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EXPLORING FACTORS WHICH INFLUENCE EFFECTIVE USE OF ROBOTIC PROCESS AUTOMATION FOR BUSINESS CONTINUITY IN A SOUTH AFRICAN BANK

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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.

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ABSTRACT

Technology advancement improves the organisation's operations while exposing them to risks and disruptions that require mitigation. Business continuity enables organisations to maintain the continuity of critical business operations during disruption. Banks adopt Robotic Process Automation (RPA) to achieve operational efficiency by automating repetitive and high-volume processes. South African banks are rapidly adopting RPA to streamline efficiency, maintain business continuity, and reduce operational costs to improve customer service. While many studies about RPA and business continuity exist, research on integrating these concepts is limited. This research explores determinants influencing RPA use for business continuity. It adopts an interpretivist paradigm combined with the Technology-Organisation-Environment (TOE) and Task-Technology Fit (TTF) framework as a theoretical lens. This theoretical lens proposes a TOE-TTF framework to explore factors affecting RPA use for business continuity. An exploratory research design applying a case study strategy and a purposive sample of ten participants was used in this study. Research data was collected in a South African bank using a semi-structured interview strategy.

The results posit that critical TOE components are technological context (i.e., RPA process selection, compatibility, RPA stability and availability, and RPA monitoring, support, and stability), organisational standpoint (i.e., collaboration amongst stakeholders, top management support and business-led initiative) and environmental context (i.e., customer satisfaction, competition pressure, and regulatory requirements) substantially impacted RPA use for business continuity. Also, bank's legacy systems strongly influence RPA use for business continuity. TTF theory factors, namely task, fit, utilisation, and performance factors, influenced RPA use for business continuity. This research provides a unique contribution as it integrates RPA and business continuity notions with the TOE-TTF framework viewpoint in a South African bank advancing the IS discipline. The results provide practitioners and researchers with a better understanding and identify critical factors organisations can be considered when using RPA for business continuity in banking. South African banks could illustrate beneficial insights when facing more competition and evolving customer needs and requirements. The research findings could be used for other technologies that are intended to be used for business continuity in different sectors.

Keywords: Robotic Process Automation, business continuity, Technological Organisation Environmental, Task-Technology Fit, South Africa

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DEDICATION

I would like to dedicate this thesis to my special family (Simphiwe, Andisa and Musawenkosi) and my sister and best friend, Karabo, for standing by me through thick and thin.

In loving memory of my dearest, loving and late grandmother, Mmadikeledi Dorothy Moerane – this one is for you, Mma!

Mosetsana wa Mokwena yo o magetla a sephara
O ntshitse kwena mo metsing a le esi
Mokwena wa Modimosana o sa ikgalaleng
O thuba metsi a dikgapetla ka sehuba
Batho ba sala ba ngunaguna!!

TABLE OF CONTENTS

DECLARATION ii
ABSTRACT. iii
ACKNOWLEGEMENTS iv
DEDICATION v
LIST OF TABLES ix
LIST OF FIGURES x
LIST OF KEY ABBREVIATIONS xi
CHAPTER 1: INTRODUCTION AND PROBLEM STATEMENT 1
1.1. Background 1
1.2. Contextualisation 2
1.3. Problem Statement 4
1.4. Research Objectives and Questions 5
1.5. Significance of this Study 6
1.6. Research Contribution 8
1.7. Delimitations of this Study 8
1.8. Assumptions 9
1.9. Research Report Structure 9
CHAPTER 2: LITERATURE REVIEW 11
2.1. Overview of Literature Review 11
2.2. Literature Review Methods 11
2.3. Robotic Process Automation (RPA) Background 14
2.3.1. RPA Evolution 14
2.3.2. RPA Definition 16
2.3.3. RPA Trend 18
2.3.3.1. RPA Market Size Forecasts 18
2.4. Business Continuity in Banking 19
2.5. Context of RPA Use in Banking 22
2.5.1. Global (excluding African regions) Case Studies of RPA Implementations in Banking 23
2.5.2. African Regions Case Studies of RPA Implementations in Banking 25
2.6. Use of RPA in a Bank 26
2.7. Effective Use of RPA for Business Continuity in a Bank 27
2.8. Impact of RPA Downtime on a Bank 28
2.9. Benefits of Achieving Business Continuity Through the Use of RPA 32
2.10. Theoretical Background and Research Framework 33
2.10.1. Introduction 33
2.10.2. Technology Organisation Environment (TOE) Framework 35
2.10.3. Task-Technology Fit (TTF) Theory 37
2.10.4. Integrated TOE-TTF Conceptual Framework 39
2.10.4.1. Technology-Organisation-Environment (TOE) Framework Perspective 40

2.10.4.2. Task-Technology Fit (TTF) Theory Perspective 42
2.11. Summary of Chapter 43
CHAPTER 3: RESEARCH METHODOLOGY 45
3.1. Introduction 45
3.2. Research Paradigm and Approach 45
3.3. Research Design and Strategy 47
3.3.1.1. Research Design 47
3.3.1.2. Research Strategy 47
3.3.1.3. Site Selection 48
3.3.1.4. Unit of analysis 48
3.3.1.5. Time horizon 49
3.4. Data Collection and Participant Selection 49
3.4.1.1. Data Collection 49
3.4.2. Research Sampling and Participants Selection Method 50
3.4.3. Data Analysis Procedures 51
3.5. Research Quality 52
3.6. Challenges experienced during the research 54
3.7. Ethical Considerations 54
3.8. Summary Of Chapter 56
CHAPTER 4: DATA ANALYSIS AND INTERPRETATION OF FINDINGS 57
4.1. Introduction 57
4.2. Participant Demographics 57
4.3. Interview Questions Profile and Response Rate 59
4.4. Analysis of Qualitative Data 60
4.4.1. Findings Related to Technology Feature 63
4.4.2. Findings Related to Organisation Feature 69
4.4.3. Findings Related to Environment Feature 75
4.4.4. Findings related to Task, Fit, Utilisation, and Performance Impact Features 78
4.5. Summary of Chapter 81
CHAPTER 5: DISCUSSIONS 82
5.1. Introduction 82
5.2. Discussions 82
5.3. Discussions of the findings related to Technology Feature 82
5.4. Discussions of the findings related to Organisation Feature 85
5.5. Discussions of the findings related to Environment Feature 88
5.6. Discussions of the findings related to Fit, Utilisation, Task, and Performance Impact Features 89
5.7. Revision of the Proposed Conceptual Framework 91
5.8. Re-examination of the Research Questions 92
5.9. Summary of Chapter 95

CHAPTER 6: THESIS CONTRIBUTION AND CONCLUSION 96
6.1. Introduction 96
6.2. Research Objective 96
6.3. Limitations of the Study 96
6.4. Contributions of the Study 97
6.4.1. Practical Contribution 97
6.4.2. Theoretical Contribution 98
6.5. Recommendations for Future Research 99
6.6. Conclusion 100
REFERENCES 103
APPENDIX B: PARTICIPATION INFORMATION 119
APPENDIX C: INTERVIEW INSTRUMENT 121
APPENDIX D: INTERVIEW TRANSCRIPT TEMPLATE 126
APPENDIX E: THEMATIC ANALYSIS SUMMARY 130

LIST OF TABLES

Table 1: Predicted RPA Earning Per Year (Gartner, 2020) 19
Table 2: List of Participants 50
Table 3: Four Key Principles of Applying Research Quality 54
Table 4: Participants By Business Function In The Bank 58
Table 5: Participants By Representation In The Bank 58
Table 6: Strategic (Executive) Levels of Participants In The Bank 58
Table 7: Participants and Tenure In The Bank 58
Table 8: Participants By Number Of Years Of Employment In The Bank 59
Table 9: Overall Interview Questions and Response Rate 60
Table 10: Key Themes and Sub-Themes 61

LIST OF FIGURES

Figure 1: Total Amount of Registered Bank Bodies in South Africa (FSCA, 2022) 3
Figure 2: Literature Review Methodology (Adopted from Okoli & Schabram, 2010) 11
Figure 3: PRISMA Flow Diagram (adopted from Page et al., 2010) 12
Figure 4: RPA Software Market Growth (Gumaste, 2019; Sharma, 2020) 18
Figure 5: RPA Risks (Adopted from Lacity et al., 2017) 30
Figure 6: Original Version of the Technology-Organisation-Environment (TOE) Framework (Adopted from Tornatzky & Fleischer, 1990) 36
Figure 7: Original Version of the Task-Technology Fit (TTF) Framework (Adopted from Goodhue & Thompson, 1995) 38
Figure 8: Proposed Integrated Conceptual TOE-TTF Framework 40
Figure 9: Research Process Onion (Adopted from Saunders et al., 2016) 45
Figure 10: Main Themes and Sub-Themes Aligned To The Research Questions 62
Figure 11: Revised Conceptual TOE-TTF Framework 91

LIST OF KEY ABBREVIATIONS

Abbreviation	Description
4IR	Fourth Industrial Revolution
AI	Artificial Intelligence
ATM	Automated Teller Machine
BPA	Business Process Automation
BCM	Business Continuity Management
BCP	Business Continuity Plan
BPR	Business Process Re-engineering
CAGR	Compound Annual Growth Rate
DOI	Diffusion of Innovations
FSCA	Financial Sector Conduct Authority
ERP	Enterprise Resource Planning
IS	Information Systems
INT	Institutional Theory
IoT	Internet of Things
ISO	International Organisation for Standardisation
IT	Information Technology
Machine Learning	ML
MS	Microsoft
RFID	Radio Frequency Identification
RPA	Robotic Process Automation
SA	South Africa
SARB	South African Reserve Bank
TOE	Technology-Organisation-Environment
TTF	Task-Technology-Fit
USA	United States of America

CHAPTER 1: INTRODUCTION AND PROBLEM STATEMENT

1.1. Background

Changes in the global economy driven by new technological developments require organisations to be more agile and rapidly respond to evolving customer expectations. Also, financial and competitive force pressurises organisations to be efficient, continuously exploring new technologies and techniques that assist them to be more productive, reduce costs, and add value to their operations. The growing development in new technologies such as intelligence (AI), automation, and machine learning (ML) are fast-evolving and taking the world by storm (Wang & Siau, 2019). Automation is an integral part of Artificial Intelligence (AI), where a technology or system automates functions initially performed by humans (Stople & Steinsund, 2017; Wang & Siau, 2019). Automation is not a new notion and has already been adopted by banks in ATMs (Dilla & Jaynes, 2015). Lacity et al. (2017) confirm that RPA is one of the critical technologies in complete intelligence blueprint automation. Robotic process automation is software that mimics human actions with computer integration to automatically replicate the same business functions (Lamberton et al., 2017; Oliveira, 2016). RPA is a solution that automates repetitive business processes initially carried out by humans and processes that do not require detailed thinking (Madakam et al., 2019). Banks seek different and better ways to remain competitive and increase profits with a cost reduction (Lamberton et al., 2017).

RPA software robots (bots) are beginning to alter how banks operate. Leading banks are adopting RPA, and some are seeing and reaping the rewards of this technology (Lamberton et al., 2017). The advantages presented by RPA in the banking sector include cost reduction, return on investment, improved process efficiency, enhanced customer experience, and increased productivity (Kumar & Balaramachandran, 2018; Lamberton et al., 2017; Maček et al., 2020; Pokharkar, 2019; Vijai et al., 2020; Villar & Khan, 2021). The banking sector is crucial to the country's economy and is prone to several risks and threats (Hiererra et al., 2022), varying from insignificant to catastrophic. Besides these possible risks, regulatory requirements have been noted as fundamental forces behind business continuity in the banking industry. The banking sector is faced with unprecedented transformation. The global banking landscape is shifting, faced with countless challenges and risks, and needs to ensure their operations run smoothly. Ferreira (2019) and Jongh et al. (2013) confirm that some of the risks faced by banks include geopolitical (such as terrorism, strikes, and fragile states), technology (for instance, cyber-attacks, unintended consequences of technology change, new technology adoption, system failures, and business disruptions), climate (for example climate change), societal (for instance aging population, energy crisis, and water shortages), and environmental risks (such as labour market imbalances and wealth disparity). Any of these disruptions impact banks negatively, resulting in loss of customers, profits, and reputation (Hiles, 2010; Losada et al., 2012; Sahebjamnia et al., 2015). Organisation readiness for any disruption is vital. This readiness is based on the organisation's recovery strategies, including business continuity and practical risk management approaches (Hiererra et al., 2022; Järveläinen, 2013). As a result, organisations need to expect risks and prepare and respond to sustain business operations (Engemann & Henderson, 2012).

Business continuity refers to maintaining critical business services/operations/processes during and after a disruption (Zhang & McMurray, 2013). Thus, its main focus is to create a plan that allows the organisation to handle disruptions as it maintains business as usual. Consequently, business continuity is essential for banks as the industry grows so that customers are protected, and regulatory practices are met (Hiererra et al., 2022). Business continuity is essential in the banking sector as compared to other sectors because they need to continue with business services during and after a disruption (Arduini & Morabito, 2010; Sayanagi & Watanabe, 2015), and interruption in the payment services limits the inability for the bank to perform payment transactions (Hiererra et al., 2022). With the rapid technological innovation, the banking sector faces many challenges during its operation, such as legacy systems, information technology (IT) application outages, power outages, and any other disruption that impacts its business services and processes. Also, the banking sector has electronic banking services which need to be available 24/7 to prevent gaps for service interruptions; thus, the banking sector must have preventative measures in place (Chandra & Kumar, 2018; Hiererra et al., 2022) to remain competitive (Arduini & Morabito, 2010). Thus, the bank's primary focus is to recover during a disruption efficiently and effectively with minimum impact on operations and customer service.

1.2. Contextualisation

The World Economic Forum Global Competitive Survey (2013/2014) indicates that the South African banking sector was rated third from 148 counties in the survey conducted. The South African industry is highly regulated and monitored by government entities such as the South African Reserve Bank (SARB) and Prudential Authority (Matoti, 2014). The banking sector and regulation are critical to any country's financial growth, stability, and success (Moyo et al., 2014). The South African banking sector consists of 36 registered banking entities administered collectively by FSCA and Prudential Authority (FSCA, 2022). According to FSCA (2022), of 40 registered entities, 18 are commercial retail banks, 13 are local branches of foreign banks, 5 are cooperative banks, and 4 are mutual banks. Figure 1 illustrates the total number of registered banking bodies per category in South Africa. The four big retail banks in South Africa that provide services to most citizens include the Amalgamated Banks of South Africa (ABSA), First National Bank (FNB), Nedbank, and Standard Bank. This study focuses on one of these banks. These banks are on track with their transformation programmes to enhance customer experience, reduce costs, and introduce new ways of working to remain competitive and profitable (PWC, 2018).

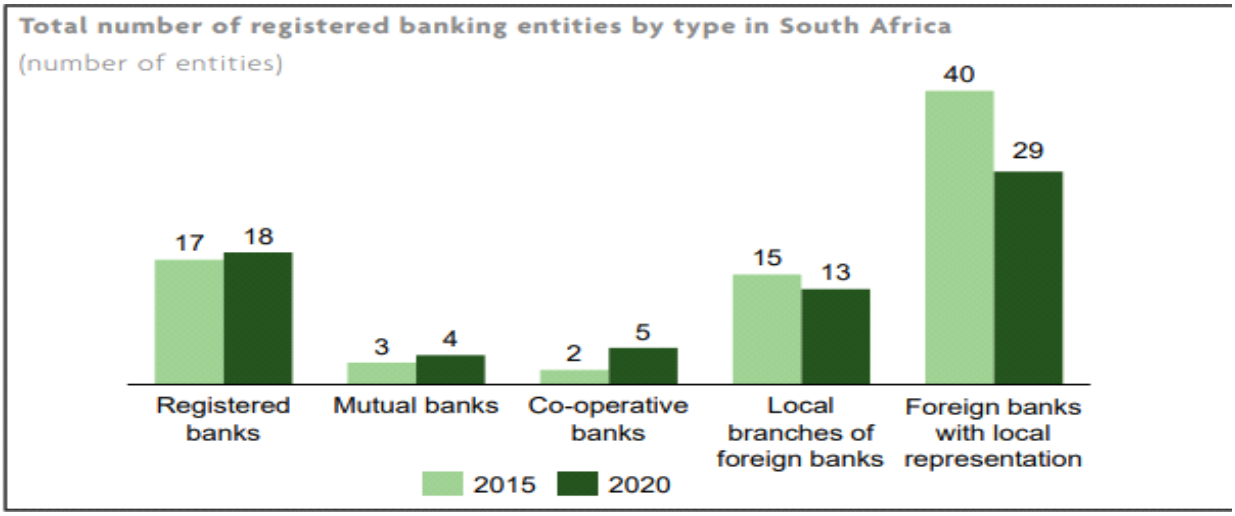

Figure 1: Total Amount of Registered Bank Bodies in South Africa (FSCA, 2022)

The banking sector is experiencing evolution, being initiated in physical branches to utilising big data and information technology. Recently, technology has seen a significant surge in innovation to improve day-to-day banking business services (Bhatt & Bhatt, 2016). The literature displays a captivating argument regarding the adoption of modern technology in the banking sector. According to Alt et al. (2018), technology-driven banking solutions can digitally transform the whole value chain and influence banking customers and inter-banking system channels. Technology has become a vital part of the banking industry, which is the core of every strong economy (Aliyu & Tasmin, 2012). Nonetheless, banks are faced with challenges which include legacy IT platforms and systems (including end-of-life and end-of-support) that are taking a long to retire, increasing competition, regulatory compliance, rising customer expectations, customer retention, security breaches, and accelerated digital transformation (FSCA, 2022; Wingard, 2020). The innovation of electronic banking (e-banking) services in the banking industry, which includes the adoption of cash send, mobile banking, application banking, and online banking, gives rise to support standard banking practices (Ibrahim et al., 2016; Kalra & Jain, 2018). Increasing technology adoption in the banking industry has led customers to choose banks they want to have a relationship with because their needs and wants are met (Chawla & Joshi, 2017).

Banks are adopting innovative technologies to remain more connective, agile, and profitable (Centre of Excellence in Financial Services, 2019). Because of this, banks need to sustain their businesses by fully embracing resilience strategies (Haylay, 2017). Nowadays, most organisations, especially banks, rely heavily on IT systems and online transaction processing. Consequently, information technology disruption in a few seconds may cause the organisation both reputational and financial loss. Prudential Authority (2022) has issued a directive that South African banks must consider adequate and effective controls as they embark on a transformation journey with the resilience of banks. Banks deliver numerous financial services through electronic channels such as plastic cards, electronic fund transfers (EFT), online banking, and mobile banking. Additionally, for banks to remain competitive, they need to understand risks, threats, and responses in adopting these mechanisms. South African banks face the issue of reshaping their legacy core banking platform, which was implemented in the 1970s and 1980s (Centre of Excellence in Financial Services, 2019).

A study by Camarate & Brinckmann (2017) confirms that legacy systems are a crucial challenge to South African banks as they are difficult to incorporate and integrate with technologies. Thus, banks are battling to seamlessly develop new technologies as they are still running legacy systems operating in silos, exposing banks to operational risks. Some risks include technology, business disruption, cyber and people risks, inefficient IT architectural technology, and unsystematic data layouts. The emergence of new technologies resulted in new and changed requirements that legacy IT systems and infrastructure cannot cope with effectively and timeously. Other risks associated with these legacy systems include the availability of talent to support them (Marinč, 2013; Quinn & Hirsch, 2020). Banks are modernising their legacy systems and infrastructure to overcome these challenges by building these on new digital technologies such as cloud and automation (Quinn & Hirsch, 2020). Consequently, South African banks are assessing new technologies, such as RPA, to address these challenges (Kumar & Balaramachandran, 2018). With many disruptions, banking customers and regulators are concerned about business services and operations continuity. Increased competition pressures and new technologies such as automation have made banks more interconnected than ever, increasing the chances of disruption.

South African financial services still use legacy systems, have mundane, repetitive processes, and rely on multiple systems to complete business functions so that customers are serviced better (BusinessTech, 2022). Furthermore, South African banks have faced several system outages in the last few years. Some of the reasons for these disruptions include legacy systems, technology incompatibility, technical failures, and software failures impacting customer service (Moodley, 2022). These are the critical reasons for this research and the chosen environment, one of the South African banks. Moreover, the empirical literature reviewed in the research databases such as Science Direct, ProQuest, IEEE Xplore, and SCOPUS between 2010 and 2023 has identified a current gap regarding RPA use for business continuity. Also, this has further influenced the selection of the financial services industry as the standpoint and a bank (including the business unit within the bank) as the unit of analysis for this research.

1.3. Problem Statement

Introducing new technologies like RPA has fundamentally disrupted the banking sector (Kumar & Balaramachandran, 2018). RPA improves operational efficiency, maintains business continuity, and reduces inaccuracy. The current challenges faced by banks concerning RPA adoption are the identification of inappropriate business processes, lack of RPA software bots' maintenance, unsupportive leadership, unclear roles, responsibilities, and silos between IT and business units, and lack of RPA understanding by banks (Santos et al., 2019). Running banks is driven by solid business objectives, for instance, speedy service delivery, availability of services, and meeting customers' expectations. Derived from the South African banking sector, it is highly regulated and competitive. With new banking emerging in the market, the study in question aims to explore elements that influence the effective RPA use for business continuity in one of the South African banks.

According to Du Toit & Cuba (2018), South African banks obtain efficiencies by adopting new technologies such as RPA to improve profit and efficiency costs. Existing literature in the RPA field recommends that RPA is a new technology that creates streamlining and efficiencies in organisations as it automates business services and processes (Lacity et al., 2017). Organisations are entirely dependent on the availability of their information systems so that daily operations are run seamlessly to remain competitive and increase return on investments. Disruptions such as downtime may have a negative impact on the efficiency and effectiveness of running organisations. Thus, it is critical to have recovery strategies in place. Business disruption occurs because of external and internal risks and can negatively impact the organisation's bottom line. Banks face setbacks such as legacy issues, unmet customer expectations, increasing competition, and the adoption of everchanging technology (FSCA, 2022).

Business continuity is defined as procedures, activities, and processes the organisation puts in place to continue business during a disruption (Zhang & McMurray, 2013). The South African banking sector has been plagued by prolonged and frequent technological outages, which have been damaging financially and reputationally, and the effects are anticipated to worsen as new technologies, such as automation, are adopted (Moodley, 2022). From the literature reviewed in this study, empirical research concerning combining RPA use and business continuity must be revised, especially in banks. Assessing benefits associated with RPA in banking is complex and is qualified by the transaction volume affected by automation (Stople & Steinsund, 2017). Banks are adopting RPA, so advantages related to it are earned (Stople & Steinsund, 2017; Willcocks et al., 2015). The core of connecting RPA use and business continuity, specifically in the banking sector, has yet to be empirically confirmed, as the available literature is still in its infancy. As a result, this makes this research necessary and appropriate. With the increasing reliance on new technology and the need for uninterrupted business operations, especially by banks, RPA has emerged as a potential solution for enhancing business continuity. However, RPA adoption in the banking sector is still in its infancy, especially in South Africa. This study explored critical elements that drive or hinder the adoption of RPA in a South African bank, providing valuable insights for decision-makers in the industry. Thus, there needs to be a suitable practical and theoretical representation of factors that influence the use of RPA for business continuity, noting the financial services (including banking) in the South African context. To this point, the positioned practical and theoretical knowledge gaps are what this research report attempts to address. The contribution to this research report in addressing this critical issue is in the proposed framework in the context of the South African banking sector.

1.4. Research Objectives and Questions

This study aims to explore factors that influence RPA use for business continuity. To close this gap, the study draws on the TOE-TTF framework as the lens and explores factors that effectively influence RPA use for business continuity in a South African bank. This study aims to explore determinants that influence the RPA adoption by one of the South African banks and its use for business continuity, thus answering the core research questions raised by this research.

RPA use for business continuity represents a unique phenomenon of interest in this study. This was done by inspecting the existing literature review to formulate a combined and comprehensive TOE and TTF conceptual framework for the RPA adoption and its usage for business continuity in a South African bank.

