P#1	I think the view is that we must adopt cloud computing service models, and software as service models, in the organization. This is because it is part of our strategy that solutions being implemented in the organization, must be cloud-based, and software as a service, based, and also platform as a service, based. So it's a view that the organization takes and it is also documented within the IT strategy that we have.	I think <b>we ensure to align to our cloud strategy, for all solutions</b> ; so that's our approach. If we choose, let's say we want to implement a new solution, we ensure that it is aligned to our strategy, it is aligned to, well, the approved strategy.  For example, <b>within our RFP, we clearly state that we want the solution to be cloud-based; so any other on-prem solutions</b> , and we've had cases where implementers ask questions - would you consider an on-prem solution? - and the answer has always been, no.  So the key considerations for any application adoption in the organization, we make sure that it is SaaS-based or cloud-based; we make sure that it <b>meets business requirements and functional requirements, and all the requirements that we have, including the regulations within the country</b> ; but it must be cloud-based.	I think, Office 365; it is the one that we are currently using now. The digital signature solution, and public key infrastructure solution; although the other is in contracting, but the Office 365 is currently in use, and it is helping us to, well, work well in these trying times of COVID-19. So that's why we have teams and all these other Office 365 solutions that we are using.  I believe these were <b>funded from the company's capex budget, which has to be approved in line with the demand plan, and all the PFMA regulations</b> , because we are a state owned entity, so we have to align ourselves to PFMA; we have to make sure that our demand plan is approved, all the way, by the management, and also by national treasury.	Well, my observation is that the business top management people, for example, people in finance, people who are doing all the trades who are presiding over those departments, <b>don't necessarily have a view on cloud-based solutions in the organization</b> ; all they care about, is that <b>solutions meet their requirements</b> . But the top management within IT is, in my observation, is that they're <b>enforcing the adoption of the strategy, and that is why we are only implementing solutions that are aligned to the strategy</b> . So business cares about their requirements, we care about their requirements, as well as alignment to the strategy.  I think their role, specifically, to speak to IT, their role is to ensure that we align to the strategy; their role is to ensure that they champion the strategy....

THEME	SUB-THEME	CODE NUM	HIGH-LEVEL CODE	CODENAME	INTERVIEW QUESTION	RELEVANT DOCUMENTATION	COUNT	MENTIONED BY:
ADOPTION	Adoption Decision	1	AdoDec	AdoDecBus	1.5, 3.19	DR2	2	PW4, PW3
TECHNOLOGY	Relative Advantage	63	TechRA	TechRAstra	3.1, 3.3, 3.11, 3.12	DR2	10	PW1, PW3, PW4, PW9, PW10; PW11, PW13, PW14, PW15, PW8
TECHNOLOGY	Security	82	TechS	TechSCon	3.1, 3.6, 3.12		7	PW2, PW11, PW6, PW7, PW1, PW10, PW14
TECHNOLOGY	Compatibility	98	TechC	TechCBus	3.9		2	PW1, PW8
ORGANISATION	Financial Resources	110	OrgFR	OrgFRBu	3.4	DR6	12	PW1, PW4, PW5, PW9, PW10, PW13, PW2, PW6, PW7, PW8, PW9, PW14
ORGANISATION	Top Management Support	113	OrgTMS	OrgTMSDr	3.7		7	PW6, PW11, PW7, PW8, PW10, PW14, PW15
ORGANISATION	Technology Readiness	123	OrgTR	OrgTRRea	3.12, 3.16		2	PW10, PW2
ENVIRONMENT	Mimetic	135	EnvMim	EnvMimSOE	3.21, 3.22		11	PW1, PW14, PW3, PW2, PW6, PW7, PW11, PW10, PW9, PW11, PW4
ENVIRONMENT	Coercive	139	EnvCoe	EnvCoeCli	3.24		11	PW1, PW3, PW6, PW8, PW9, PW10, PW11, PW14, PW2, PW13, PW5,
ENVIRONMENT	Normative	142	EnvNor	EnvNorCli	3.17, 3.26		5	PW2, PW4, PW6, PW10, PW11

# APPENDIX F: LETTER OF PERMISSION FROM THE STATE-OWNED COMPANY

---



Pretoria 0001  
Republic of South Africa

15 July 2020

Your Reference:



Ms Vukile Dlamini  
PO Box 1413  
Glenvista  
JOHANNESBURG  
2058

+27 12 [redacted]  
[redacted].gov.za

Dear Madam,

## PERMISSION FOR VUKILE DLAMINI TO CONDUCT ACADEMIC RESEARCH AT [redacted]



- 1 I acknowledge receipt of your request (i.e. memo dated 07 July 2020) to conduct academic research at [redacted] as part of your Master of Commerce (Information Systems) degree in the Business Science School at the University of the Witwatersrand.
- 2 [redacted] supports continuous development of all employees and therefore your request was considered in that context.
- 3 I therefore grant you approval to conduct the case study, titled "**Adoption of Software as a Service (SaaS): A Qualitative Case Study in a State-Owned Company in South Africa**", at [redacted]
- 4 In conducting this research, you are expected to comply with your employment contract conditions as well as [redacted] policies, procedures and standards.



## APPENDIX G: ILLUSTRATION OF SIGNED CONSENT FORM



### SaaS Adoption: A Qualitative Case Study in a State-Owned Company in South Africa

Name of researcher: Vukile Dlamini (2290811)

#### CONSENT TO TAKE PART IN RESEARCH


I, [REDACTED], voluntarily agree to participate in this research project. The research has been explained to me and I understand what my participation will involve.


(Please circle the relevant options below).

I agree that I have received Participant Information.	<input checked="" type="radio"/> YES	<input type="radio"/> NO
I agree that my participation will remain anonymous.	<input checked="" type="radio"/> YES	<input type="radio"/> NO
I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.	<input checked="" type="radio"/> YES	<input type="radio"/> NO
I agree that the researcher may use anonymous quotes in his / her research report.	<input checked="" type="radio"/> YES	<input type="radio"/> NO
I understand that all information I provide for this study will be treated confidentially.	<input checked="" type="radio"/> YES	<input type="radio"/> NO
I agree that the interview may be audio recorded.	<input checked="" type="radio"/> YES	<input type="radio"/> NO

ADOPTION OF SAAS: A QUALITATIVE CASE STUDY IN A STATE-OWNED COMPANY (SA)  
RESEARCH PROPOSAL

I agree that the information I provide may be used anonymously after this project has ended, for academic purposes by other researchers, subject to their own ethics clearance being obtained.	<input checked="" type="radio"/> YES	<input type="radio"/> NO

 (Signature)  
..... (Name of participant)  
Pretoria ..... (Place)  
28 August 2020 ..... (Date)

 (Signature)  
Vukile Dlamini (Name of interviewer)  
Cantunon ..... (Place)  
28.08.2020 ..... (Date)