Primary Research Question:
What factors influence the effective use of RPA for business continuity in a South African bank?
Secondary Research Questions:

- *How is business continuity established within a South African bank?*
- *How is RPA used effectively for business continuity in a South African bank?*
- *What is the impact on the South African bank when RPA is down?*
- *How is RPA suitable for business continuity?*
- *To what degree can business continuity be achieved when RPA is used?*

A systematic literature review (SLR) and PRISMA flow were used as a guide to address research questions based on the existing literature. This enabled the discovery of the research gap on this topic, eventually enabling the researcher to formulate the research question and topic. The literature review gave the researcher foundational insights about RPA use for business continuity while revealing the importance of achieving business continuity through RPA and the consequences banks face when RPA is unavailable. This research is an interpretive paradigm because RPA use for business continuity needs better understanding through the reasoning of participants involved in business continuity risk. RPA topic focus is specific and unique. TOE-TTF framework lens is applied to this research as providing a sophisticated approach to research technology adoption (Tornatzky & Fleisher, 1990) and a relationship between fit, task components, and technology's functionality (Goodhue & Thompson, 1995). The lens of the TOE-TTF framework, including the use of exploratory research design, has permitted the researcher to explore the topic to establish a theory subjectively. Therefore, this was suitable as the topic in question is significantly emerging with limited empirical research.

1.5. Significance of this Study

This research adopts an interpretive paradigm with the TOE-TTF framework lens. An exploratory research design employing a case study strategy, including a purposive sampling method, was used to collect qualitative data through a semi-structured interview strategy. This was suitable as limited research is available based on the research databases searched, and consequently, a quantitative approach would have needed to be more suitable. There is an exhaustive literature review available in these mentioned research databases in the discipline of technology adoption at the organisation level, RPA challenges and benefits, RPA and artificial intelligence, and change management relevant to manufacturing, banking, health care, and financial services institutions. Business continuity in information technology has interested many technologies, business professionals, and academia (Hiererra et al., 2022; Maitra et al., 2013).

According to Herbane et al. (2020), business continuity is a big topic, and many studies have been conducted to implement various elements. Furthermore, some studies concentrated on planning and managing business continuity where organisation processes are introduced, while others focused on the technical aspects resulting in establishing technical planning and solutions (Hiererra et al., 2022). However, more research should be conducted regarding RPA use for business continuity. This is likely due to a lag in article publication and some studies being conducted. The research method allowed the researcher to gather substantial contextual data about the phenomena of interest to construct a theory. Compared to traditional business process management solutions, RPA is non-intrusive to the existing and primary information technology infrastructure (Lacity & Wilcocks, 2016). As organisations minimise risks associated with RPA, existing information technology infrastructure and controls must be considered and assessed so that RPA bots operate as intended. Therefore, organisations should proactively implement adequate, efficient, and effective controls to mitigate potential risks. Research scholars have referred to financial meltdowns and strategised the financial crisis with theories drawn from studies on various disasters such as climate change, systems outages, contagious diseases, and acts of terrorism (Haldane & May, 2011).

This study concentrates on specific attributes that must be explored, influencing the effective use of RPA for business continuity in a South African bank. Failure to consider possible risks may expose the organisation to threats such as business disruption, cyber-attacks, and information leaks, and strategic vision may not be met, resulting in financial and reputational loss (Haldane & May, 2011). A business interruption could have a prevailing impact on the organisation, negatively impacting the customer experience. Business continuity provides continuous operations of critical business services during a disruption. Additionally, it includes preparing and effectively responding to disruption by ensuring that the organisation's assets (people, systems, and processes) are always available. Disregarding prevalent and emerging risks and threats to information technology (IT) is impossible. By exploring RPA use for business continuity, this research may assist practitioners and academics in understanding factors that effectively influence RPA adoption and its usage for business continuity in South African banks. This study tries to bridge the gap using an interpretive and qualitative approach by constructing an established IS theory and offering a conceptual framework. Awa et al. (2017) confirm that as much as the TOE framework is appropriate for this research, one specific limitation is that it needs to be more specific and broader, making it challenging to apply to specific perspectives and not entirely providing technology adoption complexity. While the TTF theory highlights the criticality of fit between technology and task, it needs to logically understand what represents a task setting and how this environment influences adoption in a multidimensional view where interdependence between tasks may be high (Hoehle & Huff, 2012). This research seeks to close the research gap.

It proposes a conceptual framework that provides the research with a better understanding of integrating TOE and TTF frameworks about using RPA for business continuity in other developing countries and industries.

1.6. Research Contribution

This research intends to contribute theoretically and practically to the IS body of knowledge. The integrated TOE and TTF conceptual framework articulated in this research could enhance the IS discipline's relevance to academic practitioners and researchers, especially from the South African perspective. Theoretically, the conceptual framework was constructed. During the research, there appeared to be no models which could be utilised to aid this research, specifically RPA adoption and its usage for business continuity in South Africa. The proposed TOE and TTF conceptual framework display a combination of facets obtained in the existing literature review in this research. Therefore, the research adds to the currently available literature. Practically, the research empirically discloses the elements that impact RPA adoption and its usage for business continuity in the South African financial services sector. These conceptual framework findings can benefit RPA and business continuity interpreters and adopters in clarifying their services so that the South African banking industry remains competitive. This research can indicate critical elements for South African banks that may be regarded as they continue to comply with and advance regulatory requirements. The researcher's knowledge and novel approach contribute to the existing literature. These components can be employed as terms of reference and guidelines by other industries and countries.

1.7. Delimitations of this Study

RPA focuses on automating rule-based, routine, and repetitive human activities to benefit the organisation (Ivančić et al., 2019). On the other hand, business continuity refers to ensuring that critical business services are available during a disruption (Nel & Marx, 2012; Venclova & Urbancova, 2013). These are the definitions that will be used throughout this research report. Other types of emerging technologies, such as the Internet of Things (IoT), blockchain, fintech, artificial intelligence, machine learning, cryptocurrency, chatbox, and big data, are excluded from the scope of this study. The study explored factors that effectively influence RPA use for business continuity in one of the South African banks. It did not study the RPA project lifecycle, tools, service providers, or business continuity lifecycle in sectors other than banking. Because of potential participants in the population, the sample in the current research focused on ten participants purposively selected in business (credit collections department), IT (RPA technical), and risk (operational risk and business continuity SMEs). Also, other lines of defense, such as audits (internally and externally) and regulators, were excluded from the study. This research mainly explores attributes that influence the use of RPA for business continuity in a South African bank. Delimitations describe the limitations of coverage for the intended research study. The following delimitations have been regarded:

- The research will address one of the South African banks that has adopted RPA and uses it for business continuity.
- The study will address how RPA is effectively used for business continuity.
- The study will consider how RPA is suitable for business continuity.
- The study will analyse how business continuity manifests in a South African bank and subsequently explore how RPA can be effectively used for business continuity.
- The research will explore factors considered when RPA is used for business continuity.

1.8. Assumptions

The initial assumption made by the researcher for this research was that RPA is implemented and used for business continuity in one of the South African banks and remains leading because of numerous elements. This assumption has been more evident in other industries across the globe now more than ever since the pandemic started at the end of 2019. The second assumption was that the South African bank is most suitable as it has embarked on the RPA journey to automate business processes and deems business continuity as one of its strategic drivers; therefore, it is subject to adopt it further across the bank. Thirdly, it was assumed that this South African bank's risk, IT, and business participants know technical, business, risk, and strategic guidelines regarding RPA, risk, and business continuity. Lastly, the research methodology is deemed relevant as it is linked to the research objective and satisfies exploratory research questions.

1.9. Research Report Structure

The remainder of this study is split into the following chapters:

- **CHAPTER 2: Literature Review**

This chapter covers a systematic literature review of the subject matter of RPA and business continuity. This existing literature is discussed in detail. RPA use and relevant business continuity literature are reviewed where constructed factors discovered in the literature are presented. Also, this chapter represents the essential theoretical base of this research: Technology-Organisation-Environment (TTF) and Task-Technology Fit (TTF) models. The integration of the TOE-TTF conceptual framework for the research is provided.

- **CHAPTER 3: Research Methodology**

This chapter describes the research design of this study. This involves explaining attributes that will be adopted to ensure the study has been performed satisfactorily. This entails defining a suitable research method, data collection technique, and data analysis approach.

- **CHAPTER 4: Data Analysis and Findings**

This chapter provides the results of the data analysis and related findings. Data collected from ten participants through semi-structured interviews is analysed.

- **CHAPTER 5: Discussions**

This chapter provides a detailed view of the findings. This includes interpreting and analysing the research questions linked with the findings from this study and deliberation in which the academic literature is aligned to the analysis of the interviews. Thus, discussions regarding empirical observations about RPA and its practical use for business continuity are expressed in this chapter. Also, this chapter incorporates the findings of this study and describes the refined version of the conceptual framework.

- **CHAPTER 6: Conclusion and Contributions**

This chapter finishes the thesis with the conclusion, recommendations, and suggestions for future studies.

- **Appendices and References**

This section's appendices display auxiliary evidence that gives the reader additional information to understand the research aspects. This information includes Wits University's final ethics approval, interview schedule, consent form, participants' information, research permission letter, and attestation.

CHAPTER 2: LITERATURE REVIEW

2.1. Overview of Literature Review

This study aims to gain a deeper understanding of the factors influencing RPA use for business continuity in a South African bank, consequently answering the research questions posited by this study. RPA use and business continuity are emerging topics in practice and academia. Therefore, there was a critical need to conduct a Systematic Literature Review (SLR) guided by the PRISMA flow around this topic to obtain foundation insights and knowledge into the essential phenomena. Firstly, the chapter provides RPA background, evaluates the literature on establishing business continuity in banking, how RPA is effectively used for business continuity, the influence of the RPA downtime in the South African bank, RPA appropriateness for business continuity, and the degree to which business continuity can be achieved when RPA is used. After that, the chapter discusses the integrated conceptual framework which underpins this research. Because the research is based on a South African bank, the SLR specifically focuses on RPA use for business continuity in the banking industry. The results of the SLR are discussed in this chapter.

2.2. Literature Review Methods

The literature review is successful when it assists other scholars in understanding the gathered knowledge of a particular topic (Webster & Watson, 2002). According to Rowe (2014), a literature review contains critical objectives such as synthesising past knowledge on a topic, identifying gaps and biases in the existing literature, and proposing future directions; the researcher believes that each of these fundamental objectives was considered in this research topic and literature review. This literature review followed a systematic literature review structure. The process adopted for this SLR is that posed by Okoli & Schabram (2010), depicted in Figure 2, with PRISMA flow guiding this process. A systematic approach was considered to develop the literature review following limited quality references. A systematic literature review was appropriate for this study because a detailed synopsis of the literature was connected to the research question, and existing and previous research was incorporated to strengthen the foundation and knowledge of the research in question. In other words, the SLR in this research involved systematically identifying, selecting, and evaluating relevant studies to provide a detailed understanding of the research outlook and answer research questions. This was done while complying with the notions of transparency and reducing biases.

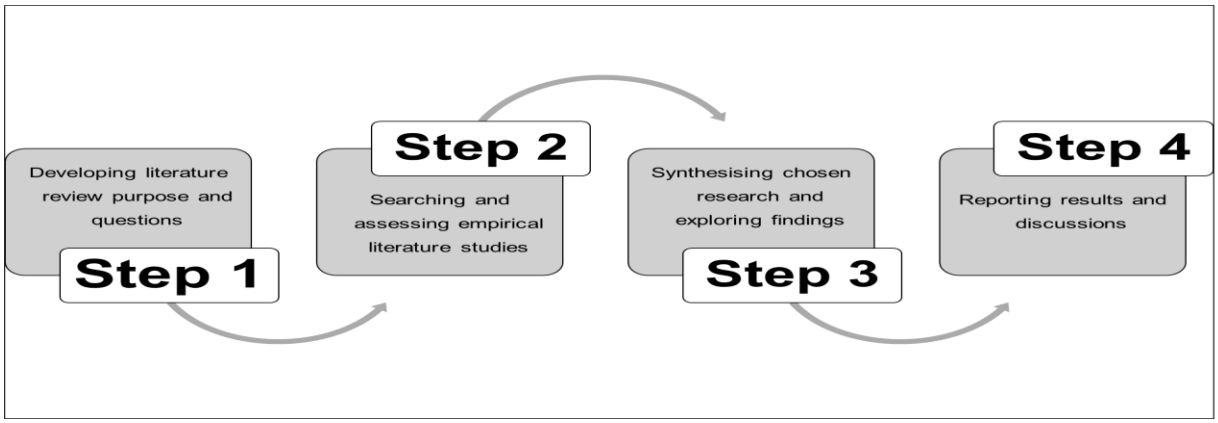

Figure 2: Literature Review Methodology (Adopted from Okoli & Schabram, 2010)

PRISMA flowchart is the most commonly used reporting guidance for systematic literature reviews, and this is detailed in Figure 3. PRISMA flow diagram was developed in 1991 in an attempt to increase the transparency, value, clarity, and quality of reporting items (Page et al., 2010). The present SLR used the PRISMA flowchart to improve transparency and ascertain the common trends of empirical studies regarding RPA use for business continuity. Also, the PRISMA guideline was found to be appropriate as it assesses the article's bias by using an explicit, systematic guide to reduce bias in the identification, selection, formation, and summary of studies.

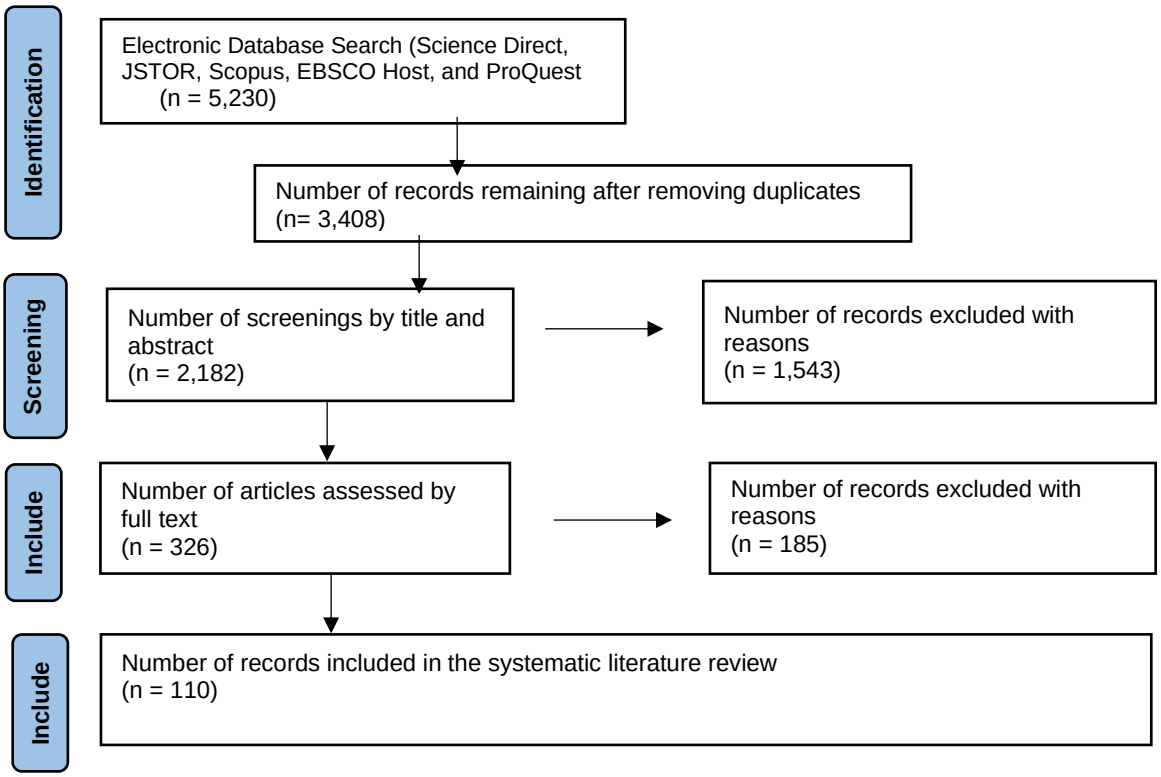

Figure 3: PRISMA Flow Diagram (adopted from Page et al., 2010)

- ***Step 1 – Identification (Preliminary selection of keywords (search terms) and articles***

The beginning of the literature review process involved a review of the initial search criteria where articles, for example, European Journal of Information Systems, Journal of Information Systems, Information Systems Management and Communications of the Association for Information Systems and MIS Quarterly, and critical digital libraries (search databases) namely Science Direct, JSTOR, Scopus, EBSCO Host, and ProQuest were accessed. Google Scholar and other South African source documents such as from SARB, Financial Sector Conduct Authority (FSCA), Prudential Authority, and Centre of Excellence in Financial Services were reviewed to discover existing literature about banking, new technologies (like RPA), and business continuity. Moreover, conference proceedings and textbooks were reviewed. Across the research databases, the following is a criterion of the search terms and keywords employed: RPA, robotic process automation, business disruption, business continuity, risk management, financial services, banking, and operational risk. This resulted in 5,230 records. Number of records remaining after removing duplicates equated to 3,408.

- ***Step 2 – Screening (Selection of Articles)***

Screening of records yielded 2,182 records after assessing titles and abstracts; the number of records excluded with reasons was 1,543. This involved primary search words of 'RPA' OR automation OR robotic process automation OR business continuity OR financial institutions OR banking, which were suitable to specific databases to focus the study results on the core material and subject matter. The second literature review was executed using insights from the first review. The critical difference was the addition of studies that adopted both the TOE framework and the TTF theory to study RPA use for business continuity; this was done because the researcher had decided to construct an integrated conceptual framework using elements from TOE and TTF as a lens.

- ***Steg 3 – Included (Reading of Abstract, inclusions, and exclusions)***

To ensure the quality and relevance of the material screened in step 2, the following criteria were followed to include and assess articles: a) peer-reviewed, b) full text, and c) articles between 2010 and 2023 were considered. The primary search presented a sum of 326 results. Literature relating to the RPA use for business continuity could have been more extensive. This could be because research is still underway, and there is a lag regarding article publication. The bibliographic search for RPA use for business continuity during the past thirteen years, adopting search criteria with an integration of the terms 'RPA,' 'Robotic Process Automation,' and 'business continuity,' noted an increase in RPA use of business continuity over the years. It is worth noting that excluding the year restriction, chosen articles on RPA use for business is a relatively new phenomenon. During the literature review, it was observed that a surplus of literature is available in the RPA and business continuity fields across all industries.

The exclusion criteria followed included articles that were not published in English, papers that were not related to organisations (that is, at an individual level), referring to other new technologies (such as chatbox, IoT, AI, and blockchain), other sectors other than financial services, including banking (for example manufacturing, healthcare, motor, and agriculture).

- ***Stage 4 – Included (Comprehensive Review including essential contribution)***

After the synthetic process, 110 records are found to be relevant papers. The results presented key findings from the synthesis of the literature review. Tew (2019) found that RPA adoption in South African banks is determined by the expected benefits this technology provides when appropriate business services and processes are identified, an effective partnership between business and IT personnel, and the availability of the skills, experience, and knowledge. Also, South African banks must implement best practices when automating their processes and consider the regulatory requirements. Furthermore, Brás et al. (2023) drew from the TOE framework to explore and examine the adoption of new technology. The results demonstrated that compatibility, convenience, and organisational confidence were critical for adopting new technology. Also, new technology use and innovation orientation influenced the organisation to adopt the new technology. Elements that influence the adoption of new technology in Nigeria were explored by Eze et al. (2019).

The results of the study used TOE to understand elements (technological factors included safety issues, adaptive capability, effectiveness, simplicity, and expandability, while organisation context-related factors include shared understanding, training, the extent of business collaboration, and diversity in skills and knowledge and environment-related aspects included completion, customer satisfaction, business growth, return on investments and service delivery) which positively influence new technology adoption. Ghaleb et al. (2021) study determine new technology adoption readiness in organisations based in developing countries.

2.3. Robotic Process Automation (RPA) Background

RPA is the future of automation, where software bots (robots) are constructed as virtual workers to perform functions traditionally conducted by humans (Lacity et al., 2017; Zaharia-Radulescu et al., 2017). RPA has become progressively crucial in the banking sector because of its capability to modernise how banks function (Shah, 2023). In the banking sector, RPA technology eliminates highly repetitive, mundane, high-volume, and routine business processes subject to human errors (Aguirre & Rodriguez, 2017; Lacity & Willcocks, 2016). As attested by Lacity et al. (2017), RPA is detailed as 'swivel chair' integration as it can allow one application system to transfer information to another where there is not any back-end system integration, mimicking humans on swivel chairs gaining access to multiple systems. Sigurðardóttir (2018) argues that RPA interconnects with a computer system in the same manner a human would, but much quicker and cheaper. Two critical traits of RPA include that RPA software robots can be developed in-house or supported by an external service provider. Scholars such as Willcocks and Lacity (2016) believe that RPA is an uncomplicated system since staff can interact with and perform business activities without any programming background. RPA configuration does not require programming skills; therefore, RPA software bots can function by linking, dropping, and dragging characters (Aguirre & Rodriguez, 2017).

RPA does not integrate with existing IT infrastructure or applications because interfaces are done by front-end imitating humans (Dilla & Jaynes, 2015; Mamede et al.,2023; Willcocks et al., 2015; Willocks & Lacity, 2016). Amongst other things, some of the business tasks that may be automated through RPA include finance (accounts payable, accounts receivable), credit (credit card and credit collections), statement processing, loan processing, fraud detection, customer service responses, and compliance (Aguirre & Rodriguez, 2017; Asatiani & Penttinen, 2016; Deloitte, 2015; Lacity & Willcocks, 2016; Seasongood, 2016). Certain banks are discussing adopting RPA, while others are in their RPA implementation journey to reap the rewards and benefits this technology offers (Cahill, 2017) while gaining a competitive edge (Stople & Steinsund, 2017).

2.3.1.RPA Evolution

Robots have been around for years, dating far back as 1400, when humanoid robot plans were portrayed by Leonardo da Vinci (Ostdick, 2016). The birth of digital transformation has given rise to RPA, and this emerging technology depends on associated technologies, for example, AI. RPA concepts are not new and have been around for over ten years.

This concept has evolved and looks distinct since it is the design of a technology-related application robot to bring automation to simplified tasks, and that is how business process re-engineering (BPR) was born. BPR matured and became a business process automation (BPA) process as organisations investigated automating their processes (Cornforth & Downey, 2018; Ostdick, 2016). Process automation was adopted because of the high number of transactions that needed to be processed and the recognition that the workforce headcount could not be increased due to cost reduction faced by organisations. BPA is the impetus of RPA, and the fact that it is not a new technology or an expansion of the preceding technologies, even though there are arguments regarding this in the automation fraternity (Cornforth & Downey, 2018; Lacity et al., 2017; Ostdick, 2016; Slaby, 2012). Doguc (2020) confirms that while RPA is still regarded as a developing technology, it still depends on other technologies, such as screen scraping, AI, and workflow automation. It takes these technologies to a new level and improves their abilities significantly (Doguc, 2020). In the early 1990s, the following are RPA forefathers (Cornforth & Downey, 2018; Khanna, 2022; Ostdick, 2016):

- *Screen Scraping Software*

This software was established before the invention of the internet and modelled for automation testing. It is currently used to pull data from the internet on the presentation layer. Most financial institutions use screen scrappers to automate complicated processes (Khanna, 2022; Ostdick, 2016). More flexible technologies were required by users in order to be compatible with other applications and screen-scaping software needed by users (Cornforth & Downey, 2018).

- *Management Tools and Workflow Robotic*

Workflow Automation Software allows the software developer to produce a catalogue of items to be automated, and it links up with the back-end systems (Ostdick, 2016). Furthermore, where the same fields need to be captured, workflow automation software captures and updates the organisation's database; accordingly, for instance, customer information (name, address, and contact details) can be recorded by workflow automation software (Cornforth & Downey, 2018; Khanna, 2022).

- *Artificial Intelligence (AI)*

This term appeared in 1956 and suggests that AI machines are computer systems that solely execute functions that humans have hitherto conducted. AI is an expensive technology that can turn mundane and inefficient functions into more streamlined tasks (Cornforth & Downey, 2018; Ostdick, 2016).

- *RPA Emergence*

RPA includes a variety of technologies incorporated under one software to be implemented as required for several automation rationales (Welsh, 2019). According to Deloitte (2015), RPA is an integration of automation and AI; it is the technology application providing staff with the ability to configure an IT application system software or 'bot' to reason, collect and extract knowledge, recognise designs, and learn and adapt new situations. RPA journey is not new in IT as it can integrate and enrich these technologies and best utilise them (Deloitte, 2018). Technological evolution has been taking place for a while, and the RPA term has been brainstormed since the beginning of 2000 (Ostdick, 2016). The term RPA was initially used and established by Blue Prism in 2012 (Cornforth & Downey, 2018). Since the automated processes were not intelligent enough to handle transaction processes, the next BPA advancement was required, and the RPA we know today came about.

In the early 2000s, organisations were somewhat unfamiliar with the RPA, which had gone through an essential improvement until 2015, when RPA was fully introduced to the market (Welsh, 2019). Using the ' drag and drop ' approach, RPA permits users to automate and administer workflow. Contrary to its forefathers, RPA conforms to dynamic systems without human intervention (Cornforth & Downey, 2018). In the 1990s, new technologies (such as screen scraping software, workflow automation tools, and the infancy of AI) instigated RPA, and these three programs are considered the ancestors of RPA (Welsh, 2019). RPA has been secluded, and AI advancements have revived RPA (Ostdick, 2016). With the Fourth Industrial Revolution upon, RPA is associated with and plays a critical role in this sedition RPA plays a critical role in assisting organisations in overcoming challenges faced by organisations, such as data concerns and qualms, in shaping legacy systems that are crucial to business processes (Cornforth & Downey, 2018). Thus, RPA is seen as a stimulus in the Fourth Industrial Revolution (Ostdick, 2016).

2.3.2.RPA Definition

Three factors represent RPA, and these are: RPA software/bot, which can either interact with other applications or be a stand-alone, business process that needs to be automated and computerised (programme) in which the RPA bot activities are running, controlled, handled and scheduled. These are the main three phrases that are used in RPA (Cornforth & Downey, 2018; Khanna, 2022; Madakam et al., 2019; Ostdick, 2016):

- *Robotic* refers to robots imitating (mimicking) human activities.
- The *process* is a method that is followed to perform a task. This is further stated by Madakam et al. (2019) that a process takes inputs from various people or systems and is executed according to the required rules so that the desired output is produced, and critical processes are automated (Madakam et al., 2019).
- *Automation* is any action that is conducted by a robot in the absence of human involvement. Madakam et al. (2019) explain that automation ensures that a software, process, or application system functions automatically.

When there is technological disruption, functional delivery requisites continuously change faster, resulting in organisations either keeping up or being left behind. The most disruptive and fast-growing concept in the rapidly evolving global economy is Robotics Process Automation (RPA), an emerging and profitable technology spanning different industries (Fung, 2014). Nowadays, advanced and new technology has disrupted organisations, and the banking sector is no different. It has brought about a variety of new customer and channel experiences. Because of that, with South African banks still utilising legacy systems, they are forced to put cutting-edge so that they remain competitive, and for this technological journey to be successful, it has been endorsed by the workforce affected by it (FSCA, 2022). RPA has become progressively crucial in the banking sector because of its capability to modernise how banks function (Shah, 2023). Automation is done by applying RPA is one of any organisation's strategic priority so that to manage improved profitability and competitive advantage (Lacity et al., 2017).

Robotic transformation is operating at an accelerated pace and technological disruptions such as blockchain, big data analytics, ML, AI, Digital Workforce, Internet of Things (IoT) as well as affiliated technologies robots have taken over how things are performed providing us is new ways of work (Berg et al., 2018) Despite its classification, robotic process automation does not imply physical robots conducting human functions (Zaharia-Radulescu et al., 2017) RPA deals with software that is programmed to execute particular tasks which are previously conducted by humans (Fung, 2014; Lacity et al., 2017) RPA is the future of automation, where software bots (robots or bots) are constructed as virtual workers to perform functions traditionally conducted by humans (Lacity et al., 2017; Zaharia-Radulescu et al., 2017). Tornbohm & Dunie (2017) argue that for an RPA software bot to be adopted, a business process must be identified and mapped so that the robot can then follow the logic and perform user functions accordingly. One of the essential requirements for RPA attribute include the fact business processes should have to eligible for the automation (Aguirre & Rodriguez, 2017; Fung, 2014; Lacity & Willcocks, 2016; Seasongood, 2016). Moreover, in the banking sector, RPA technology eliminates highly repetitive, mundane, high-volume, and routine business processes subject to human errors (Aguirre & Rodriguez, 2017; Lacity & Willcocks, 2016). RPA is the automation of simple, monotonous, and rule-based business processes through the adoption of software to capture, interpret, and execute in an existing IT system environment (Deloitte, 2018).

An RPA software bot is versatile, can function 24 hours a day and does not ger tired (Chandra & Kumar, 2018; Hiererra et al., 2022) As attested by Lacity et al. (2017), RPA is detailed as 'swivel chair' integration as it can allow one application system to transfer information to another where there is not any back-end system integration, mimicking humans on swivel chairs gaining access to multiple systems Sigurðardóttir (2018) proclaims that RPA interconnects with a computer system in the same manner a human would, but much quicker and cheaper. Two critical traits of RPA include that RPA software robots can be developed in-house or supported by an external service provider. Lacity et al. (2017) believe that RPA is an uncomplicated system since staff can interact with and perform business activities without any programming background. RPA does not integrate with existing IT infrastructure or applications because interfaces are done by front-end imitating humans (Asatiani & Penttinen, 2016; Dilla & Jaynes, 2015; Mamede et al.,2023; Willcocks et al., 2015; Willocks & Lacity, 2016). Supporting this, RPA configuration does not require programming skills; therefore, RPA software bots can function by linking, dropping, and dragging characters (Aguirre & Rodriguez, 2017; Lamberton et al., 2017). In other words, RPA is seen as the next technological wave that brings a number of benefits, such as reduced errors, increased staff productivity, and enhanced scalability. Willcocks & Lacity (2016) attest that organisations adopt RPA technology to decrease costs, increase staff satisfaction, improve customer service, reduce error rate, enhance business process quality and provide business continuity. For RPA to be successful, organisational support and planning is critical (Aguirre & Rodriguez, 2017; Lacity et al., 2017).

Amongst other things, some of the business tasks that may be automated through RPA include finance (accounts payable, accounts receivable), credit (credit card and credit collections), statement processing, loan processing, fraud detection, customer service responses, and compliance (Aguirre & Rodriguez, 2017; Asatiani & Penttinen, 2016; Deloitte, 2015; Lacity & Willcocks, 2016; Seasongood, 2016). Certain banks are in talks regarding adopting it, while others are in the process of their RPA implementation journey so that they reduce labour and the time taken to execute tasks (Cahill, 2017) while gaining a competitive edge (Stople & Steinsund, 2017).

2.3.3.RPA Trend

RPA is a work-in-progress that is expected to revolutionise banking. Because this tool is rapidly advancing, RPA implementation is thriving in this industry. Regardless of this rapidly growing technology, the banking industry adapts faster than other sectors. Future trends recommend that there will be a partnership between software bots and humans in various segments (Brás et al., 2023; Seibt & Vestergaard, 2018). On the other hand, according to Kot & Leszczyński (2019), continuous RPA growth is hard to maintain, but new technological trends may give organisations a competitive edge and market influence. Amongst all the new technologies presently taking off, organisations spending money on digital transformation have mainly discovered RPA.

2.3.3.1. RPA Market Size Forecasts

According to the research conducted by Grand View Research, the RPA market is estimated at $357.5 million globally and anticipated to increase to $8.75 billion by 2024 at a compound annual growth rate (CAGR) of 31% (Gumaste, 2019). Likewise, as confirmed by Sharma (2020), whose statistics on the study of Grand View Research, from 2020 to 2027, assert that the RPA market is valued at $1.1 billion and expected to see a CAGR of 33.6%. Similarly, Gartner Research reports that the global RPA software expenditure is forecasted to reach $2.4 billion in 2024 (Gumaste, 2019). Furthermore, 80% of large firms are predicted to have implemented RPA by the end of 2022. Gartner forecast that RPA expenditure would achieve $2.4 billion by 2022 (Sharma, 2020). This is shown in detail in Figure 4.

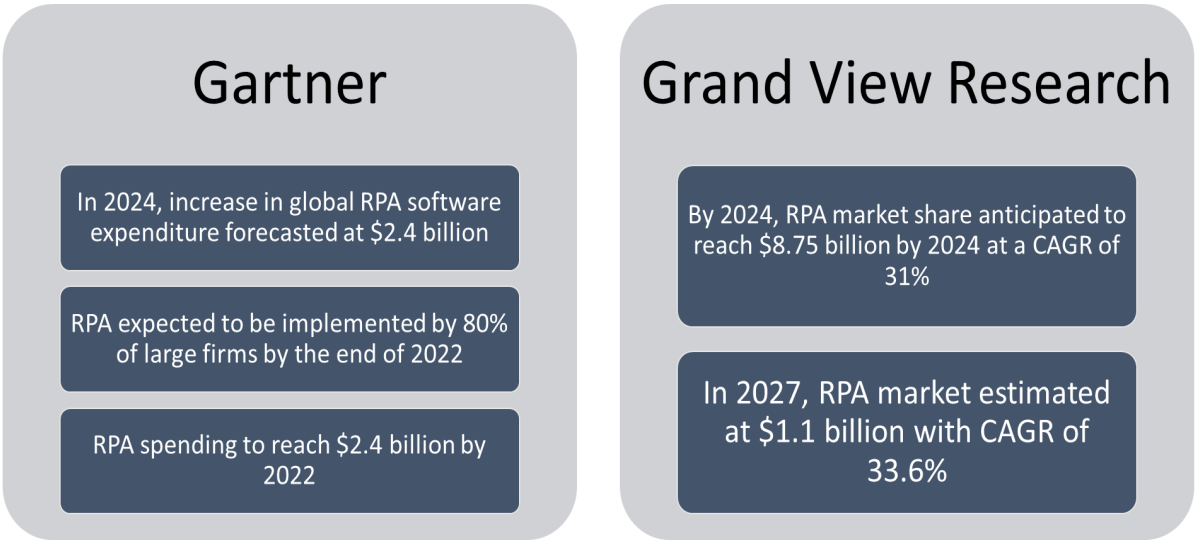

Figure 4: RPA Software Market Growth (Gumaste, 2019; Sharma, 2020)

Meanwhile, globally, RPA software earnings are anticipated to amount to approximately $1.58 billion in 2020, a rise of 11.9% from 2019 (Gartner, 2020). This is detailed in Table 1. During 2020, RPA prices were anticipated to decline by 10% to 15%, with a yearly 5% to 10% reduction anticipated in 2021 and 2022 (Gartner, 2020).

	2021	2020	2019
Growth (in %)	19.53	11.94	62.93
Revenue ($ million)	1 888.1	1 579.5	1 411.1

Table 1: Predicted RPA Earning Per Year (Gartner, 2020)

Deloitte (2018) further estimates that this number is anticipated to go up to 72% in the next few years. Ostdick (2016) reports that in the study conducted by McKinsey and Company, RPA continues to have a complete economic impact of $6.7 trillion by 2025. Also, McKinsey and Company affirm that this automation software robot is expected to have more influence than other sectors (Ostdick, 2016). According to Grand View Research (2010), the financial services (including banking) sector is the market leader in adopting RPA. This is because these sectors need streamlined business processes as they deal with sensitive and large data volumes as the banking industry is under pressure to adopt new technologies (Grand View Research, 2010). As maintained by (Ostdick, 2016), RPA is demonstrated to be a popular technology because of its ease of implementation and high return on investment (ROI), therefore, its market growth is anticipated to grow further in the next few years. With RPA adoption increasing in numerous sectors, this trend benefits organisations, individuals, and markets (Ostdick, 2016). Market size for RPA is driven by organisations enhancing their customer experience and streamlining of business processes (Gartner 2020). RPA software bots are not a choice but necessary to sustain the everchanging technologies and competition.

Based on the earlier discussions, it is evident that RPA uncovers new prospects for organisations to re-evaluate business, promising the possibility of better remodelling their business and operations (Gartner, 2020; Ostdick, 2016). Considering these statistics, it is clear that RPA is taking organisations by storm and is anticipated to provide organisations with positive results and performance (Gartner, 2020).

2.4. Business Continuity in Banking

The banking industry is at the centre of any economy, and the likelihood of disruptions may severely impact the entire financial system and the country's economy. According to de Villiers (2015), banks have sensitive customer and transaction data, and their systems must be robust because if the banks go down, the impact is felt across the economy. As one of the most critical parts of the economic industry, banking is expected to operate its business during a disruption (Sayanagi & Watanabe, 2015). Increasing consumer expectations and competition have forced banking top leadership to implement, continuously upgrade, agile, and scalable new technology solutions and practices. The range and magnitude of banking services integrated with new technology complexity need a detailed collaboration between banks and customers to be in place.

The most advanced technologies expose organisations to risks since they are interconnected and complex; thus, a single point of failure affects the whole ecosystem (Helbing, 2013). Technological advances in the banking industry have introduced multiple products and services using numerous yet integrated channels. The use of new technology, such as RPA, is increasing and includes nearly all banking operations. Every organisation faces internal or external risks in its business operations. Risk is everywhere, in everything we do, and affects everyone. Risk management is a base of prudent banking principles and the unified development of organisations (Svatá & Fleischmann, 2011). Risks are unknown circumstances that may impact an organisation's capability to attain its goals. Risk is an uncertainty of incidents (Baker, 2012; Berg et al., 2018). Business continuity in banking is manifested by a detailed risk management framework, which includes potential operational threats and risks. This includes recovery strategies considering people, technology, and business processes during disruptions. Organisations such as banks that heavily depend on information technology to meet their business objectives are confronted with the possibility of disruption to their business process, information, and technological infrastructure, which negatively impacts the availability of business services to customers (Vermin & Reinhart, 2016). Banks perform in a fluid operating setting based on a continuously evolving economic outlook, expanding business scope, increasing customer experiences, harnessing modern technologies, and strengthening regulatory requirements while remaining attentive to evolving IT risks (Deloitte, 2020). Banks must be protected against disruptions, so business continuity measures are critical to reduce financial and reputational losses (Storkey, 2011). It is more critical that technologies and information systems crucially impact business operations, processes, and services in the banking sector.

Chandra & Kumar, 2018 attest that these days, the banking sector is expected to have its business services 24/365. Thus, the availability of the bank's IT services is critical. Because of this, risk continues to be the most complicated and challenging factor to manage, specifically for banks as they seek to establish, measure, and mitigate the risk. This is relatively due to their changing landscape, volatile customer preferences, and regulatory processes (Vysya & Gill, 2015). According to Svatá & Fleischmann (2011), the benefit of information systems and technology relies predominantly on how these systems and technologies are exerted and connected to banking functions. This is a crucial element for the success and competitiveness of the bank. It is critical to understand the determinant of the business disruption risk as an issue for practitioners and researchers because it is critical that once the cause is understood, adequate and effective controls to mitigate this risk should be put in place. Risks may emerge from both the internal (e.g., systems failures, business process failure, and critical person dependency) and external (e.g., cyber-attacks, political, market pressure, and compliance) of the organisation and impact its reputation and profit (Aghili, 2010). Top continuity risks include cyber-attacks, hardware failures, end-of-life/end-of-support, network disruption, and ransomware (Pickett, 2023). The research conducted by (Apulu & Latham, 2011) note that information technology infrastructure and systems are closely related. This has been evident in the Nigerian and Ethiopian banks where a deficiency of reliable power supply negatively impacted the effective running of online services (Eze et al., 2019; Tariku & Lessa, 2021).

Also, as banks' services and transaction numbers increase, they must develop business continuity measures to deal with disruptions and ensure that they can continue operating when faced with disruptions (Chandra & Kumar, 2018). Banks deal with highly confidential customer information, transactions, and market activities where system outages can result in massive losses (Pickett, 2023). Business continuity is activities to maintain and continue with business operations impacted by the disruption (Engemann & Henderson, 2012; Zhang & McMurray, 2013). As banks continue to be sophisticated in adopting new technologies such as RPA to stay relevant in the competitive market, they need measures to deal with disruptions; thus, business continuity is critical (Tariku & Lessa, 2021). In the study conducted by (Tariku & Lessa, 2021), it is confirmed that the Bank of Ethiopia put adequate business continuity strategies to ensure the availability of the IT infrastructure. Business continuity is critical especially in the banking industry, and these main reasons, as noted by the Bank of Japan (Watanabe, 2015):

- Maintaining economic activities by ensuring continuity of financial services during and after disruptions.
- Preventing widespread payment and settlement, including preventing technology risks and disruptions.
- Decrease risks such as negatively impacting the bank's reputation, opportunities to maximise profits, and customer service.

Business continuity strategies include technology readiness to maintain services during disruptions through documenting and reverting to manual processes (Pickett, 2023). The disruption in the South African banking sector substantially negatively impacts the bank's bottom line (Moodley, 2022). According to Elin (2020), South African banks have taken business continuity seriously. Consequently, due to the nature of the banking operations and regulatory requirements, the banking industry has invested heavily in ensuring that its data, IT infrastructure, and applications remain available under any circumstances during a disruption (Elin, 2020). Automation is playing a critical role in allowing South Banks to take advantage of this technology to streamline processes so that there is 24-hour availability of the bank's services (Chandra & Kumar, 2018). Ensuring business continuity during uncertain times remains a crucial concern for banks, but it also ensures resilience in future disruptions (Elin, 2020). One South African bank, ABSA, confirms that business continuity is critical for their bank, especially during the pandemic in 2020 (Steyn, 2021). In 2021, The South African Reserve Bank (SARB) issued a directive that banks must have the resilience to adapt to the changing environment and as new technologies such as RPA are adopted to sustain core business services (SARB, 2021). Thus, banks are expected to understand the rationale behind business continuity and the value it brings (de Villiers, 2015). Business continuity in the banking sector is critical to ensure the continuity of services, protect customer information, and safeguard reputation. Engemann & Henderson (2012) explain some of the critical elements of establishing business continuity in banking:

- *Resilient IT infrastructure* – Banks invest in resilient and redundant IT infrastructure and applications to ensure the continuous availability of critical systems and information.
- *Risk Assessment and Management* – Banks conduct detailed risk assessments to ascertain potential risks and threats, including system failures, cyberattacks, and natural disasters. Risk management approaches are implemented to reduce the impact of these threats and risks.
- *Cybersecurity controls* – Banks adopt rigorous cybersecurity controls to prevent unauthorised access and protect customer information.
- *Regulatory requirements* – Banks must comply with regulatory and compliance requirements related to business continuity. These regulations allow banks to have suitable controls to maintain financial stability in the economy and protect customer matters.

By implementing these controls, banks can enhance robust business continuity, which reduces disruptions, protects customer interest, and maintains confidence in the financial system. A culture of preparedness and regular testing are critical factors in establishing business continuity.

2.5. Context of RPA Use in Banking

The banking industry has been evolving in the last decade. Tew (2019) reports that RPA in banking involves solutions that intend to automate uniform, routine, and high-volume business services and processes so that the bank can reduce expenses. By allowing business process automation, RPA not only enhances productivity but also assists in composing operational costs for organisations (Maskey, 2023). Utilising RPA in banking activities allows cost reduction, streamlined business processes, and ensure that these processes are carried out timeously (Lacity et al., 2017). Grand View Research (2020) claims that in 2019, the banking and financial services sectors were viewed as world leaders in RPA adoption, representing 29% of global earnings. Most banks around the globe have embarked on the RPA journey, and the concern is for this technology to be appropriately established (Stople & Steinsund, 2017). Banks started off utilising RPA to manage many simple business functions. Chandra & Kumar (2018) and Tew (2019) detail that RPA can be effectively used in banking in various ways, such as:

- *Fraud detection and prevention*: RPA can automate fraud detection processes by consistently monitoring transactions and identifying suspicious anomalies and patterns. This assists in detecting and preventing fraudulent activities in real time and provides customer account security.
- *Data entry and processing:* RPA bots can automate data entry and processing functions, including loan applications and customer information. This decreases the risk of errors and increases the processing time, ensuring seamless operations even during disruptions and high volumes.
- *Customer service and support:* RPA can handle routine customer queries, including transaction history requests and balance inquiries, ensuring uninterrupted customer service. This decreases dependency on human resources and allows customer support to be uninterrupted and available 24/7.

- *Business process monitoring and reporting*: RPA bots can continuously monitor and report on critical business processes, for example, credit collections, payment processing, and loan origination. This aids in ascertaining issues or bottlenecks that may impact business continuity, allowing for proactive resolution.
- *Regulatory and compliance reporting*: RPA can collect, validate, and report data needed for regulatory and compliance requirements. Therefore, this provides accurate, timely, and complete reporting, decreases the risk of non-compliance, and reduces penalties from the regulator.

Chandra & Kumar (2018) attest that banks can improve business continuity by enhancing efficiency, maintaining uninterrupted customer service, decreasing manual activities, and ensuring compliance by leveraging RPA effectively. Nevertheless, it is critical to note that RPA should be adopted and used as a component of a sound recovery strategy.

2.5.1. Global (excluding African regions) Case Studies of RPA Implementations in Banking

With the widespread adoption of digital platforms in banking, banks must formulate new ways to deliver the best customer service while maintaining system security, reducing costs, and adhering to compliance and regulatory requirements (Vishnu et al., 2017). Banks implement RPA to improve and streamline operations efficiency so that the accuracy and speed of business processes are enhanced and provide business continuity. The banking sector is one of the most appropriate for RPA technology (Madakam et al., 2019) because the bank's critical business processes generate high-volume transactions and documents that are managed and coordinated by a combination of new technology, legacy systems, and manual processes (Vishnu et al., 2017). Hence, as attested by S & P Global Market Intelligence research data, at the end of 2021, US banks (such as Wells Fargo, JP Morgan, Bank of America Corporation, and Fifth Third Bancorp) closed 2,927 retail branches, resulting in 79,027 active branches (Miao, 2021). According to research derived from P and S Market Research, RPA adoption in the banking industry exhibited critical success (Partnership, 2019). This study reflects that several banks in the United States of America (USA), The Netherlands, Bulgaria, and South Korea have implemented RPA.

- *The Netherlands: ING Bank* (The BankingScene, 2021)

In 2016, ING Bank communicated its 'digital conversation' strategic plan to adopt RPA so that they reduce their labor force by constructing a digital platform bank. Consequently, 7,000 staff were retrenched, with a further 1,200 staff moved to other departments. The 'digital conversation' strategic plan assisted the bank in cutting costs of approximately €900 million. To achieve this strategic goal, ING Bank intended to invest at least €800 million in technology and science research and development in the next few years so that the bank's processes, infrastructure, workflow, and data are consistent.

- *United States of America (USA): Bank of New York Mellon* (Demissie, 2020; Hindle et al., 2019)

In 2016, The Bank of New York Mellon adopted RPA to decrease costs and enhance operational efficiency. The bank's report stated that RPA adoption had attained extraordinary results where the account closing verification of a business over numerous IT application systems obtained 100% completeness and accuracy. The bank used RPA software bots to automate the trade-settlement process; thus, as trades were cleared, human staff completed the function in ten minutes, and RPA bots completed the business function in a quarter of a second. Also, transaction processing acceleration improved by 88% with 99% accuracy over five IT systems, while account closures were confirmed at an accuracy of 100%. In May 2017, the bank revealed that in the previous 15 months, it had adopted over 250 RPA software bots. Furthermore, the bank confirmed that fund transfer RPA software bots saved the organisation $300 million annually by reducing the human workforce. Customer experience improved, costs were reduced, and operational processes were streamlined.

- *Bulgaria: Postbank* (Gavrilchik, 2022)

Postbank adopted RPA to automate 20 loan administration processes, such as updating user profiles, payments processing, and capturing invoice data. Another business process that RPA automated included where one human staff member was assigning received payments for credit card debts to correct customers and multiple and several IT systems were used to perform this task. Before RPA implementation, seven staff members spent approximately four hours daily fulfilling this task. RPA conducted this task 2.5 times quicker without defects.

- *South Korea: Shinhan Bank* (Jihyun, 2019)

Shinhan Bank developed RPA in April 2018. By October 2018, the Shinhan Bank rolled out RPA software bots, which included 44 projects and 21 business units. The implemented RPA software bots satisfactorily dealt with over 6,000 functions per day. The scope of the RPA covered office registration documents, transaction reports, and statements, handling foreign exchange, and recording taxes and fines.

- *United Kingdom: The Co-Operative Banking Group* (Industry Wires, 2019; Rutaganda et al., 2017)

The Co-Operative Banking Group is one of the retail and commercial banks in the United Kingdom. This bank adopted RPA because it has the excess waiting (queue) process performed daily to return, reject, and accept direct standing and debit orders since customers with insufficient funds needed to meet the required payments. A team of nine staff members performed this daily function to execute around 2,500 higher-risk accounts manually. In order to address and automate its queuing process, the bank adopted RPA. RPA software bots, which gave the bank less time to complete this workload, meaning that 20 RPA digital workers are completing and processing the same workload at 11 a.m. daily compared to completion done by humans at 3 p.m. Also, the human workforce was redeployed to other departments in the bank, leading to improvement in payment processes whereby 80% of the payment processes were automated, and customer experience improved.

2.5.2. African Regions Case Studies of RPA Implementations in Banking

RPA adoption in Africa is growing at a slow pace. While most organisations globally are rolling out RPA to streamline their business processes, reduce costs, improve customer experience, and reduce labour costs, this journey has been slow in Africa (Matinde, 2021). The primary reason for this is that expenditure on labor is significantly lower in Africa than in the rest of the world. Matinde (2021) confirms that the relatively lower expenses of many workers with low education in Africa mean that it is cheaper to have a human workforce to perform functions than to automate. Despite this, some African financial services institutions (including banks) have deployed RPA. As customers in Kenya embrace digital banking, commercial banks have decreased retail branches to 1,459 in 2021 because of the adoption of digital technology (Otini, 2022).

- *Nigeria: Union Bank* (Ekwealor, 2018)

Union Bank adopted RPA in 2018. The top three complaints received were involving ATM cash transaction failures. Furthermore, customers had to wait three days to get money sent back to them once the ATM reconciliation process was completed. The banks had approximately 900 ATMs that needed to be reconciled. Since the rollout of RPA, this process has been reduced to around 2 hours. This has improved customer experience, and there are intentions to implement RPA in all business processes and services to improve banking operations.

- *Bank Anonymous (The name of the bank was not mentioned in the paper): One of the largest banks in Africa* (IBA Group, 2022)

One of the largest banks in Africa adopted RPA because staff was switching between different systems to perform their daily tasks. Examples of business processes that were automated included verification that needs to be performed when a customer buys a new car (this process involved five systems to check the customer's proof of address, employment, income, and identity), collection of funds from the customer's bank account when they are in arrears (this process included five systems for the customer's status and history as well as validate and recover debts) and verifying transactions where fraud is suspected (the operation entails seven systems where transaction logs were examined, checking and recovering fraudulent transactions). With RPA adopted, processing time has decreased from four hours to four minutes, and human intervention in the processes was reduced by approximately 90%.

- *Mauritius: ABSA Bank* (Fabiano, 2020)

The bank adopted RPA in 2020 since it experienced challenges with sending financial reporting accurately and timeously, and this process comprised a high level of human involvement. Some of the challenges the bank experienced before automation included collecting data files manually for regulatory reports preparation (this process was subject to errors that took the team hours to action), staff manually accessing data files to perform the financial reporting process, and deadlines were missed. RPA adoption reduced the financial reporting process time; approximately twenty files were automated daily by the software bot, human involvement in data files was eliminated, data files were extracted directly from the source, and the risk of missing submission deadlines was substantially reduced.

2.6. Use of RPA in a Bank

The banking sector has always presented a high volume of processes, transactions, and tasks, meaning that banking is an excellent industry to adopt automation (Tew, 2019). Thus, financial services, including banks, have been investigating. RPA adoption, mainly to automate mundane business processes and use it during crises in big data analytics and mining (Villar & Khan, 2021). RPA has transformed the banking sector by ensuring that core bank's operations are more efficient and enabling customer services to be tailored while improving security and availability (Villar & Khan, 2021). In 2019, the South African big four banks (Nedbank, Absa, FNB, and Standard Bank) closed 695 branches because of an aggressive digitisation drive and shifting customer behaviour (Tarrant, 2019). During this time, Capitec ambitiously grew its mark as it elevated its branches by two-thirds in 2011, from 507 to 840 at the end of February 2019 (Tarrant, 2019).

Despite the elevated adoption of digital banking, South African banks still foster a noticeable mark to service their customers. RPA has been adopted by critical financial services institutions like Nedbank, Old Mutual, and FirstRand, while a group of other prominent organisations is rapidly implementing it (Burrows, 2020). One of these banks that adopted RPA was able to process 30% additional loans per month, increasing profits by millions of rands (BusinessTech, 2022). There is limited empirical literature regarding South African banks based on research databases, and this posed a challenge for the researcher to obtain more details and insights about the research in question. Tew (2019) maintains that South African banks have been using RPA, and the elements impacting adoption have been diversified, with impact on the workforce and business process automation being prevalent. South African banks have adopted RPA so that they can derive benefits from it (Tew, 2019). Although there is a limited research available, various research have been noted regarding RPA deployment by South African banks:

- *Old Mutual Bank* (Digiblu, 2022)

The bank embarked on an RPA journey to enhance its agility and speed to market, considering changing market forces and customer expectations. Some challenges that have led the bank to deploy RPA include legacy systems impeding the bank's innovation prospect, increased administrative costs, and increased operational risks because of regulatory requirements and competitive pressure. RPA software bots were adopted to automate administrative processes. Over time, the bank rolled out five hundred bots, increased return-on-investments by over 200%, and reduced processing time by 50%.

- *Standard Bank* (Daniels, 2020)

The bank began the automation journey in 2016 to tackle some critical concerns, including regulatory challenges, elevated customer expectations, maintenance of many legacy systems, and dissatisfaction from staff. Since the adoption of automation, the bank's account opening process time has been reduced to five minutes, releasing staff from routine functions to concentrate on providing customers with exceptional experience and increasing return on investment by over 300%. Some of the bank's operations, which were automated, include know-your-customer, where the software bots digitise, categorise, and extract information from documents.

2.7. Effective Use of RPA for Business Continuity in a Bank

RPA streamlines bank's business processes and increases its preparedness for disruption (Lacity et al., 2017). Banks must have recovery strategies in place in a world of increasing disruptions such as natural disasters, system outrages, and legacy systems (Haldane & May, 2011). RPA can aid banks by automating the processing, which could be expensive and time-consuming to execute manually (Frąckiewicz, 2023). Moreover, RPA can benefit banks in the long run by assisting them in constructing a resilient and preparedness culture (Frąckiewicz, 2023). Frąckiewicz (2023) argues that when banks automate their processes, a level of preparedness is considered before and during a disruption because it ensures that the bank is not caught off guard and is always prepared to respond appropriately in the event of a disruption. RPA can assist banks in building more resilient operations, quickly establishing and responding to potential disruptions, and creating a resilient culture. In a disruption, RPA plays an integral part in the recovery strategy as it is used for business continuity (Frąckiewicz, 2023). Business continuity can be the immediate specifications of continuing with business operations, providing seamless activities, enabling effective customer experience, attending to a sudden spike in demand or volume, and satisfying sudden customer needs. Business continuity has become more pertinent over the years because of disruptive incidents affecting the world. One of the key and catastrophic disruption that the world faced and impacted organisation including banks (namely Bank of America, Morgan Stanley, Lehman Brothers and Bank of Taiwan) operations was terrorist attacks 9/11 in the United States of America (Obi, 2010). Moreover, other prevalent examples of disruptions which impact bank's operations include climate risk, technology risk and the recent coronavirus pandemic, which have influenced the business continuity path (Brás et al., 2023).

Unforeseen disruptions such as the coronavirus pandemic, which impacted the world beginning of 2019, forced organisations to accelerate their automation technologies, for example, RPA (Bharti, 2020). 2020 was challenging for businesses in all sectors, and business continuity was appreciated more than before (Ninetex, 2020). Technologies like RPA have helped provide recovery strategies for organisations to remain ahead in an evolving world. Utilisation of RPA can help in business continuity during disruptions (KPMG, 2020). RPA confirms that RPA can be used to minimise downtime because RPA reduces human error risk, as this can cause costly delays and mistakes (Frąckiewicz, 2023). Bharti (2020) declares prevalent and current disruptions which are playing out assist banks to reflect on their existing and current business continuity and risk-controlled environment. In the research conducted by Valgaeren (2019) regarding RPA adoption by banks (namely ING BNP Paribas Fortisa and Belfius) it was found that RPA provides these banks with many advantages, for example, improved operational efficiency, increased productivity, enhanced customer service, including accuracy and availability of the RPA bots 24/7. Risk mitigation and resilience against business disruptions are crucial to meeting customer expectations. Bharti (2020) suggests that the Federal Bank in India has managed to automate its business processes and kept operations running even when the world was going through the coronavirus pandemic, thus enabling the bank to continue delivering services to customers.

Frąckiewicz (2023) reveals that banks that have embraced new technologies are better positioned to sustain their business operations as usual and leverage the disruption to boost their position among competitors. According to Wojciechowska-Filipek (2019), RPA maintained the continuity of the bank. Frąckiewicz (2023) confirms that RPA assists banks in improving their recovery strategies in various ways, and these include:

- Automating manual processes by RPA makes it faster and easier for banks to respond to disruptions. In other words, automation decreases manual interventions and streamlines business processes.
- RPA provides banks with real-time insights and data to systems, allowing identification and addressing of issues immediately.
- RPA offers banks a competitive advantage because automated business processes assist banks in responding to disruptions faster than their competitors, allowing them to remain ahead of the competition and stay competitive in the sector.

In essence, RPA is transforming the way banks manage their recovery strategies. By automating manual business processes, providing system real-time, and decreasing costs, RPA allows banks to create cost-effective and more efficient business continuity.

2.8. Impact of RPA Downtime on a Bank

Downtime is costly, disruptive, and unacceptable in modern-day business outlook (Ewing, 2022). In the digital world, a few minutes of system outage may devastate banks, resulting in negative press, loss of customer satisfaction, worn-out IT staff resources, and decreased end-user productivity (Faganel, 2022). System outage costs and effects have not been favourable to banks because of their increasing dependence on IT infrastructure and systems. Banking is about trust, and when customers cannot perform banking services, this creates distrust. They will not use the offered services and eventually move to a competitor. Likewise, the regulator expects banks, banking IT platforms, and services to be always available as there are some reporting and regulatory requirements, such as payments (FSCA, 2022; Matoti, 2014). Faganel (2022) suggests frequent system outages, ineffective technological innovations, legacy systems, maintenance, and monitoring issues negatively impact customer experience, leaving the regulator unimpressed as this impacts the economy's financial stability.

In a nutshell, any system downtime can have a disastrous impact on the bank reputationally and financially, including a license to trade may be revoked. For example, the bank's average downtime cost is $ 5,600 per minute (Gartner, 2020). RPA technology may fail, so it is crucial to have recovery strategies in place so that the bank is not negatively impacted. According to Faganel (2022), establishing service level agreements between internal stakeholders such as business and technology teams, proactive measures to monitor, support, and maintain RPA, regular review of recovery plans, and manual procedures to be followed in case RPA is unavailable are important.

RPA bots can fail or break because of errors in the codes used to develop bots, disregard of operational risks and threats (compliance, business continuity, information and cyber), unsuitable business processes being automated, bugs in the RPA software code and changes (such as updates and upgrades) in the IT infrastructure in which the bots are built on, server problems, incorrect handling of system and RPA exceptions and errors, expired RPA software license resulting in inconsistencies and errors in the automation process (Faganel, 2022). Therefore, for RPA bots to be resilient, banks must have proactive support, monitoring, and maintenance measures in place (Ariola, 2019). The top seven outages hit the United Kingdom banking sector in the second half of 2019; impacted banks included Barclays, Royal Bank of Scotland (RBS), and National Westminster (NatWest) (FinTech Futures, 2019). Also, in 2021, Akbank, Turkey's seventh-largest bank, was hit by a technical outage where an IT primary system technical issue resulted in customers being unable to access their accounts (Ozdemir, 2021). Regarding the African perspective, top African banks have not been immune to having their services down because of the unavailability of information technology platforms. In June 2022, one of the top Nigerian banks, Zenith Bank's internet and mobile banking infrastructure experienced a catastrophic outage caused by server issues affecting customers and many bank services were unavailable (Chisom, 2022). Similarly, in 2010, a prominent Kenyan Equity Bank experienced an IT disruption for two days, attributed to a system upgrade (Oeri, 2010). Bank of Kigali in Rwanda experienced a service disruption for two days in 2020 because of a power event in their data centre, triggering IT equipment to fail (Oeri, 2010).

When banking services are down, customer complaints increase, resulting in reputational and financial loss (Chisom, 2022; Oeri, 2010). South African banks have not been immune to IT disruptions; they have experienced these in the last few years (Moodley, 2022). This amount is even more staggering considering the constant outages South African banks have experienced in recent years (Moodley, 2022). In the 2021 and 2022 period alone, four South African banks had their systems down; one bank had its systems down for 40 hours, another for six hours, while two others acknowledged that they had experienced system glitches from time to time at several points. All four banks attributed these outages to IT infrastructure, system age, malfunction, and software bugs (Moodley, 2022). These IT downtimes and outages indicate that South African banks have been under significant strain, where they had to apologise to customers openly and the regulator (SARB) for outages in their banking services (Moodley, 2022). Moodley (2022) further declares that this has made it difficult for these banks to quantify the financial and reputational losses. Certain banks have implemented RPA software bots, yet effectiveness and efficiency cannot be demonstrated (Katke et al., 2019). Others have introduced several solutions needing a more proper long-term plan, causing challenges and uncertainty in scalability (Katke et al., 2019). Key challenges that have been identified impacting banks when it comes to RPA adoption include the following:

- *Complex IT platform*: Numerous organisations, especially banks, are still running old systems with banking on legacy systems and have embarked on transformation journeys to improve the same IT systems. According to Dias et al. (2019), systems do not generally have automated tests linked with them in most cases. Such implementations may result in the collapse and failure of the system.

On the other hand, other studies maintain that RPA can be easily combined with legacy systems (Lamberton et al., 2017; Moodley, 2022).

- *The shortage of RPA and linked talent* to support, maintain, and monitor RPA software bots is an essential challenge because the demand supersedes the supply (Cognirati, 2017).
- *Stand-alone technology:* Implementation of RPA cannot be executed in isolation so that it does not break down. Thus, for business processes to be entirely automated, sophisticated digital technologies such as machine learning are integrated for better outcomes (Lamberton et al., 2017).

RPA has risks that cannot be overlooked. Even though RPA can guide automation and increase competitive edge, organisations frequently set unreasonable expectations and goals regarding RPA implementation. This results in RPA implementation failing to deliver improved value and what it was intended to deliver. Figure 5 below exhibits key RPA risks.

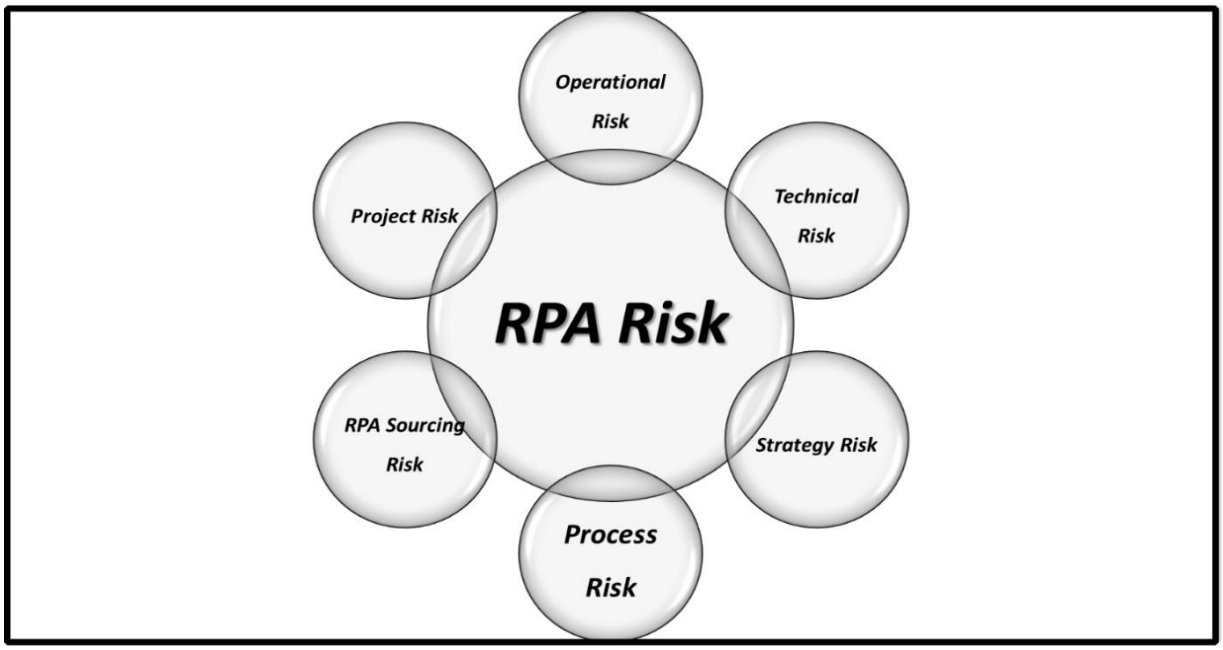

Figure 5: RPA Risks (Adopted from Lacity et al., 2017)

According to Lacity et al., 2017, RPA risks are categorised into the following detailed classifications:

- *Technical risk:* Technical risks, which include data security, automation, and IT infrastructure incompatibility, need to be mitigated so that RPA operates adequately and effectively. Lacity et al. (2017) attest that unexpected system outages and slow responses are disastrous risks organisations face.
- *Process risk:* Malfunctioning functional procedures can adversely impact the organisation's performance, causing operational outages. Failed or ineffective internal business processes, systems, and people can bring on process risk.
- *Strategy risk:* Since RPA can drive the organisation's strategy, vision, and goals to enhance customer service and optimise the organisation's competitiveness, there are instances where the organisation can miss RPA's total value due to misalignment to the goals and strategic intent.

- *RPA sourcing risk:* When organisations use the incorrect sourcing model, high costs are experienced.
- *Tool selection risk:* Organisations need to do their homework in choosing the right vendor for support and maintenance, especially for externally developed RPA software robots.
- *Operational risk:* A proper operating model should be in place so that the execution (or operational) risk is mitigated. In other words, when training is conducted timeously, roles and responsibilities are clearly defined. These should be completed before the RPA bot is deployed into production so that the staff impacted know precisely where they fit in. Deployment of an appropriate operational model is critical as it reduces performance and functional concerns. The rationale for functional and implementation risks are the unstable operation of the robots, excessive maintenance, and inefficient utilisation of RPA bots.

Natsas & Roopnarain (2018) and Tew (2019) maintain that banks need a well-considered plan in place when adopting RPA so that concerns regarding business expectations mismatch, automation of unsuitable processes, regulatory and compliance requirement changes, incorrect software updates, and lack of technical support and maintenance are avoided. This way, automation achieves more good than harm (Natsas & Roopnarain, 2018). RPA technical support, maintenance, and monitoring are crucial to avoid possible system errors that may impact the functioning of RPA bots, leading to downtime. Consequences of these concerns frequently yield incompatibility of business expectations and poor business results, and these include outage / unavailability of RPA, reduced efficiency, and productivity loss (Grishina, 2022; Lacity et al., 2019, Tew, 2019). RPA unavailability can cause revenue loss, irate customers, and reputational damage, negatively impacting the organisation's bottom line (Natsas & Roopnarain, 2018). Siderska (2021) states that RPA can be seen as an enabler of business continuity, especially when the world experiences a disruption such as a pandemic, as proved during the coronavirus. For businesses to remain sustainable, organisations have effectively used business continuity to service their customers (Siderska, 2021). Nah & Siau (2020) explore new technologies, for example, RPA and AI, confirming that they improve resilience and continuity of business operations in an organisation. When RPA bots are unavailable in a bank, it can have several consequences, which include the following (Kamat, 2019; Lacity et al., 2019):

- *Banking operations disruptions*: RPA plays a critical role in automating several business processes in a bank. When RPA bots are unavailable, previously automated functions may need to be carried out manually, resulting in inefficiencies and delays. Thus, this can interrupt the seamless running of business operations, impacting the customer experience.
- *Reduced efficiency:* RPA is adopted because banks can automate business processes faster than humans. When RPA functioning is disrupted, task efficiency and speed may be compromised. This may result in increased backlogs and longer processing time.
- *Customer service impact:* RPA bots often provide banks with improved customer service. When RPA functioning is disrupted, credit collection, account maintenance, customer requests, and queries may be delayed. This can negatively impact customer experience, leading to irate customers and financial and reputational loss.

- *Increased error rates:* RPA bots are designed to minimise human errors by carrying out tasks accurately, completely, and consistently. When the RPA bot is unavailable, there is an increased risk of human errors creeping into manual processes. This can lead to data entry inaccuracies, impacting the bank's reputation and causing a negative customer experience.
- *Financial implications:* RPA is adopted to enhance operational efficiency and cost-effectiveness. When RPA is unavailable, the bank may experience increased costs because of additional human resources. This can impact the bank's financial performance and competitive edge.

In essence, Lacity et al. (2017) and Moodley (2022) recognise that to mitigate the impact of RPA unavailability, banks should have recovery strategies in place, and this may include manual workarounds to ensure business continuity and reduce disruptions. Regular monitoring, maintenance, and testing of RPA systems are vital in ascertaining and proactively addressing concerns.

2.9. Benefits of Achieving Business Continuity Through the Use of RPA

As organisations adopt RPA, business continuity needs to be considered. Failure to strategise for business continuity in evolving conditions may result in RPA implementation issues and business process disruptions (Ewing, 2022). Globally, financial services institutions' regulators are aware of the need for bank continuity, which is critical to minimise the damaging impacts of any disruptions (Matoti, 2014). Thus, regulators have developed several guidelines, regulations, and recommendations so that banks manage business disruption risk by putting adequate and effective business continuity controls (FSCA, 2022). The explanation of business continuity is related to risk management (Zhang & McMurray, 2013). Business continuity is a control associated with an essential operational risk that improves the organisation's resilience (Zhang & McMurray, 2013). During the unprecedented disruption, RPA supports preserving business continuity so that inclusive responsiveness is ascertained. As organisations shift business operations to RPA, this is a reliable and foreseeable solution regardless of what arises. Furthermore, RPA software bots must always be available to operate during disruptions. RPA software robots can continue business operations without disruptions or errors; thus, they can function uninterrupted. RPA has become crucial for its effectiveness around business continuity (Lacity et al., 2017; Martin, 2022), so the RPA needs to be available 24/7 (Ewing, 2022). This will provide quick problem resolution when needed and allow the RPA solution to improve adequate RPA support and maintenance are essential for the organisation to meet its objectives and strategy and increase efficiency and productivity (Ewing, 2022),

Business continuity is gained through RPA facilitation so that business process efficiency is gained, cost savings, customer experience increases, and profits increase (Pedroza, 2022). Analysing RPA bots is critical to ensure that the automated business processes are running around the clock and that effective RPA recovery strategies are established to improve business continuity (Ewing, 2022; Lacity et al., 2019). This enables organisations to prepare and prevent disruptions, establishing business continuity and understanding automation, which mitigates business disruption risk (Ewing, 2022).

Although the RPA technology has countless benefits, achieving RPA involves selecting suitable business processes that can be automated for the best return on investment with uninterrupted automation and fast turnaround time (Kothandaraman, 2020). This automation can lead to some of the key benefits that contribute to business continuity, and these include (Lacity et al., 2017; Pokharkar, 2019; Tew, 2019):

- *Scalability:* RPA software bots collaborate to execute many examples of business services and processes; thus, the bots can handle the workload (Accenture, 2016). That is, RPA assists organisations in meeting specific goals by automating critical and suitable business processes. RPA allows for easy scalability as bots can be deployed or scaled up/down based on business needs. This flexibility ensures that business operations can adapt to changing demands without disruptions.
- *24/7 Availability:* During disruptions, RPA can be instrumental in ensuring business continuity. By automating critical business processes, RPA ensures that banking operations are available 24/7, even during disruptions. This enables businesses to provide uninterrupted services to customers and maintain operational efficiency.
- *Disaster recovery and backup:* RPA can automate data backup and recovery processes, ensuring that critical information is securely stored and readily available in case of system failures or disasters. This helps minimise downtime and ensures business continuity.
- *Cost savings:* Implementing RPA in banking operations reduces costs significantly as human interventions and resources are eliminated. When organisations adopt RPA, they can reduce their staff complement by at least two-thirds (Deloitte, 2015; Kumar & Balaramachandran, 2018; Lamberton et al., 2017).
- *Economic advantages:* Costs are reduced, effectiveness is enhanced when RPA is adopted (Subramanian & Harris, 2021), and adoption of digital transformation revenue increases (Deloitte, 2015).

By leveraging RPA's benefits, banks can remain resilient and ensure continuous operation is available during a disruption. Lacity et al. (2017) note that though RPA can contribute to business continuity, it is not a stand-alone solution and should be combined with other business continuity controls such as resilient IT infrastructure, human oversight, documentation, and testing of recovery strategies so that detailed continuity strategies are in place. In summary, the benefits of using RPA for business continuity in banking are critical as the bank's operations are transformed to provide more accurate, faster, and customer-centric services while reducing costs and mitigating threats and risks.

2.10. Theoretical Background and Research Framework

2.10.1. Introduction

Frameworks about technology adoption have been applied in a variety of disciplines. Amongst other research, the focal point has been the connection between technology adoption and dominant variables (Oliveira et al., 2014). Various theoretical frameworks are being applied to investigate adoption at the organisation level.

Some of the widely used models, amongst others, comprise Technology-Organisation-Environment (TOE) – (Tornatzky & Fleisher, 1990), Diffusion of Innovation – DOI (Rogers, 2003), Institutional Theory (Oliveira & Martins, 2011), Iacovou model (Iacovou et al.,1995) and Task-Technology Fit (TTF) – (Goodhue & Thompson, 1995). Some researchers combined the TOE framework with other theories to better understand IT adoption decisions (Oliveira & Martins, 2011). The research in question adopted the TOE-TTF framework to examine better factors that effectively influence RPA use for business continuity in one of the South African banks. Regardless of the number of new technology adoptions, concerns persist (Martins et al., 2010; Mirza, 2010). This has led several scholars to question the appropriateness of existing frameworks for this complicated phenomenon in the IS discipline. Other than several studies used the fact TOE framework to clarify technology adoption (Balaid et al., 2014; Oliveira & Martins, 2011), this framework was adopted based on three determinants, namely technology, organisation, and environment, which are based on the internal and external factors of the bank, provides comprehensive factors which are meaningful when researching the bank's perspective about adopting RPA and using it for business continuity. The TOE framework is more suitable for this research as it considers internal and external factors to understand the adoption of new technology. The TTF model explores RPA use for business continuity, the tasks required to perform, the characteristics of technology (in this instance, RPA), and the use of RPA. TOE framework is essentially silent on the fit between technology's performance and operations and task elements (Balaid et al., 2014). Also, the TOE framework rarely supports straightforward task and fit elements, which the TTF model handles separately; hence, these were integrated. Since the TOE framework can be incorporated with other theories to illustrate IT better adoption, this research integrated the TOE framework with the TTF theory.

The TOE framework will benefit from other theories to address the concerns of task interdependence, task complexity, fit, and performance. It will give more detailed and insightful views into exploring elements influencing the bank's decision to adopt RPA and use it for business continuity. Notably, this involves integrating the TOE framework's empirical features. With task and fit elements addressed individually by the TTF model, this research aims to enhance and integrate the TOE framework and TTF theory to extend the TOE insights and empirically explore the task and fit elements of TTF theory. This paper reflects on the TOE framework and TTF theory to examine RPA use and business continuity. Even though DOI, Institutional Theory, and the Iacovou model are applied to study technology at the firm level, they were not deemed suitable for this research. DOI model is any new technological service or product to the potential adopter Oliveira & Martins (2011). Regardless of DOI's popularity, it could be more objective regarding the technological aspect of adopting new technology while disregarding other elements (Alwahaishi & Snasel, 2013; Thomas, 2013). New technology adoption surpasses economic, social, and political elements (Thomas, 2013). Some of the DOI theory limitations include focusing on individual behaviours and concentrating exclusively on new technology, which hindered the adoption of this theory in this research.

Institutional Theory (Oliveira & Martins, 2011) was also deemed unsuitable as it focuses mainly on the actions and structures of the organisation, including the fact that decisions are driven by the organisation's cultural and social features, and this was not the intent of this research. Another model which was noted as being inappropriate for this study was the Iacovou model (Iacovou et al.,1995) purely because it focuses on the analysis of inter-organisational systems elements, which include technology adoption (Oliveira & Martins, 2011), and this was not the purpose of this study. A breakdown of 110 reviewed research articles pointed out that 38 (34%) papers employed the TOE framework, 16 (15%) papers used the TTF framework, and 29 (26%) papers were exclusively focused on RPA. In contrast, 27 (25%) were aimed at business continuity. This is a further rationale for the proposed study and conceptual framework. Even though many of the analysed papers considered technology adoption in the banking sector utilising the TOE framework that considers Technology, Organisation, and Environment elements and Task, Technology Fit components included in the TTF model, including business continuity in banking focused on questionaries and surveys as a research method, the TOE framework, and TTF theory were not integrated and used at the banking sector in a South African perspective. Also, the reviewed papers studied the RPA adoption using the TOE framework to detail the Technology, Organisation, and Environment elements of the components of the new technology.

From the perspective of TTF theory, the articles reviewed highlighted that this theory was combined with other adoption frameworks at the firm level, such as DOI and Institutional Theory. Regardless of focusing on adopting new technology, the reviewed papers present predominantly similar and conflicting findings and arguments. They demonstrated that TOE framework elements such as IT infrastructure comparability, skills and knowledge, leadership support, and regulatory requirements are critical elements for RPA adoption (Brás et al., 2023; Eze et al., 2019; Tew, 2019). Similarly, with the TTF theory, the research data analysis indicated and supported the overall robustness of the TTF theory in the banking industry (Hoehle & Huff, 2012). Despite that, a limitation related to the shortage of research and empirical evidence that can contribute to exploring aspects that effectively influence RPA use for business continuity in the banking sector in South Africa was noted. Another weakness identified in the existing and limited study was the focus on other countries other than South Africa, including developed (USA, UK, and The Netherlands) and developing (for example, Nigeria, Zambia, and Vietnam) countries where the RPA technology is rapidly adopted, and business continuity have been noted as key for the survival of the financial services sector by the regulator because of stringent regulations, there is the availability of IT infrastructure, experience from previous disruptions which were costly for the organisation and digital transformation that has been established.

2.10.2. Technology Organisation Environment (TOE) Framework

Banks increasingly adopt new technologies to improve their operations and maintain business continuity in today's rapidly volatile business landscape. For South African banks, RPA technology has become critical in ensuring efficiency and resilience during various challenges and disruptions. The TOE framework and TTF theory can assist in establishing elements that influence the successful adoption and use of RPA for business continuity within a South African bank.

The research in question explored factors influencing the effective use of RPA for business continuity at a firm level through the lens of the TOE framework, as it provides flexibility in the data collection step of the study when IT artifacts such as RPA and Cloud are studied. The TOE framework has a robust theoretical basis proven by empirical results (Oliveira et al., 2019). Various technology adoption researchers have used the TOE framework because it gives a functional theoretical framework for researching the adoption and integration of various technology innovations (Oliveira & Martins, 2011). It highlights three attributes of an organisation that guides technology adoption. These include technology, organisation, and environmental elements at the organisation level (Tornatzky & Fleischer, 1990), shown in Figure 6. These three TOE framework structures influence how organisations view the need for modern technologies, then explore and adopt them. In this study, the TOE framework was adopted because:

- TOE structures influence how the South African bank views the need for modern technologies and then explores and adopts them.
- It provides a more sophisticated approach to research technology adoption, such as RPA, and it assists in understanding better the complicated relationship of elements that influence decisions to adopt RPA.
- It is a flexible framework applied to various sectors, organisations, and technologies.
- The TOE framework also proposes comprehensive factors that provide a more meaningful view into a better understanding of RPA adoption and use for business continuity.

The environmental factor is as critical as other elements. It is highlighted in this research because of the character of the determinant: the bank, being part of the financial services institution, is highly regulated by the South African Reserve Bank (SARB), which directly impacts RPA use for business continuity in banks.

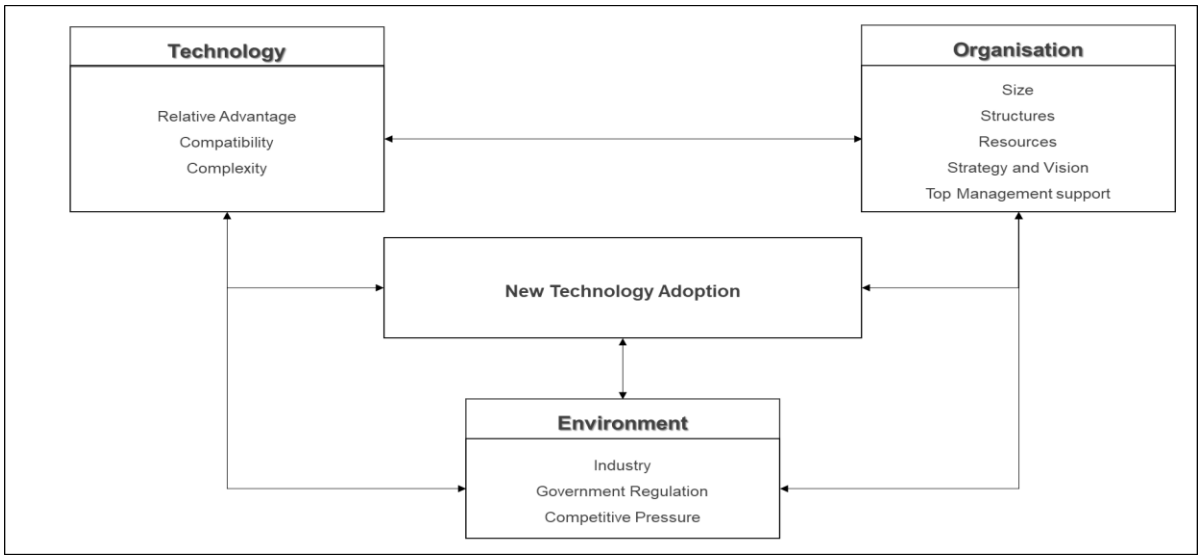

Figure 6: Original Version of the Technology-Organisation-Environment (TOE) Framework (Adopted from Tornatzky & Fleischer, 1990)

- **Technology Context**

The technological element concentrates on the traits of RPA itself and its compatibility with the bank's existing IT infrastructure and systems. The technological context involves technologies utilised in the organisation, including the new ones suitable to the organisation. Thus, this feature relates to internal and external technologies, including business processes pertinent to the organisation. TOE framework disclosed that an organisation should assess technological characteristics to its internal and external contexts (Baker, 2012; Chau et al., 2020; Eze et al., 2019; Gangwar et al., 2015; Martin et al., 2012; Matikiti et al., 2018; Nga et al., 2017; Rawashdeh et al., 2022; Wang et al., 2016).

- **Organisational Context**

Organisational factors focused on the bank's internal environment, including its capability and readiness to adopt RPA. This context includes the organisation's features and resources, which impact any decision to adopt modern technologies. Some of the examples of elements incorporate size, resources, vision, strategy, top management support, skills and internal communication measures (Baker, 2012; Chau et al., 2020; Eze et al., 2019; Gangwar et al., 2014; Ghaleb et al., 2021; Matikiti et al., 2018; Musawa & Wahab, 2012; Oliveira & Martins, 2011; Tornatzky & Fleischer, 1990).

- **Environmental Context**

Environmental components include the external elements influencing the adoption and use of RPA in the South African banking sector. The environmental context deals with the environment in which the organisation operates. This element deals with sector structures, competitors, regulatory structure, customers, and availability of technology service providers (Alshamaila et al., 2013; Baker, 2012; Chiu et al., 2017; Ngah et al., 2017; Oliveira et al., 2014; Oliveira & Martins, 2011; Tornatzky & Fleischer, 1990; Wong et al., 2020).

The TOE framework factors collectively illustrate concerns, including barriers and opportunities for the organisation to adopt new technology.

2.10.3. Task-Technology Fit (TTF) Theory

The TTF theory is the extent to which new technology helps individuals execute their business functions (Goodhue & Thompson, 1995). Oliveira et al. (2014) have articulated TTF as the logical viewpoint of how a new technology can improve an operation. Also, the core of TTF is the notion that technology provides value through being helpful in some or collection of business operations (that is, tasks) and that users may consider this in their assessment. The basic TTF model is illustrated in Figure 7, where a lens of technology use and the benefit it gives is provided.

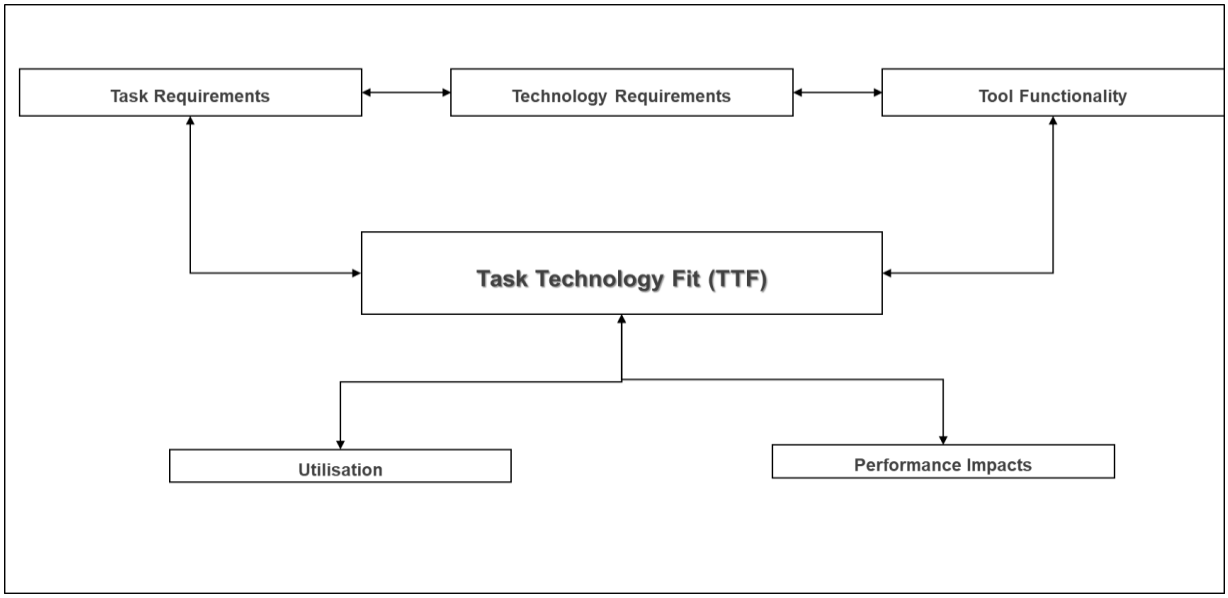

Figure 7: Original Version of the Task-Technology Fit (TTF) Framework (Adopted from Goodhue & Thompson, 1995)

TTF framework was adopted in the study in question because it:

- Provides a relationship between fit, task components, and technology's functionality.
- Assists in assessing business continuity following the effective use of RPA.
- Addresses task requirement challenges that need to be addressed in the TOE framework.
- Provides a match between tasks automated by RPA and technology (RPA) elements to determine RPA performance and use for business continuity.

The TTF model highlights five constructs, namely tasks, technology, fit, utilisation, and performance impacts.

- *Task* construct specifies users' business processes or actions in a particular environment. Thus, task features are regarded especially concerning the technology that underpins business operations or tasks. Also, it illustrates the task requirements of the technology (Awa et al., 2017). They are split into various levels subject to the operations' complications (Goodhue & Thompson, 1995; Hoehle & Huff, 2012).
- *Technology* refers to tools utilised by individuals so that they can perform their tasks. Technology is the tool that individuals utilise to perform their tasks (Goodhue & Thompson, 1995; Yang et al., 2015). From an IS research perspective, technology is noted as IT systems (data, hardware, and software) and user support activities (such as training) made available to help users execute their operations.
- *Task-technology fit:* The TTF model is how technology aids an individual in conducting his or her day-to-day functions. This element highlights the level to which technology allows users to achieve specified tasks. The TTF model includes the extent of the connection between technology use, individual capabilities, and task fulfilment (Goodhue & Thompson, 1995). In order to attain an elevated level of fit, there must be many similarities between user and task elements.

TTF is an essential improvement in IS theory (Hoehle & Huff, 2012). In this study, task-technology fit is the equivalence between task guidelines, individual capabilities, and technology, such as RPA and cloud functionality.

- The *fit* notion has repeatedly evolved since the progress of the contingency hypothesis in the research at the firm level (Hoehle & Huff, 2012). Regardless of the broad usage of the expression fit in several models that address variables' contingencies, the exact meaning and n utilisation still need to be defined. The fit notion is evident in several IS theory studies. Goodhue & Thompson (1995) consider the scope, which measures fit and includes compatibility, system reliability, and ease of training and use. For RPA technology to be effective, it is expected to be compatible with existing information systems, dependable, and easy to use in training the technical team.
- *Utilisation* is how technology is utilised so that business tasks are completed. This context involves the usage of several technologies to complete specific tasks. Several concepts influence technology utilisation, for example, when a particular technology is utilised and several tasks a particular technology is applied to execute (Goodhue & Thompson, 1995).
- *Performance impact* involves the achievement of business duties by individuals. Better performance articulates enhanced efficiency, effectiveness, and better quality. This factor denotes the ability of the rolled-out technology to help users achieve tasks that have been defined. A measure for improved quality, efficiency, and effectiveness is an increased extent of performance. As a result, achieving improved TTF levels offers enhanced performance, thus attaining the user's task needs (Goodhue & Thompson, 1995).

The study has constructed an integrated conceptual framework considering technology, organisation, environment, utilisation, performance, task, and fit factors to understand how these influence effective RPA (as a technology) use for business continuity. Also, TTF theory concentrates on the extent to which RPA technology connects with business operations and proposes enhanced organisational performance when there is a better fit between necessary activity and technology. Therefore, the proposed framework drew from literature to explore factors influencing effective RPA use for business continuity.

2.10.4. Integrated TOE-TTF Conceptual Framework

Oliveira and Martins (2011) suggest utilising an integrated theoretical framework or model to gain better insights into the complicated adoption approach. This segment articulates how attributes of the frameworks are contextualised for the current research. Consequently, this research sought to contribute to the existing IS body of knowledge by introducing the integrated TOE-TTF conceptual framework to explore the use of RPA for business continuity in South African banks. This conceptual framework expresses that banks regard Technology, Organisation, and Environment features as they adopt RPA and utilise it for business continuity. All features have benefits and limitations that influence the bank's decision to continue rolling out RPA and use it for business continuity. Figure 8 illustrates the proposed integrated TOE-TTF framework.

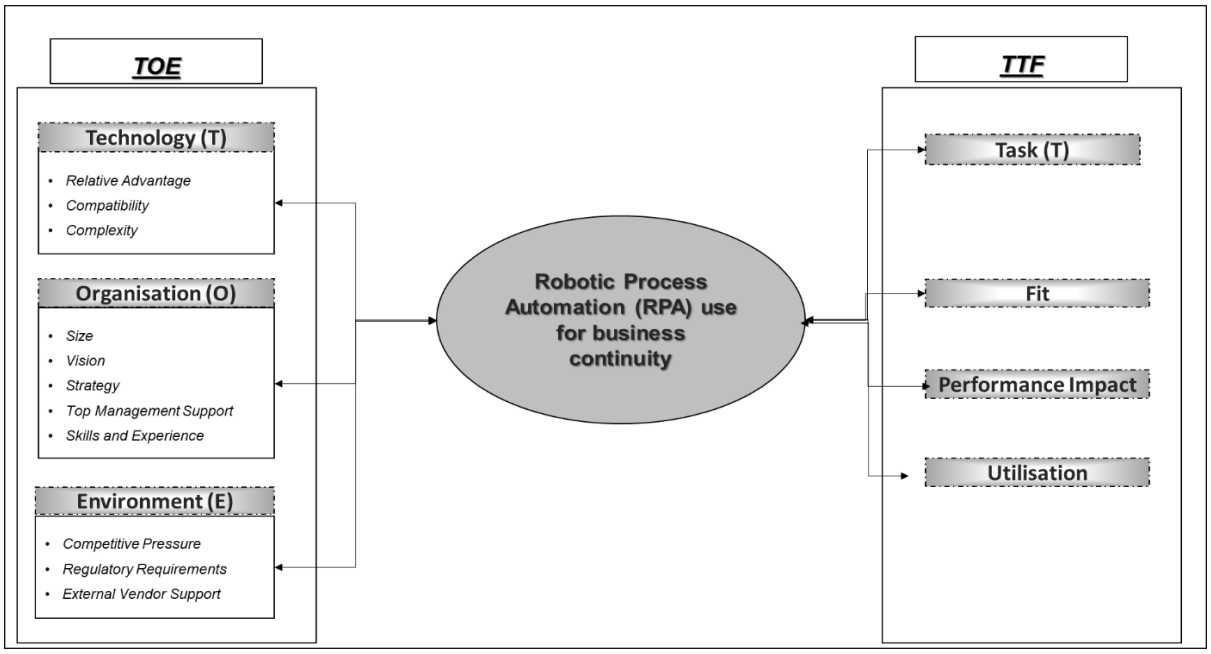

Figure 8: Proposed Integrated Conceptual TOE-TTF Framework

Some elements in the TOE framework would vary depending on the technology being researched (Oliveira & Martins, 2011). The TOE framework is aligned with the TTF model, especially regarding the organisation and environment elements (Oliveira & Martins, 2011). Thus, there is an alignment for an emerging technology such as RPA, which is used for business continuity. To explore the fit of RPA to manage multiple tasks and its use for business continuity, in this research, the TTF model is used as a lens to explore the performance impact in the South African bank. The foundation of this new proposed conceptual model is to explore factors that influence RPA use for business continuity. Thus, RPA must be used for business continuity, suitable tasks must be automated, and it must be a good fit for the bank with the tasks it supports. The subsections below introduce the chosen features covered in the proposed TOE-TTF conceptual framework.

2.10.4.1. Technology-Organisation-Environment (TOE) Framework Perspective

- **Technology Perspective**
  - *Relative Advantage:* Rogers (2003) explains that relative advantage is the degree to which technology adds value and benefits the organisation. In the context of this study, perceived RPA benefits include reduced operational costs, increased profits, and improved customer experience. These lead to satisfied customers, efficient and streamlined business processes, continuity of business services despite the fact there is a disruption, and reduced errors in business operations processing. A better understanding of this factor was required to realise substantial advantages for the banks.
  - *Compatibility:* Compatibility relates to aligning modern technology with the existing IT infrastructure, business requirements, and practices (Rogers, 2003). High and wide compatibility allows new technology acceptance (Rawashdeh et al., 2022).

Thus, organisations may be more inclined to adopt RPA because they believe it fits and meets their business requirements. Hence, this research needed to explore this with the South African bank concerning RPA use for business continuity.

- C*omplexity:* The complexity of a recent technology indicates that it is difficult and complex to be used, model, and interpret (Rogers, 2003). Some research on IT adoption has shown that the role of technology readiness and complexity is critical when adopting RPA (Jaradat et al., 2020; Priambodo et al., 2021). To elevate the adoption rate, Berman et al. (2012) confirm that advanced technologies must be uncomplicated, user-friendly, and manageable. Examining this aspect would uncover how technology complexity impacts RPA adoption.

- **Organisation Perspective**
  - *Size:* Organisation size is critical to adopting innovation (Rogers, 2003). Borgman et al. (2013) confirm that sector reports indicate that larger organisations are more likely to adopt emerging technologies than smaller organisations. In summary, organisation size is crucial to the strategic significance of adopting new technology such as RPA. Researching this attribute would provide a better understanding of how the size of the organisation, that is, the bank and the department within the bank, influences the decision to adopt RPA.
  - *Strategy and vision:* The influence of technology adoption on the organisation's strategy and vision is incorporated in the proposed conceptual model to examine this element in this research. A strategy assists the organisation in advancing (Flechsig et al., 2021). Senior management should meet the organisation's strategy directives (Wang et al., 2016). An organisation's strategy and the adoption of modern technology are linked (Lopez-Lopez & Giusti, 2020). Organisation's top leaders must evaluate their current RPA posture to establish how and where RPA technologies can be ingrained, including determining justifications for implementing IT strategies differently (Flechsig et al., 2021). Exploring this factor better explains how strategy and vision influence RPA adoption and its use for business continuity.
  - *Skills and Experience:* Tew (2019) states that service providers of RPA confirm that it is an easy software to implement. Organisations utilise it to simplify business processes and, at the same time, to apply all RPA abilities effectively with the limited competent knowledge needed. Also, RPA professionals and service providers influence internal and existing abilities to support RPA adoption, implementation, and use, which benefits the organisation (Rutaganda et al., 2017). In other studies, third-party vendors were employed to assist the organisation in constructing the internal capability with the intention that when the RPA project is completed, internal human resources would be ready for more implementations (Lacity et al., 2017). Studying this factor better explains how RPA is adopted and used for business continuity.
  - *Top management support:* Top and senior leadership commitment and support are essential for adopting innovative technology as it drives resource allocation, providing funds, articulating strategy and vision, process re-engineering, and services integration (Hung et al., 2016; Yang et al., 2015).

Also, the responsibility of top management is to determine barriers, furnish resources, and affirm an organisational culture that supports and implements new technologies (Gangwar et al., 2015). Top management support is critical for deciding, adopting, and integrating new technological innovations in a firm (Oliveira et al., 2019). Top management commitment and support impact the RPA adoption (Rawashdeh et al., 2022). This element needed to be explored to understand better RPA adoption and its use for business continuity by a bank.

- **Environmental Perspective**
  - *Competitive Pressures:* Organisations may go through competitive pressure from the extent of technology impact, competitive drawbacks, and intensity of competition locally and globally (Picoto et al., 2014). Additionally, competitive pressure is the foundation of the use of new technologies (Chau et al., 2020; Picoto et al., 2014). Competitive pressure is connected to the pressure levels experienced by organisations from similar sector competitors. Notably, it is a crucial incentive and driver for adoption (Picoto et al., 2014). Pressure from competitors in the same sector influences the organisation's aim to integrate RPA into its operations to gain a competitive edge (Rawashdeh et al., 2022). Examining this aspect would explain how the bank (including other departments) is pressured by its competitors to adopt RPA and use it for business continuity.
  - *Regulatory requirements:* There is a rise in the number of laws and directives to regulate the adoption of new technology; legal compliance and regulation breaches have become severe issues for many banks. In this research, regulatory requirements deal with SARB regulations, which banks must comply with to establish financial system stability. This is done by allowing and encouraging financial services institutions (including banks) to adopt innovative technologies to remain relevant and competitive (Hung et al., 2016). Examining this factor allows a better understanding of how they stimulate RPA adoption.
  - *External Vendor RPA Support:* Third-party technology support is vital for adopting new technology. When there is no technical support for the adopted technology, such as RPA, the bank may not adopt RPA as it may impact the organisation's strategy and values, including the availability of services to customers. External vendor support guards the recent technology against adverse results due to training loss, lack of and limited support, modernisation, and maintenance (Rawashdeh et al., 2022). This feature needs to be examined more in banking regarding RPA adoption.

2.10.4.2. Task-Technology Fit (TTF) Theory Perspective

- *Task:* The task element includes functions related to the technology that underpins the tasks. Task interdependencies and task complexity also measure task characteristics. According to Awa et al. (2017), combining technology's capabilities and task's complexities positively influences technology adoption. Depending on the task's difficulty, these were split into different details required. Furthermore, tasks initiated and automated by RPA can fall into several concepts, namely mundane, repetitive, complex, and manual business processes.

A viable RPA business function's attributes are rule-based, repetitive, mundane, and definable (Dilla & Jaynes, 2015). In this element, the research would explore how RPA business processes are selected and their suitability as candidates.

- *Fit:* Typical facets of determining fit include system reliability, compatibility, and ease of use (Goodhue & Thompson, 1995). This study explores this feature to understand better how it informs RPA use for business continuity.
- *Performance:* This measures if using RPA improves the bank's (including department) performance. Performance impact concerns achieving the task (Goodhue & Thompson, 1995). This refers to the RPA and business continuity performance. In other words, business continuity can directly influence RPA's performance. RPA performance indicates that business processes are improved, efficient, and streamlined, and system performance is improved. Also, business continuity in this research is related to performance (Keradjaan et al., 2021). Achieving a higher amount of TTF offers an enhanced performance, thus meeting the task requirements (Goodhue & Thompson, 1995). This attribute must be understood better because RPA helps the bank meet its business operations. This measures whether using the information systems enhances the user's work performance. Studying this element would identify insights into how this influences RPA adoption and its use for business continuity.
- *Utilisation:* This factor involves using technology to meet specific tasks. Thus, RPA is used by the bank for business continuity to meet its business operations. The expected outcome is one of the factors of utilisation.

By considering these technological, organisational, and environmental elements in the TOE framework, a South African bank can effectively explore the feasibility and appropriateness of RPA for its business continuity requirements. Furthermore, the TTF theory ensures alignment between tasks performed in the bank and the capabilities of RPA technology. This alignment improves the probability of a successful RPA implementation and adoption, enabling the South African bank to improve efficiency, business continuity, and productivity during disruptions.

2.11. Summary of Chapter

The literature review was helpful to the researcher as it assisted in noting RPA adoption and its usage for business continuity at an organisational level. The researcher considered that these critical objectives were included in this thesis. A systematic literature review (SLR) format was followed so that the status of the existing body of knowledge regarding firm adoption of RPA and using it for business continuity using the proposed framework, namely Technology-Organisation-Environment (TOE) and Task-Technology Fit (TTF), could be understood and applied for the study. Even though there have been limited studies about RPA adoption and its usage for business continuity in banking (research databases used to search were Science Direct, IEEE Explore, ProQuest, and SCOPUS between 2010 and 2023), specifically in South Africa, a general base of RPA adoption and business continuity understanding was obtained from international literature.

Furthermore, this chapter displayed and examined theoretical frameworks (TOE and TTF) that influenced the research topic. These frameworks introduced the conceptual framework that guided the research process. The next chapter details the research methodology implemented during the fieldwork.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. Introduction

This chapter illustrates the methodology used in this research by discussing the research paradigm, approach, design, and strategy, including data collection procedures and analysis. Moreover, the research context, sampling method, qualitative evaluation guidelines, and ethical considerations of the review are reviewed. The rationale for the chosen research design and paradigm, including the appropriateness of the selected approach based on the research objective and questions, are clarified. Research methods shape the basis of the study; they are the techniques utilised to collect and exhibit quality research information (Fraenkel et al., 2011). When choosing the appropriate research process for this thesis, the research onion established by Saunders et al. (2016) was adopted, as depicted in Figure 9.

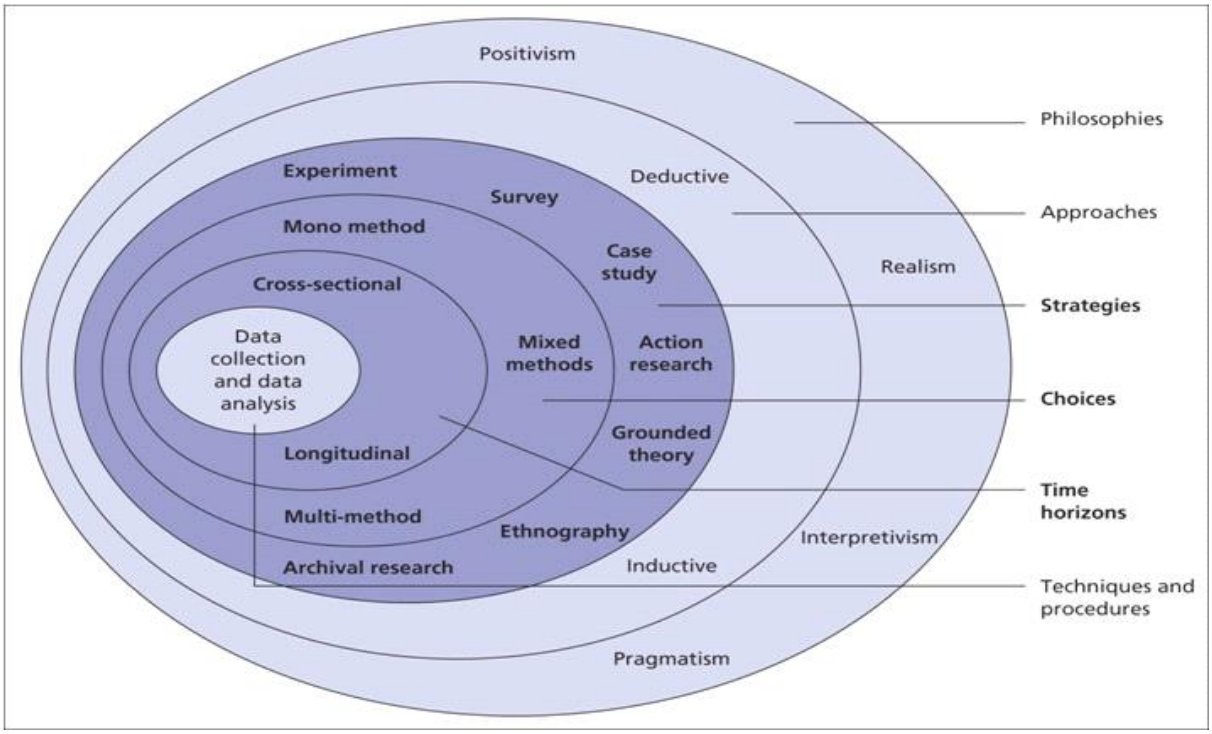

Figure 9: Research Process Onion (Adopted from Saunders et al., 2016)

3.2. Research Paradigm and Approach

The interpretive approach was adopted because it affirms the aim of getting detailed insights by analysing qualitative data, for instance, participants' feelings, opinions, and experiences regarding using RPA for business continuity in the chosen South African bank. This paradigm preference was guided by the research questions format such as 'how' and 'what'. The researcher intended to collaborate individually with the South African bank's participants in a short period so that an inclusive understanding of crucial concerns regarding using RPA for business continuity is investigated in a real-life and practical setting. The participants' perceptions, beliefs, experiences, and opinions would influence the know-how of the reality in this study, and these would direct the researcher's approach to describe, objectively examine, and understand factors that influence the RPA user for business continuity. Walsham (2006) maintains that the interpretive approach is best suited where the researcher needs to gain prior knowledge and insight into the case under discussion.

As a result of the lack of explicit knowledge and integration of the TOE-TTF framework lens in RPA use for business continuity, an interpretive paradigm proved to be more appropriate for this research. The interpretive approach is appropriate for exploring and improving new theories (Bhattacherjee, 2012). Also, this research favours the interpretivist paradigm to explore factors that influence RPA use for business continuity in detail. According to Bhattacherjee (2012), the interpretive paradigm is an inductive approach to study that requires a theory to be built or research a phenomenon more thoroughly, therefore gaining better knowledge of the phenomena and constructing conceptualisations from the observed data. An interpretive lens was suitable for this research because there is a need for theoretical advancement in using RPA for business continuity in banking topics. Walsham (2006) states that the interpretive paradigm is most suitable where the researcher needs an empirical understanding of the instances in question and can increase our knowledge of the phenomena of interest in its contextual environment. An interpretive paradigm proved more suitable in this study because of the need for explicit theoretical knowledge and foundation regarding RPA use for business continuity.

While there are some empirical theories and assumptions regarding RPA and business continuity, the integration of these two notions is non-deterministic in nature and unique to the context in which this research is carried out. The interpretive paradigm lends itself well to researching the phenomena of interest from the views of humans through understanding social and behavioural phenomena from the views of these human agents (Bhattacherjee, 2012; Oates et al., 2022; Orlikowski & Baroudi, 1991; Saunders et al., 2016). Interpretivists have a subjective standpoint of the physical and social worlds and believe they are a critical part of the research process, influencing participants and researchers (Bhattacherjee, 2012; Saunders et al., 2016). Interpretivists believe that reality continually evolves and can have various views (Bhattacherjee, 2012; Saunders et al., 2016). Interpretive research attempts to establish, explore, and describe to gain a detailed understanding of how meaning is created in the real world through social section (Oates et al., 2022). The positivist approach was inappropriate for this study because exploring factors influencing RPA use for business continuity was not to test theory (Bhattacherjee, 2012), was irrational, and did not intend to collect quantitative data nor test relationships and concepts between variables. Also, a positivist approach disregards social views and opinions, which was the study's foundation.

There are two primary approaches to research, namely deductive and inductive. The deductive approach recognises established theoretical frameworks and models and moves to prove them with empirical evidence (Bhattacherjee, 2012). The inductive approach declares that a new theory is built from comprehensive observations of the world for generalisation (Bhattacherjee, 2012). This study was inductive in nature, meaning a new theory was being built with a partial deductive aspect because concepts adopted from the existing literature were used in this research standpoint. In an inductive approach, the researcher concludes the observations and findings, which are generable to develop a new theory; thus, a new theory of exploring factors that influence RPA use for business continuity in the banking sector is built.

The researcher was allowed to build on the existing concept and research the uniqueness of the setting in question, expanding and constructing the existing knowledge on RPA use and business continuity. Part of the deductive research, which was found appropriate for this research, refers to several existing adoption frameworks and models that already exist in literature and have been tested to apply to the phenomenon of new technology adoption. This research used the TOE and TTF framework as a lens to explore aspects that influence RPA use for business continuity. This is a common deductive research approach where the researcher explores previously established theories by applying new empirical data (Bhattacherjee, 2012).

3.3. Research Design and Strategy

3.3.1.1. Research Design

An exploratory research design was adopted in this study. Exploratory study detects and creates ideas (Bhattacherjee, 2012). Thus, it is performed in parts that require more knowledge of the subject matter to understand the subject in an introductory manner (Bhattacherjee, 2012). Exploratory research is executed to establish the extent of the issue, create preliminary notions regarding the subject matter, or determine elements critical to the study (Bhattacherjee, 2012). Assessing the primary research question and weaknesses on existing RPA use and business continuity literature confirms that there is a need for analyses of a detailed connection between RPA use and business continuity in South Africa. Therefore, the intervention being determined needed to be clarified. An exploratory study has permitted the researcher to create introductory ideas and theories about the primary research question. Even though the researcher could have adopted a descriptive research design, RPA use and business continuity topics are broad and would have needed to be more practical to answer definite research questions presented in the research with an exploratory research design or any other research designs exhibited in Figure 9.

This research aimed to create ideas on the connection between RPA use and business continuity to examine elements that may be essential to this research matter. With limited empirical studies regarding RPA use and business continuity, this study can build a foundation for future research. Thus, an exploratory research design was adopted because it complements the context and complication of this research, its objective, and the research question.

3.3.1.2. Research Strategy

The chosen research strategy for this study was that of a case study using qualitative data collection and analysis. Case study research explores the study in its setting, utilising several sources to collect data (Oates et al., 2022). A case study research strategy has been adopted because the research focused on the detailed examination of a particular case, in this instance, a business unit in a South African bank that uses RPA for business continuity. According to Creswell (2014), a case study research strategy is when the researcher examines a detailed plan, process, activity, event, or one or multiple people. The case study research strategy is most relevant for this research because it is about understanding the phenomenon regarding the meanings of humans who deliver to these phenomena.

Case study strategy lends well to qualitative data analysis and exploratory research design because they enable the researcher to research an area where little insights are available so that detailed knowledge of the phenomena is gained (Creswell, 2014). The qualitative research approach was established in the natural sciences to research natural phenomena. A qualitative case study concentrates on a specific matter of inquiry to acquire a comprehensive understanding (Oates et al., 2022). Furthermore, this provides a story regarding what occurred in a particular environment, which may be distinct from that specific standpoint. Qualitative data incorporates observations of participants, questionnaires, interviews, and document examination (Oates et al., 2022). This research has collected data about individuals' expectations, experiences, and perceptions in a particular case and organisation. This research collected data about human expectations, perceptions, and experiences in a specific case or organisation. A case study utilising qualitative data has enabled the researcher to explore the connection between RPA use and business continuity in a single case so that robust contextual data about this case is obtained. Thus, this has enabled the researcher to form a conclusive theory about RPA use and business continuity research that could be adopted in future studies in the Information Systems (IS) discipline.

3.3.1.3. Site Selection

The case study has explored factors influencing RPA use and business continuity in a South African bank. This study has focused only on the South African banking industry; the four big retail banks in South Africa are Amalgamated Banks of South Africa (ABSA), First National Bank (FNB), Nedbank, and Standard Bank (FCSA, 2022). This study was conducted in Kaelo Bank (pseudonym), a major bank with a strategic priority to adopt digital technology to service customers. Kaelo Bank provides multiple products and services and has embarked on a digital transformation, including business process automation. It has also put effort into driving risk management by ensuring its services are always available. Kaelo Bank was thus chosen as the research site because it was assumed that the participants working in this bank would be very familiar with RPA use for business continuity, including the bank's strategy regarding new technology adoption and recovery strategies.

3.3.1.4. Unit of analysis

According to Oates et al. (2022), the initial step in considering how research data analysis needs to be analysed is to clarify a unit of analysis. The study in question has focused exclusively on one of the South African banks. The South African banking sector includes four large banks. This research was carried out in Kaelo Bank (pseudo name), one of the large banks in SA. The researcher selected this bank because of its strategic intent to digitise, business process automation, and its journey to use RPA for business continuity. Consequently, it has the potential to give an understanding regarding the subject in question for this research. With the researcher employed at Kaelo Bank, it was convenient to quickly access prospective participants involved in the RPA adoption and its use for business continuity. Since Kaelo Bank has multiple departments, this case study research considered one business unit: the credit collections department.

This credit collections department was the first in the bank to adopt RPA as most of its business processes were high volume, manual, and repetitive and used it for business continuity to enable it to maintain operations during a disruption.

3.3.1.5. Time horizon

This research study was conducted at a particular timeframe; thus, cross-sectional research was adopted. This research collected and refined data in a single stage that retained resources and time. One of the critical elements that have determined the adopted research design, strategy, and approach is the duration of the research. Moreover, a cross-sectional study was conducted because this research did not include experiments to understand better one of South African banks' and RPA's use for business continuity. Saunders et al. (2016) express that the time to study the phenomena is independent of the chosen research methodology. The cross-sectional approach involved the examination of an event at one specific timeframe to give a synopsis of the research results (Oates et al., 2022).

3.4. Data Collection and Participant Selection

3.4.1.1. Data Collection

Data collection for this research was semi-structured interviews with individuals involved in a South African bank's RPA, risk, and business (credit collections department). Saunders et al. (2016) affirm that theory can be utilised as a foundational indicator in the design and collection of research data. These semi-structured interviews were conducted virtually via Microsoft (MS) Teams. Semi-structured interviews include a specific level of flexibility in the discussions, even though the researcher organises a set of critical themes which need to alter the sequence of prearranged questions, including responses to concerns raised by the interviewees which were not part of the compiled themes (Oates et al., 2022). Since interviews were executed virtually, the researcher had to use numerous techniques to establish active participation and connection with research participants.

MS Teams digital recording was used to document interview discussions, with permission obtained from the participants. Conversations, interviews, and recordings are part of qualitative research and, with interpretive and evidence methods, make the world noticeable (Saunders et al., 2016). The researcher transcribed interview data, integrating it into an electronic matrix to execute data analysis where key themes were confirmed. In semi-structured interviews, the researcher formulated open-ended and closed-ended theme questions, enabling participants to disclose feelings, information, experiences, and emotions in the discussions, and exploratory data was collected (Oates et al., 2022; Rogers et al., 2011). Since RPA use for business continuity study is limited, literature regarding this topic did not give the researcher a comprehensive insight on the subject matter, nor can the researcher assume to have known or had in-depth information about this topic before data was collected. Derived from the main research question and the proposed conceptual framework, a degree of adaptability in the data collection through semi-structured interviews enabled the prospect of revealing information not already evident in the existing IS body of knowledge.

Regarding the valuable information obtained during interviews, most interviewees provided similar views regarding RPA use for business continuity that is helpful to the field of research. Appendix C includes a detailed blueprint of the research instrument, themes, and prearranged questions developed for the study.

3.4.2. Research Sampling and Participants Selection Method

Sampling is often used since it is impossible to research the whole population in this study. Considering that the research strategy for this research is a case study, appropriate participants were selected from the staff of the case site by sampling. Sampling is the method considered when choosing a group of a sample of the whole population to allow generalisation, observations, and statistical assumptions on the collected data for that population (Bhattacherjee, 2012). The sampling followed for this research was a purposive (non-probabilistic) sampling method. The purposive sampling method is suitable when the researcher knows the prospective participants who will likely give relevant and helpful information so that the intent of the research is met. Based on the research objective and research questions, the following primary sampling characteristics were pinpointed by the researcher:

- Participants had to be employed by Kaelo Bank for at least six months.
- Participants must have been exposed to RPA, risk, and business continuity, including Kaelo Bank's strategic intent.

This research sampling method was deemed suitable compared to the probabilistic sampling technique, where participants may have limited insights into RPA use, business continuity, and the bank's strategy. Participants were easily accessed as the same bank employs the researcher. Because of the limitations to the research in a single case site, the researcher targeted a limited number of participants; semi-structured interviews were limited to ten participants from the business (credit collections), risk, and RPA technical team because these roles have participated in and have knowledge about RPA, its use, business continuity, credit collection business processes, risk, and business continuity. Table 2 illustrates a list of the participants in the interview process. Pseudonyms were applied to protect participants' identities.

Participant	Role	Department including Main Function	Number of Years in the Bank
Participant A	Head: Automation Intelligence	IT (RPA Technical)	21
Participant B	Technical Lead: Intelligent Automation	IT (RPA Technical)	20
Participant C	Business Head: Intelligent Process Automation	Business (Credit Collection)	13
Participant D	Head: Business Segment	Business (Credit Collection)	20
Participant E	Head: Customer Experience	Business (Credit Collection)	19
Participant F	RPA Feature Analyst	IT (RPA Technical)	15
Participant G	RPA Technical Developer	IT (RPA Technical)	8
Participant H	RPA Business Analyst	IT (RPA Technical)	10
Participant I	Manager: Operational Risk	Risk (Operational Risk)	30
Participant J	Manager: Business Continuity Management	Risk (Business Continuity)	24

Table 2: List of Participants

Immediately after the participants accepted to be involved in the research, some time was arranged and booked in their calendars. The interview schedule was designed because the researcher intended to obtain as much information regarding the research phenomenon as possible, including presenting the research aim and objective. The interview schedule is included in Appendix C, where these were arranged into three components: Kaelo Bank (pseudo name), participants' background information, and RPA, as well as business continuity adoption questions. Participants were considered experts and had the opportunity to narrate and share their knowledge and experience. Moreover, participants could cover RPA adoption elements and its use of business continuity components that were not part of semi-structured questions. This aided the researcher in dealing with the likelihood of bias impacting the proposed TOE-TTF framework. The researcher has been exposed to both business and risk; therefore, she was able to be part of the discussions. This assisted the researcher in establishing communication and trust with the participants, thus, allowing participants to expand on their experiences without feeling pressurised or as if they were being evaluated (Oates et al., 2022). The researcher followed up on interesting discussions that unfolded in the interview.

The semi-structured approach provided versatility during the interviews regarding leading discussions derived from some participants' responses instead of the closed-ended interview approach. Selected participants (business, risk, and RPA technical team) who have been directly or indirectly involved in RPA adoption and its usage for business continuity were interviewed one-on-one. The duration of the interviews was 45 – 60 minutes, based on the availability of the participants. Follow-up interviews were scheduled so that further questions the researcher might have to address in the initial interviews were addressed. Also, the participants were sent follow-up emails to respond to additional queries. Because this is exploratory research, semi-structured interviews were conducted by employing themes and predetermined investigative questions while providing versatility in the sequence of the interactions (Oates et al., 2022). Due to coronavirus pandemic restrictions (for example, lockdown), participants were working from home; therefore, all interviews were conducted online via the bank's MS Teams platform.

3.4.3.Data Analysis Procedures

During the research, details of RPA use for business continuity were uncovered from the participants' viewpoint as opposed to an answer to the problem. The raw data collected by semi-structured interviews was examined predominantly employing qualitative data analysis. However, qualitative analysis was used, such as overall interview questions and response rate per interview question concept. According to Oates et al. (2022), qualitative data analysis indicates patterns and themes must be extracted from audibly, visually, and verbally collected data. This research adopted a thematic analysis process, in other words, a perusal of all data, coding drawing relevant themes, categories of these into classifications, for example, from raw data or existing theories, and establishing definitions of patterns so that the factors which influence RPA use for business continuity in a South African bank are considered. Also, it is not linked to any pre-existing theoretical framework regarding RPA use for business continuity.

The thematic analysis process is adopted for sizeable and smaller qualitative data files (Saunders et al., 2016). MS Excel Spreadsheet was applied to transcribe, scrutinise, and code data. Firstly, themes emerged from the elements of this research's proposed integrated conceptual model, while more concepts were also discovered. As anticipated by the researcher, the data analysis process was complex, laborious, and iterative. Transcribed data was copied into an MS Excel spreadsheet, themes were coded, and patterns were revealed. The following thematic framework techniques were implemented (Saunders et al., 2016):

- Scrutinised and understood participants' perspectives.
- Incorporated identical data outlined from the transcripts.
- Determined crucial patterns or themes for additional investigation.
- Enhanced and expanded the proposed conceptual framework derived from themes.
- Formed an opinion and established a conclusion.

This technique formed research findings and interpretations for answering the research questions verified with participants before the research report was concluded. The researcher deliberated on participants' knowledge, perceptions, and biases throughout the data analysis step to prevent unforeseen data misinformation. Therefore, it is critical to have techniques that can be utilised to examine research quality. Bhattacherjee (2012) believes that interpretive research studies illustrate social reality and intend to explain social reality with a subjective perspective. Reliability and validity concepts in interpretive research are not intended for examining research quality. Analysis and examination were based on the notes from the interviews. These transcripts were viewed as a foundation to construct valuable analysis illustrations. Interview data was documented, analysed, and condensed in a format that provides common themes from responses obtained from participants.

3.5. Research Quality

Research quality was considered throughout the study, including attributes aligned with interpretive validity, trustworthiness, and reliability. The most claimed quality of the research for qualitative study was established by researchers such as Lincoln et al. (2018). These researchers recommend four critical principles that are applied to evaluate the quality of qualitative research: transferability, confirmability, credibility, and dependability. These are shown in Table 3.

Principle	Description and suggestions for assessment
Transferability	Transferability is the level at which qualitative research outcomes are transferred or generalised to other conditions (Lincoln et al., 2018). Thus, transferability is not generalisability; it means the capability to demonstrate that the research findings can be employed in other perspectives. From a qualitative viewpoint, transferability improves the research where the researcher identifies the context and principles that were vocal points of the research. The researcher needs detailed information and broad explanations of all information implemented in their study so that the research can be transferable to other viewpoints, people, settings, and times (Oates et al., 2022). This was

	presented by confirming that solid interpretations were given, in-depth records, views of the case study, and phenomena being studied. The researcher was satisfied that this study is transferable to other conditions, times, perspectives, and people.
Confirmability	According to Lincoln et al. (2018), confirmability is the level to which the research has been formed by participants, not by the researcher's influence. The research must be presented accurately, and the reader must clearly and efficiently understand the discussion. This was articulated by ensuring an analytical flow of information from the reviewed literature and conceptual framework through research instruments, coding and assessment of results, demonstration of research results, limitations, and contributions. The researcher attempted to verify that the argument was logical and clearly understood by the reader by including commentary from the research supervisor and arranging the study drawing from developing themes. Furthermore, the researcher gathered raw audio recordings from all interviews, maintained transcripts, and performed data analysis in MS Excel Spreadsheet and PowerPoint. The research data talks for itself is traceable and not derived from the researcher's assumptions. Exploration of research data from interviews and participants and an in-depth assessment of the research procedure were conducted to ensure the confluence of evidence (Oates et al., 2022).
Credibility	Credibility is the conviction that the researcher has in the authenticity of their research findings (Oates et al., 2022). In the research, credibility details specific meanings of the research participants. The researcher must ensure that participants are involved in numerous circumstances and that data collection has reached saturation; otherwise, further study should be executed. The researcher spent time linking data collected during interviews to the reviewed literature. Also, the researcher connected the truth of participants' understanding of RPA adoption and its use for business continuity by obtaining the captured interview data and assessment thereof confirmed by participants.

Dependability	Oates et al. (2022) explain that dependability demonstrates that research findings and data stability included in the study are dependable. Also, Oates et al. (2022) affirm that an audit trail is utilised throughout the research process and that every stage of the study is articulated and recorded. The research process was documented and followed so that there is traceability in another similar perspective research providing a similar conclusion. The researcher ensured that an audit trail was maintained throughout the research process, and this is evident from the connections between each theme developed from the reviewed literature and conceptual framework to the research instrument, limitations, coding, depiction of research results, and contributions.

Table 3: Four Key Principles of Applying Research Quality

3.6. Challenges experienced during the research

Executing the research revealed one challenge, but it was mild and did not influence the reliability of the research. This issue includes that the South African bank underwent two organisational changes where some identified participants either resigned or moved to other departments. However, this did not impact the number of participants identified to partake in the research, as the researcher found other participants with the same designation as the ones initially selected.

3.7. Ethical Considerations

Ethical considerations in research are critical principles that influence what is right or wrong (Batterchejee, 2012). Because of the nature of the research in question, a case study, it was crucial to regard ethical implications. The research concentrated on one of the South African banks as a case study, and for ethical reasons, it was referenced as Kaelo Bank (pseudo name). Research ethical considerations are crucial for both the case study organisation and participants in this research. Thus, it was vital for the researcher to consider and mention research ethical considerations (Rosenthal, 1994). This was an interpretive research study; values and ethics play a crucial role because no group principles can be presumed to be critical compared to others (Rosenthal, 1994). Consequently, this research ascertained that participants' values were not compromised and were considered throughout the study. The selected participants were requested to partake voluntarily, and their informed consent was essential. Hence, all participants completed a consent form before the researcher started the interview process.

Confidentiality was assured and exercised in all research procedures, for example, data processing, and participants' right to privacy was upheld. Furthermore, pseudonyms were used throughout the research to protect the identity of the bank and participants. The researcher established confidentiality and privacy by ensuring that the organisation and participants' names were masked with pseudonyms and that data was fully protected (Oates et al., 2022). The original recordings and transcripts will not be submitted to protect the organisation's and participants' confidentiality and privacy.

Compliance with the university and case site requirements and regulations was assured. Research data was only utilised for research purposes and not adopted as a bias at participants' places of work or elsewhere. The researcher applied for ethical clearance before collecting data at the selected bank. Participants were also presented with a School of Business Ethics Committee clearance letter (Appendix A), supplied by the University of the Witwatersrand, clearance, and permission from the bank assuring them that the proper process was followed, and permission was granted. Based on ethical considerations set out by Batterchejee (2012), the researcher ensured that thorough information was provided to the participants on why, what, and how the study was being conducted. Before carrying out and during interviews, the researcher provided clear and full details about the study so that participants could familiarise themselves with the research and coverage in question. Participants were reminded of their right to withdraw from the research at any point throughout the research. Furthermore, the participants were also permitted to decline to respond to any research question they could or did not wish to answer.

Batterchejee (2012) claims that participants in the research process should understand that their participation is entirely voluntary and that they can withdraw from the study at any time. Throughout the interview process, participants were treated with the utmost respect. This study used a set of guidelines from Rosenthal (1994) to provide ethical quality throughout the qualitative case study. The researcher spent a fundamental amount of time throughout the master's degree growing both their technical and research skills, including credibility as a researcher. For example, while performing the study, the researcher complied with the requirements of the relevant IS professional code of conduct and the University of the Witwatersrand School of Business Ethics Committee. Data analysis and recording were completed without data exploitation and dropping. Data treatment and safekeeping followed South African regulations, for instance, the Protection of Private Information Act 4 of 2013, including the banks' terms and conditions. When reporting research results, the researcher looked for citations and misrepresenting findings, including self-censoring, while maintaining the organisation's and participants' confidentiality. The researcher has revealed accurate and truthful research results. Researchers have an ethical responsibility for how research data is disclosed and analysed in their research (Batterchejee, 2012). Overall, in this research, the researcher aimed to be objective and remain ethical and professional as required in the IS research discipline, including paying attention to not interfering with the rights of the university, bank, and participants. Because this is an interpretive study, understanding of the case site and participants and interpreting the several realities of participants, the researcher was consistently mindful of their positionality in this study, especially during data collection (for example, performing interview process) and analysis process so that the outcome of the study was unbiased. Advice from the research supervisor and peer review have helped the researcher become more self-aware about the research subject matter and process. The study followed ethical guidelines set out by Rosenthal (1994) so that ethical considerations are applied in the qualitative case study. The researcher followed applicable regulations set out by the School of Business Science Ethics Committee at Wits University and the IS professional code of conduct.

3.8. Summary Of Chapter

This chapter provided extensive standpoints of each of the layers of the research onion established by Saunders et al. (2016), where these were removed beginning with the far-off layer of the onion moving inside. Aspects discussed in detail include research paradigm, design, strategy, data collection, sampling methods, and participant selection. The research paradigm strategy, including the site and selection of participants, was articulated extensively, along with an outlook of the sampling methods and data collection. The data analysis process was then explained with a perspective of the coding approach adopted. Each chosen method was assessed and justified; connections were also drawn in the reviewed literature, proposed conceptual framework, research questions, and research instrument used in this study. Data analysis and thematic analysis techniques were also articulated. Ethical considerations were deliberated and justified using Rosenthal's (1994) and Bhattacherjee's (2012) principles.

CHAPTER 4: DATA ANALYSIS AND INTERPRETATION OF FINDINGS

4.1. Introduction

This chapter showcases the narrative and interpretation of the research. The data collected through the interview process is produced and examined, stemming from the themes developed from the analysis and conceptual framework (detailed in section 2.10). The themes summarised in this chapter form the foundation from which the research questions raised by the study will be addressed. A total of ten participants took part in the interview. Section 4.2 provides the participants' demographics. Section 4.3 depicts the interview questions profile and the response rate. The remainder of the sections, Sections 4.4 and 4.5, introduce the findings from the TOE framework, namely Technology, Organisation, and Environment features, including the TTF model, which is Task, Utilisation, Fit, and Performance impact features. A summary of the chapter is presented in Section 4.5.

4.2. Participant Demographics

In the early stages of the data collection process, the researcher requested permission from Kaelo Bank and then called potential participants, asking for their participation in the study. Even though the organisation was going through structural changes from the top to the bottom level and the participants' designations were changed along the way, identified participants were interested in participating in this study. A total number of ten (10) participants were interviewed for this study. With the participants, the researcher discussed the research's objective and approval received from the university and Kaelo Bank. Semi-structured interviews were carried out with experienced staff employed by Kaelo Bank. Participants' roles ranged from IT (RPA technical team), business (credit collections), and risk (operational risk and business continuity) involved in the adoption functioning, including overseeing risks and controls for RPA and business continuity operating at strategic and operational levels. The size of the sample was derived from the criterion saturation. This is where new data is not inclined to be found based on recurring concepts (Thompson & Walker, 1998).

The researcher allocated pseudonyms to each participant for confidentiality and privacy reasons. For confidentiality purposes, pseudonyms were adopted to label field notes and transcripts. Participants are referenced as follows:

- **Head: Automation Intelligence** (Participant A)
- **Technical Lead: Intelligent Automation** (Participant B)
- **Business Head: Intelligent Process** Automation (Participant C)
- **Head: Business Segment** (Participant D)
- **Head: Customer Experience** (Participant E)
- **RPA Feature Analyst** (Participant F)
- **RPA Technical Developer** (Participant G)
- **RPA Business Analyst** (Participant H)
- **Manager: Operational Risk** (Participant I)
- **Manager: Business Continuity Management (**Participant J)

While scrutinising participants' employment in the organisation, it was established that 50% (5 out of 10) were from the IT department, 30% (3 out of 10) were from business, and 20% (2 out of 10) were from the risk unit. Table 4 shows the ten participants based on multifaceted departments from credit collections, RPA technical team, and risk:

Participants	IT Participants (RPA Technical)	Business Participants (Credit Collections)	Risk Participants (Operational Risk Manager and Business Continuity Manager)	Total
Number	5	3	2	10
Percentage	50%	30%	20%	100%

Table 4: Participants By Business Function In The Bank

Additionally, the ten participants were portrayed by their representation in the bank. Participants in senior management were sufficiently presented, consisting of 7 out of 10 (70%). These seven participants comprise 2 RPA technical executives, three business (credit collections) executives, and two from risk. 3 out of 10 (30%) were from operational level. Table 5 displays a breakdown of ten participants and their representation in the bank, while Table 6 exhibits participants in the bank who are at the strategic level. This deconstruction regarding role grade indicates an appropriate illustration of RPA, risk, and business continuity in various roles in the bank.

Participants	Strategic	Operational	Total
Number	7	3	10
Percentage	70%	30%	100%

Table 5: Participants By Representation In The Bank

Participants	IT (RPA Technical) Executives	Business (Credit Collections) Executives	Subject Matter Experts (SMEs) (Operational Risk and Business Continuity)	Total
Number	2	3	2	7

Table 6: Strategic (Executive) Levels of Participants In The Bank

In addition, participants were outlined based on the number of years of employment in the bank. When this was considered, the majority, 9 out of 10 participants (90%), had more than ten years of experience with Kaelo Bank. Only 1 participant (Participant G) has been with the bank for eight years. Table 7 shows the list of participants and their tenure in the bank.

Participant	Number of Years in the Bank
Participant A	21
Participant B	20
Participant C	13
Participant D	20
Participant E	19
Participant F	15
Participant G	08
Participant H	10
Participant I	30
Participant J	24

Table 7: Participants and Tenure In The Bank

There were 8 out of 10 (80%) with over ten years of experience, while those participants with 8 to 10 years of experience were made up of 2 out of 10 (20%). With the experience and skill that the participants have, participants were deemed suitable for this research. Table 8 analyses the number of years of employment participants have been employed by the bank.

Participants were also described by the experience that they had in RPA. Most participants (90%) have between 6 and 25 years of experience in RPA and business continuity, while one participant (10%) has RPA and business continuity experience ranging between 6 and 10 years, as shown in Table 8. Therefore, all the participants chosen for the study were deemed appropriate for this research as they have enough banking experience and have explored RPA adoption and understanding of business continuity.

Estimated number of years in the bank	Number of participants	Percentage of participants
0-5	0	0%
6 - 10	2	20%
11 - 15	2	20%
16 - 20	3	30%
21 - 25	2	20%
25+	1	10%

Table 8: Participants By Number Of Years Of Employment In The Bank

In summary, the participants' attributes mentioned above demonstrate that the sample of this research provides a suitable illustration of RPA adoption and its use for business continuity collaborators in business, RPA technical, and risk departments. Senior management, that is, executives, provided a more comprehensive perspective of the bank's strategic view on RPA and business continuity compared to participants operating at the operational level of RPA and business continuity, and the participants were the target audience. All participants are employed in a South African bank with over 30,000 staff. The average experience of the sample group was between eight and thirty years. The sample was predominately comprised of staff members who have been in the South African bank for over ten years, which was by the targeted population with the appropriate experience aligned and determining RPA adoption, risk, and business continuity in this specific bank.

4.3. Interview Questions Profile and Response Rate

The interview questions were split into three components, as depicted in Appendix C (interview schedule). Overall, 11 out of 42 (26%) interview questions have been allocated to the background, with 6 out of 42 (14%) allocated to South African bank background and 7 out of 42 (16%) assigned to the participant's demographic background. The research comprised 42 questions, 29 out of 42 (69%) questions dedicated to the main interview questions formulated from the research question and objectives.

Of all the main research questions posed to business, RPA technical, and risk participants, there was a 100% response rate, meaning all ten participants answered all the questions asked. The overall tolerable response rate was 100%. Therefore, the researcher considered this exceptional. Table 9 below outlines the divided interview questions.

Segment	Number of main research questions	Number of questions with 100% responses	Tolerable response rate (%)
Part 1: Background of Participants	7	7	100%
Part 2: South African Bank's Background	6	6	100%
Part 3: Main Interview Questions	29	29	100%
Total	**42**	**42**	**100%**

Table 9: Overall Interview Questions and Response Rate

The response rate in Part 3: The main interview questions have been split according to the proposed conceptual TOE-TTF framework. A list of interview questions, related factors from the conceptual framework from where these questions were developed, and the clearly defined research questions on which these interview questions attempted to collect information is depicted in Appendix C – Research Instrument. During the research, the researcher observed that participants responded effortlessly to the interview questions as these were relevant to their day-to-day bank operations and referred to their experience with RPA, risk, and business continuity. Thus, the semi-structured interview questions asked the participants were deemed relevant for this research.

4.4. Analysis of Qualitative Data

The research analysis was carried out using thematic analysis. Themes were determined by classifying the criteria more closely connected to the research questions and models (Braun & Clarke, 2006). The requirements included describing and collapsing similar characters into more and single detailed blueprints, which were grouped based on factors of the TOE and TTF frameworks. Thus, the study did not intend to extend, prove, or discredit the framework but instead to construct and classify the research study adopting the TOE and TTF framework as a lens. The qualitative data in the four sections are derived from technology, organisation and environment, and task-technology fit features. The leading themes and sub-themes that developed are documented in Table 10.

Technology	RPA Benefits
	Compatibility
	Complexity (RPA build and development)
	RPA Business Process Selection
	RPA support, maintenance, and monitoring
	Availability and Stability of RPA
Organisation	Vision
	Strategy
	Top Management Support
	Size
	Skills and Experience
	Collaboration between business, RPA technical and risk
	Business-led initiative

Environment	Competitive Pressure
	Customer Satisfaction
	Regulatory Requirements
	Third-Party Support
Task-Technology Fit	Task suitability for RPA
	RPA fit for the bank
	Use of RPA Technology
	Performance Impact provided by RPA

Table 10: Key Themes and Sub-Themes

Furthermore, Figure 10 showcases the main themes and sub-themes aligned with the research questions.

Figure 10: Main Themes and Sub-Themes Aligned To The Research Questions

The organisational feature was the most quoted factor and is the influential theme in the study. RPA benefits were the most discussed sub-theme, considering it is a developing technology and no new themes developed from follow-up interviews. The sections below include the report analysed using the TOE and TTF framework features.

4.4.1.Findings Related to Technology Feature

This section depicts technological elements at the bank's level in South Africa, including RPA benefits, complexity, and compatibility. Based on the reviewed literature, these are critical for RPA use for business continuity. Over and above that, three new sub-themes emanated as the consequences of the interview data that positively influenced the bank's use of RPA for business continuity. The following discussion introduces findings correlating to each sub-theme comprehensively.

- *RPA Benefits*

The results of the qualitative data analysis demonstrate RPA's advantages, and all ten participants were aware of the benefits RPA delivers. Rawashdeh et al. (2022) and Tew (2019) confirm that RPA adoption is one of the aspects of new technology, such as RPA, that may cause quicker and easier adoption. Also, Tew (2019) explains the benefits of RPA in his study, which aligned with the feedback from participants interviewed in this study, meaning that there is consistency with the literature reviewed. The benefits stated by the participants included return on investment, better customer service, cost reduction, usage for business continuity, consistency of quality, and increased efficiency. In the discussions held, using business continuity for RPA provided better customer service, and they were noted as the most emphasised. This indicated that RPA benefit was an influential element for the bank to adopt RPA. For example, Participants A, D, E, and J commented that RPA enabled the bank to have better customer satisfaction.

Participant A confirmed, *"The bank is currently on the digital journey, and RPA adoption supports this journey. I look at my business area as 'entrepreneurs' of the bank as we are bringing in technology to improve what is currently available so that we can service our customers better. RPA assists us in streamlining business processes, using it for business continuity and improving customer experience. Since RPA is available 24/7, it gives us business continuity to always service our customers."*

Participant D posited, *"Exceptional customer service, cost reduction, availability 24/7, and increased profits are some benefits gained from deploying RPA*."

This was similar to the viewpoint expressed by Participant E, *"The bank is clear in terms of digital journey adoption, and RPA is one of those technologies that have been adopted to automate and streamline business processes by providing customers with a seamless experience. Providing customer services is key for us, and with RPA implementation, we can ensure continuity."*

"Frees up resources so that they can focus on meaningful tasks, increased productivity, increased customer service, and increased profits – the adoption of RPA is aligned to the bank's strategic intent, and these mentioned benefits are included as part of the bank's 2025 ambitions. One of the most important strategic intents of the bank is to be always available even when we are in a crisis; RPA adoption allows continuity of our services to customers", raised by Participant J.

- *Compatibility*

The findings indicate that RPA software bots were compatible with the bank's current and available IT systems. It was articulated by the participants concerning the adaptability to the current bank's technologies, business values, and potential requirements. All participants specified that utilising RPA is compatible with and could be integrated with the existing bank's IT infrastructure and systems. They also noted a concern that the bank is facing when it comes to legacy core banking systems. Additionally, 100% of the participants declared that RPA compatibility was perceived to be aligned with the current legacy decommission programme, such as end-of-life and end-of-support, which the bank has stated. Lamberton et al. (2017) and Wang et al. (2016) attest that it is crucial to consider if the new technology is compatible with the existing organisation processes and systems.

The RPA use must align with the bank's IT infrastructure requirements. It is critical to consider if the new technology, such as RPA, will be compatible with the existing organisation processes and systems (Wang et al., 2016), and high compatibility allows for new technology to be adopted (Lamberton et al., 2017). Thus, organisations are more willing to use RPA if they believe it fits and meets their requirements and strategy. As an illustration in this research, Participant A affirmed that:
"Majority of the legacy systems are mainframe-based, which is challenging to automate as we cannot incorporate the most robust tools to our availability, or we are simply advised that automation is not allowed. Fortunately, many of our systems are being moved to the cloud. If a bot performs a task on a mainframe legacy system that is becoming cloud-based, an amendment to the current code is requested and adapted to the new interface, which is done easily and compatible with the RPA software bot."

"Even though the bank has a legacy system, RPA development and implementation is not taking place in legacy systems which are about to be decommissioned. Besides that, RPA is an easy tool to learn and integrate into the existing bank's IT platform. These legacy systems were built at the inception of the bank and are expensive to integrate and maintain", said Participant B.

Participant D stated, "*Legacy systems are a serious issue in the bank. They impact the bank's digital strategy growth, negatively impact customer experience, and, to a certain extent, RPA efficiency. RPA software bots cannot change existing outdated systems. However, it can assist by giving us a couple more years as a bank before replacing a legacy system, which cannot be prolonged. As the technical team, we do not implement RPA in the IT infrastructure near the end of life and support.*

We work closely with the bank's IT infrastructure team to understand legacy systems, including the infrastructure, and we would instead not build RPA on these systems. We would rather wait and work together with business regarding holding off the rollout of the bot."

Participant F pointed out, *"Even though legacy systems are a major obstacle for our organisation as we have embarked on the digital journey. However, we work with the rest of the Group IT team to understand the legacy landscape, including decommissioning these systems to make the new and old integration seamless."*

Participant G stated*, "Legacy core banking systems are a concern in the bank. All hands are on deck to ensure that existing technologies are integrated as we build new technologies such as RPA."*

- *Complexity (RPA Build and Deployment)*

Some studies have discovered a connection between the complexity of the IT infrastructure and RPA adoption (Singh et al., 2017). In this study, the complexity of the existing IT infrastructure positively influences the bank to use RPA. As noted by participants, RPA complexity was discovered to be another factor that influences RPA adoption. All ten participants observed RPA as a less complicated, flexible solution that is easy to build. For instance, Participant A affirmed that *"RPA is a flexible solution which functions well with any process. RPA meets evolving business requirements, making it a suitable solution for automating business processes in the bank and using it for business continuity as we are exposed to disruptions. Therefore, with RPA being an adaptable solution, it is easy to build and deploy with other systems in the bank. RPA can meet the bank's changing needs, including the legacy systems currently being used."*

"RPA is easy to understand, build, and use and does not take long to configure and build. This technology does not require the team to have any previous programming skills", Participant B added.

Participant G posited*, " Compared to other application systems which need to be built in the bank, RPA is not complicated to work on, including incorporating it in the bank's IT infrastructure."*

"Building and working on RPA is easy. It takes us only a short time to build the bots." Participant H posed.

Several studies on new technology adoption indicate the role of technology compatibility in RPA adoption (Borgman et al., 2013; Chiu et al., 2017; Ghobakhloo & Hong Tang, 2013; Priambodo et al., 2021). Thus, this is in alignment with the findings of this research.

- *RPA Business Process Selection*

RPA business process selection was identified as another critical factor influencing the RPA adoption decision. It was revealed that it was essential to identify appropriate business processes to automate through RPA to gain a competitive edge and measure return on investment. This was the case for all participants. Also, all ten participants confirmed that before any business processes were automated using RPA, relevant business stakeholders identified and selected these appropriate processes before the RPA technical and risk teams got involved. According to Tew (2019), banks need to identify suitable business processes that need to be automated by RPA. Furthermore, suitable processes can manage exceptions and report on issues that the process experienced during execution (Tew, 2019). This is in alignment with the findings of this factor.

For instance, Participant B indicated, *"Selection of suitable business processes to be automated by RPA is key. Before a business process is automated, the business identifies processes that need to be automated. Then, the RPA business analyst and developer work with business and various subject-matter experts such as legal, operational, business continuity, compliance, technology, and information risks and provide sign-off. Then RPA development and rigorous testing occur before migrating RPA software robot to the production environment*."

In addition to previously mentioned comments, business processes considered unsuitable for RPA were not automated. *"Repetitive, rule-based, and manual business processes are deemed suitable to be automated RPA*", Participant D pointed out.

Participant E highlighted*, "As a business, we look at all the business processes and decide which ones are suitable and need to be automated. We work with all involved from RPA technical and risk teams, and before RPA development takes place, we need to be comfortable with the analysis, and our risk partners also provide sign-off."*

Compatible with the views shared by Participants B, D, and E, Participant A echoed the same sentiments concerning the fact that businesses steered the selection of processes that were required to be automated and influenced the adoption of RPA. Business stakeholders were responsible for highlighting and choosing processes that needed to be automated by RPA.

Participant A stated, *"Business drive their agenda and strategies, and they prioritise processes they want to automate. Businesses take ownership of automated processes; therefore, this is business-led."*

- *Stability and Availability of RPA*

Keeping RPA services smoothly operational is always challenging since several issues may lead to RPA's slow response and unavailability. With proactive monitoring measures in place regarding RPA and the availability of RPA, these were perceived as essential elements that impacted the bank's decision to adopt this new technology.

All participants indicated that the repercussions for the bank are huge when RPA software bots are unstable and down. These include irate customers and financial and reputational loss to the bank. RPA success relies on the process's stability and configuration (Tew, 2019). RPA automation will only be successful if the IT infrastructure and processes are stable (Rutaganda et al., 2017).

"Our bots are built based on a benefit calculation; we aim to build the bots as robust as possible to minimise maintenance that eats away at the benefit. The more the bot breaks, the less feasible it becomes and will ultimately be rebuilt or decommissioned. When RPA bots happen to be a problem as the process speed and volumes tend to slow the platform down, we pause the bot job, clear out what anomalies in the RPA bot, and rerun the job", as maintained by Participant A.

Participant B stressed, "*RPA software bots are built to be robust and continuously monitored to manage slow response and breakdown proactively. We cannot afford to have our RPA software bots unavailable. So far, the bots have been stable."*

Participants C, D, and E affirmed*, "RPA software bots have been stable, and no failures have been reported thus far." "We are happy with the stability of the bots." "I am unaware of any RPA failures since we embarked on this journey."*

Regarding the availability of RPA recovery strategy and the fact that there have been instances where RPA had been restored within the agreed recovery time objective, 100% of the participants highlighted that service level agreements (SLA) were in place between business and RPA technical team; and for that business revert to manual processes. For example, Participant B emphasised that 24 to 72 hours operational level agreements between the business and RPA technical team have been established, and the business may fall back to a manual workaround should the SLA be missed.

"SLA between business and RPA technical team is 24 hours to 3 days. Should the SLA not be met, the business is informed so that they can revert to manual business processes", attested Participant B.

In agreement with Participant B, other participants, such as G and H, shared the same standpoints. Participant H maintained that *"The team is given 24 hours to attempt to the bug fixes and resolving the issues experienced, after which business is requested to use the fall-back plan (manual processes), which means reverting to the old manual processed until the bots are functional and can resume processing."*

- *RPA Maintenance, Support and Monitoring*

The findings of this study revealed that for RPA software bots to be constantly available, proactive monitoring was vital, as well as necessary and available maintenance and support to influence the adoption of this technology.

Establishing a fundamental RPA infrastructure capability to promote adequate ongoing support, monitoring, maintenance, and risk strategy is crucial (Rawashdeh et al., 2022). A vast majority, 90% of the participants, indicated that the performance of RPA was monitored continuously and proactively by the RPA technical team. Also, the RPA technical team investigated and provided necessary support to businesses when there were anomalies. For instance, Participant E suggested, *"The RPA technical team have created dashboards to monitor RPA performance proactively. Any anomalies are raised, and the technical team ensures these are resolved before business contact us*."

Participant B specified, "*RPA bots are monitored remotely by the RPA bot manager, and there is a live feed into Splunk (RPA performance monitoring tool) to monitor the performance and provide results where there are anomalies; we investigate and manually rerun the jobs. Splunk can resume jobs and trigger new automation when the RPA bot is slow."*

"RPA bot manager monitors RPA software performance and works closely with the RPA technical team so that issues raised are investigated and resolved. Where the RPA technical team does not meet SLAs with business, business is informed", as affirmed by Participant G.

This was further affirmed by Participant H, "*We have built-in exceptions that send through notifications to the RPA developer/bot manager should the bot encounter any challenges; we also have Splunk, which monitors the heartbeat of the bot and can indicate should the bot be offline and has not processed anything for that particular day. Any unsuccessful jobs are rerun."*

Participant C posited*, "When RPA performance issues are experienced where RPA is slow and unavailable, the RPA technical team informs us, and we can revert to manual processes while they investigate and fix the problem."*

On the other hand, 1 out of 10 (10%) participants (Participant D) declared that improvement was needed as far as RPA bots monitoring was concerned. *"Even though RPA bots are monitored, there could be improvement regarding this",* Participant D noted.

In summary, these results noted in the technology feature provide crucial insights into the role of technology elements in using RPA for business continuity. This research stage established that the technology context was essential to understand the decision for the South African bank to roll out RPA and utilise it for business continuity. The influential determinants include (i) RPA advantage, (ii) compatibility, and (iii) complexity (RPA build and deployment). Furthermore, other factors emerged from the data, including (iv) business process selection, v) stability and availability of RPA, and vi) RPA maintenance, support, and monitoring. The next component introduces the findings about the organisational characteristics.

4.4.2.Findings Related to Organisation Feature

As indicated earlier, this segment reflects on the findings regarding organisational features which were perceived to influence the use of RPA for business continuity in the bank. The organisation perspective was the determined theme, which included five main sub-themes: size, skills and experience, top management support, vision, and strategy. Two new sub-themes, namely collaboration between RPA technical, business, and Risk teams and business-led initiative, emerged from the interview data. These themes were pinpointed in the interview data and in line with what was identified in the literature. Each of the established sub-themes in the organisation feature is articulated in-depth in this section.

- *Size*

Previous research found that the organisation size impacted new technology adoption (Borgman et al., 2013; Lin et al., 2016; Nguyen & Petersen, 2017; Wang et al., 2016). The view was that larger organisations have more resources to explore new technologies, mitigate threats and risks, and implement new technologies (Borgman et al., 2013). Thus, understanding that the organisation's size is a crucial influence on adopting several technologies, the participants were requested to reflect on their organisation and department size in connection with RPA use and business continuity. Interestingly, size was not regarded as a drawback. The interview data findings showed that the bank's size enabled all participants to regard the importance of adopting RPA and business continuity. For instance, Participant D declared, *"… the size of the organisation impacts technology and business continuity adoption*."

"We are a large organisation with operational complexity with multiple operational processes that are manually intensive. The bank made a strategic and investment decision to adopt RPA software robots to support the desired automation, digital transformation, and overall cost efficiency", illustrated Participant I.

Similarly, 8 out of 10 (80%) participants confirmed that the size of the bank departments influences RPA adoption. It was reported in their viewpoints that the size of the bank impacted adoption; other business units in Kaelo Bank have adopted RPA; therefore, it has been adopted across the bank. For example, Participant B noted, *"Size of the organisation impacts the implementation of RPA. Other departments use RPA as they have seen the benefits*."

Participant D declared, *"Yes, the size of the organisation and business unit impact technology and business continuity adoption."*

"Other business units within the bank have embarked on the RPA journey and are aware of the benefits it brings, including providing business continuity for the bank", explained Participant E.

On the other hand, 2 out of 10 (20%) of the participants (Participants A and H) have a different view than the rest. They declared that the firm and department's size barely affect RPA adoption. For instance, Participant A said, *"Not so much the size of the business unit but more the number of processes and volumes that are required to be processed considering the complexity of the processes."*

Participant H also stated*, "I have not encountered any challenges to adoption based on the size of the business unit we support."*

- *RPA Skills and Experience*

The literature cites cases where banks use external training organisations to adapt to existing technical teams so that these existing teams can acquire RPA technology, build know-how and begin to develop their automated functions that are prevalent in the banking sector (Lacity et al., 2017; Tew, 2019). Regarding the impact of required RPA experience and skills, all participants were found to have the same viewpoints about the influence of this organisational element on RPA adoption. All ten participants revealed the significance of the readiness, which ensured that the RPA technical team was adequately skilled. Rigor training interventions applied by Kaelo Bank for RPA adoption readiness comprised continuous self-upskilling, attendance of webinars, conferences, and bespoke training. For example, Participant A denoted that there was a competitive RPA programme.

"A candidate must be a certified 'citizen developer' before implementing bots or being involved in the automation of business processes. We have a competitive RPA programme in place. Ongoing training needs to be completed to stay relevant in the field, either with new technologies or upgrades to current ones. Training interventions are in place for all our technical team", pointed out Participant A.

Moreover, Participants B, H, and I detailed the training interventions in place to ascertain that the RPA technical team was skilled and knowledgeable as follows:
"There is a rigorous programme for staff interested in joining the RPA technical need to follow. When staff applies for this programme, skills and experience are considered. Potential candidates undergo the interview process, and an online exam must be taken and passed."

"Part of the exam includes identifying, building, testing, and showcasing the final product to the RPA technical leadership. Training interventions are also in place, facilitated by one of the RPA service providers, Work Fusion. Regular upskilling and cross-skilling take place between teams."

"RPA technical team have a training path that the bank has put in place to ensure they have the necessary skills to deal with most of the challenges they may face in the RPA space. An example of the training would be the Work Fusion citizen developer programme and the Microsoft citizen developer programme. These are prerequisites for a developer or feature analyst role in our team. We also have support from our in-house IT teams should the fixes require more extensive IT knowledge to resolve."

"The team are highly skilled and are subject to constant training and skills development, integration to business and upskilling of business sponsored staff to be accredited."

- *Top Management Support*

As Rawashdeh et al. (2022) attest, top management plays a critical role in new technology and should not be disregarded. In this study, there was general agreement amongst all ten participants that top management commitment and support influenced RPA adoption, including business continuity. The top management's role is to give leadership, direction, and support in adopting new technology (Rawashdeh et al., 2022). The viewpoints of all participants regarding top management support were consistent. This aligns with the research conducted by Gangwar et al. (2014), which shows a positive connection between management support and adopting new technology. All participants remarked that top management support, commitment, and involvement in RPA adoption and business continuity were crucial and evident in this bank. For example, Participant A detailed the support provided by the management as this:

"Top management in the bank have gone all out to adopt new technology, and RPA is one of such technologies. Business continuity of RPA is key as key business processes have been automated so that customers are always served, improving customer experience. This has allowed the rest of the bank to adopt this since the tone at the top has been set right from the beginning, making it easier for all involved at all levels as the message is consistent."

Additionally, Participant D confirmed that top leaders had supported RPA and business continuity adoption, *"With the influence and support of top leaders, we were able to adopt RPA and ensure that we rolled it out successfully, all risks about amongst others business disruption, legal, compliance, cyber, information, technology and people risk were considered. Necessary controls which were adequate and effective were put in place. The three lines of defense continuously manage, oversee, and monitor the controls."*

- *Strategy*

All ten participants revealed the importance of the strategy to ensure that Kaelo Bank has a digital strategy aligned to the bank's overall strategy so that set objectives were met. Thus, this influenced and enabled RPA adoption and its use for business continuity. Flechsig et al. (2021) argue that top management should determine how their organisation's current RPA state influences how and where RPA technologies can be established, including ascertaining reasons for doing technology differently. Thus, there is alignment with the response from participants and literature. The participants also confirmed that the bank perceived digital transformation, including RPA, as a strategic influencer that supported alignment between business and technology strategy. All participants stated that technology adoption, such as RPA and business continuity, was vital in the operation and existence of the bank.

For example, Participant A mentioned that "*Strategy is critical for the bank as it allows us to live through the always-on assertion and be able to service its customers. This also puts this bank at the forefront. One area where the focus has been in the bank is the digital journey, and RPA offers that. The bank has also embarked on ensuring that all business services are always available despite any disruption that may be experienced."*

This was further reported by Participant E, who indicated, "*The bank is clear in terms of its digital journey adoption, and RPA is one of those technologies that has been adopted to automate and streamline the business process by providing customers with seamless experience including that our services are always even when we are experiencing a disruption."*

"Even though the bank is going through operational transitions, the strategic drivers have not changed as one of its strategic priorities includes serving our customers, ensuring that we are always available, and adopting digital capabilities while doing that", Participant D said.

Additionally, Participant J confirmed, *"One of the bank's strategic intents is to transform customer experience through digitisation. RPA is one of those technological transformations that the bank has adopted.* B*usiness disruption risk is one of the key risks that the bank leadership prioritises as it impacts reputation and financial loss."*

- *Vision*

Technology adoption inception begins with a vision. The vision expresses what the organisation's leadership intends to achieve because of their predicted achievements. All ten participants have confirmed that digital transformation, which included RPA, was the bank's vision. Balasubramanian (2012) indicates a connection between vision and adopting new technology. The participants' feedback agrees with the literature. The participants agreed that the digital journey and business continuity were topical at various strategic levels, including risk and governance committees. This was aligned with the bank's business continuity strategy of ensuring that it continued with its operations even if there was a disruption and adoption of new technologies such as RPA for enhanced customer experience. Participants C, D, and E respectively elaborated on the manner that the digitisation journey was aligned to the bank's as follows:

"One of the bank's ambitions is the digital journey, and RPA offers the bank precisely that. This digital journey has the potential to deliver strategic values to the bank. RPA allows the bank to digitise manual processes to better service customers as the bank's priority is to integrate client experience, which is enabled by digitisation. It also brings in the element of business continuity, as we need to ensure that our bots are always available. This journey allows us to be at the forefront and be leaders as we provide our customers with exceptional experience." This was suggested by Participant D.

"This digital journey transforms customer experience so that we meet customer needs through digital capabilities. The digital capabilities should service customer needs, and the main one is ensuring that our services are always available", as confirmed by Participant E.

Participant I noted*, "The bank's key intent is to provide customers with an exceptional experience by digitising our processes with innovative technologies such as RPA. The adoption of RPA is no different from the bank's strategic and digital direction regarding the automation of critical business processes. This goal aligns with the bank's vision of putting the customer first in everything we do, including managing customer expectations."*

- *RPA is a business-led initiative*

Ten (100%) participants shared that RPA adoption and business continuity in Kaelo Bank were led and driven by business. They further confirmed that the business selected processes that needed to be automated. At the same time, the RPA technical and risk team provided them with the service to ensure this automation was successful. Lacity et al. (2017) attest that business operations lead to RPA adoption in practice; in other words, RPA is an operational asset that needs to be determined, run, and led by business process stakeholders. This has been evident in the feedback provided by participants, indicating an alignment with the literature. RPA was a business-led initiative because the businesses had a closer and better understanding of what their customers wanted and needed, as well as the fact that the RPA technical team built, deployed, supported, and maintained the RPA solution to ascertain that value was delivered. For example, business continuity, technology, information, and compliance risks were effectively managed. For instance, this was reiterated in the discussions held with Participant A who stated that:

"We are not responsible for determining business processes that need to be automated; business stakeholders do that as they own the business. We help them to build, support, and monitor these RPA software robots. They also need to ensure that they have controls to mitigate risks associated with business continuity; we (the RPA technical team and the rest of the bank's IT team) assist from the ITDR perspective as we are fully responsible for the IT component."

"We own the risk as our first line of defense, and we need to ensure that they are adequate and effective, including owning and managing risk daily. We work hand-in-hand with our business partners regarding any initiative, including automation of our business processes by RPA. We led this initiative, and the RPA technical team does not build any RPA bots without us", noted Participant D.

Participant J confirmed, *"Yes, business leads this journey by identifying processes that need to be automated and ensuring that controls are in place to manage all operational risks, including business continuity. Our Group IT does the work, and risk provides the second line of defense. Businesses are the first line of defense and work closely with the RPA technical team, while the risk is the second line of defense as they oversee risk, control, and compliance."*

- *Business, RPA Technical, and Risk Team Collaboration*

Regarding the influence of partnership between the business, RPA technical, and Risk team, all participants agreed that the success of the RPA adoption and business continuity was a collaborative ambition. Furthermore, once the business has identified processes that need to be automated, relevant risk stakeholders are involved and provide sign-off. Where RPA software bots were slow or down, business and risk were informed accordingly. Therefore, collaboration between the business, RPA technical, and Risk team impacted RPA adoption and its use for business continuity. In order to aid in determining suitable business processes to be automated by RPA, several organisations have internally established decision aids, for instance, scorecards and business case templates, so that these are used when business, technical, process owners, and risk teams collaborate on screening of processes and risks takes place (Kokina & Blanchette, 2019).

Business process stakeholders lead RPA adoption so that technology, process efficiency, and process subject matter experts provide input in the process and build of this technology (Lacity et al., 2017). This is further evidenced by Rutaganda et al. (2017), who argue that appropriate collaboration and alignment between business and relevant stakeholders provide a better understanding of suitable processes that need to be automated, consequently allowing the quick introduction of RPA bots. Based on the participants' feedback, this aligns with the reviewed literature. For example, Participant B attested that a process assessment is in place that is followed by all stakeholders from the business, RPA technical, and Risk team so that RPA software bots are effective and meet business requirements. *"We cannot develop any RPA software bot without discussing the business process with the impacted business stakeholders, including our Risk partners, because there is a process assessment we need to follow. All the parties involved are aware of this assessment requirement."*

This is further supported by Participant D, *"We as business lead the automation conversation. We need to know which processes we are automating, then work directly with the RPA technical team who kick off the process assessment and involve all the relevant Risk subject-matter experts (SMEs). There is a sense of collaboration between us (business), RPA technical, and Risk teams – one cannot do without the other."*

Participant I emphasised, *"All Risk SMEs need to be involved in the process assessment and provide sign-off. The business must also sign off RPA documentation before project lifecycle phases start."*

In summary, the research identified that the organisation viewpoint illustrated a critical part of exploring and understanding elements that influence the use of RPA for business continuity by Kaelo Bank. The influential elements regarding this context include (i) size, (ii) vision, (iii) strategy, (iv) top management support, and (v) skills and experience. Moreover, (vi) RPA is a business-led initiative, and (vii) collaboration between business, RPA technical, and risk teams emerged as new influential features from interview data.

4.4.3.Findings Related to Environment Feature

Together with the technology and organisation viewpoints, the environment feature forms part of the TOE framework. This theme consists of four subthemes: competitive pressure, regulatory requirements, external third-party RPA support, and one emerging sub-theme, customer satisfaction, which unfolded during interview data.

- *Competitive Pressure*

Based on the participants' positive responses, this research confirms competitive pressures in the South African bank. Previous studies (Rawashdeh et al., 2022; Siderska, 2021; Wang et al., 2016) discovered that competitive pressure influences new technology. This denotes that when Kaelo Bank embarked on a digital journey like RPA, other competing South African banks felt pressure and were forced to adopt the same technology.

Regarding the impact of competitive pressure on RPA adoption, all participants expressed complete opinions concerning the fact that competitive edge impacted Kaelo Bank's decision to consider the adoption of RPA and its use for business continuity. Thus, during the interviews, the ten participants perceived competitive pressure as a critical reason to adopt and accept RPA. In particular, Participant D indicated that Kaelo Bank operates in a competitive sector, and modern technologies are required for banks to remain competitive, relevant, and sustainable.

"*Kaelo Bank is part of the sector that is competitive and needs to adopt new technologies such as RPA and digitisation to remain relevant, sustainable, and have a competitive edge*", revealed Participant D.

On the other hand, 7 out of 10 (70%) participants (Participants B, D, E, F, H, I, J) reported competitive pressure for the bank to adopt recent technologies such as RPA and utilise it for business continuity. For instance, Participant I illustrated that *"RPA software bots are widely used in the financial services industry within the big four banks and smaller competitor banks, giving us the competitive edge, we need. I am also aware of RPA being used by our outsourced third parties in the Credit Collections operational areas*."

However, concerning other competitors using RPA to gain a competitive edge, nine participants confirmed that they were aware of other banks that have successfully adopted RPA. For instance, Participant A said, *"Other banks have adopted RPA to provide their customers with a better experience by serving them better and quicker."*

Participant F shared the same views and concurred, "*We have competitor banks in SA which are making headway in the automation industry."*

The connection between competitive pressure and RPA adoption was significant and supported by the literature.

- *External Vendor RPA Support*

In contrast to other technologies, for example, cloud computing, where firms work very closely with the external vendor for RPA support, this was different for Kaelo Bank. In other words, external vendor support did not influence the decision to adopt RPA. All ten participants highlighted that this element had no fundamental impact on the bank to adopt or not adopt RPA as software bots were built, maintained, and supported in-house. For example, Participant C declared that there was no external vendor RPA support; thus, RPA software bots were developed and supported internally by the RPA technical team. *"We do not have third-party development and support as our RPA software bots are in-house developed."*

This was further stressed by Participant B, who claimed, *"Our RPA software bots are in-house developed and maintained by our RPA technical team. Consequently, there is no reliance on third parties for support."*

"*Our bots are built and maintained in-house; thus, we have not outsourced this function to third parties*", maintained Participant H.

- *Regulatory Requirements*

Previous research found that regulatory requirements influence organisations to adopt new technology (Borgman et al., 2013). The assumption was that the current banking regulations and laws support adopting technologies, for instance, RPA (Borgman et al., 2013). No government or financial services rule restricts banks from adopting RPA software bots to perform operational functions. Regulatory requirements were deemed another critical feature that influenced the adoption of innovative technology. The findings reported by the participants varied slightly. 9 out of 10 (90%) confirmed they were aware of regulatory requirements for adopting and implementing an innovative technology such as RPA. One out of 10 (10%) indicated that he was unaware of this.

For instance, Participant C explained that there was a need to understand regulatory requirements when innovative technology adoption is considered by commenting, *"We need to compete with other banks for customers. Thus, we need to understand what the regulator requires us to do regarding controls regarding new technology adoption."*

Participant C further stressed, "*Yes, especially RPA relation to the processing and automating is identifiable information expressed by POPIA and the SARB. SARB issues guidance notes regularly regarding the need for financial services institutions to have adequate and effective controls when adopting new technologies such as RPA."*

"Since we are highly regulated, the regulator is involved in ensuring that we as banks remain competitive; thus, we need to adopt new technologies", said Participant E.

Participant I indicated, *"The South African Reserve Bank (SARB) monitors and regulates financial services institutions to ensure adequate and effective controls are incorporated when adopting new technology such as RPA. Also, with business continuity being one of the critical factors for operational Risk, banks must avoid experiencing any disruption. SARB regularly circulates guidance notes stipulating that banks should have resilience strategies in case a disruption is experienced."*

"SARB issues guidance notes regularly regarding the need for financial services institutions to have adequate and effective controls such as system resiliency and availability when adopting new technologies such as RPA", as suggested by Participant J.

Therefore, through participants' feedback, this research supported the previous studies' conclusions, implying a positive connection between new technology adoption and regulation.

Over and above this, the research revealed that 6 out of 10 (60%) participants were unfamiliar with the South African Reserve Bank (SARB) instructions concerning ensuring that the bank's systems are available. For instance, Participant F confirmed that he was unaware of the regulator's viewpoint regarding the financial services system availability and resilience by revealing, *"No, unfortunately, I do not know of any regulator's view when it comes to the resilience and availability of our systems."*

- *Customer Satisfaction*

Customer service ensures the best customer experience, which influences new technology; thus, one happy customer easily shares a positive experience with others, while one unhappy customer can damage the bank's reputation (Nguyen & Petersen, 2017). The interviews with the participants showed that RPA adoption and its use for business continuity positively influences and improves customer service. The findings of this study advise that customer satisfaction is an influential determinant for RPA adoption and its utilisation for business continuity. Siderska (2021) highlights that RPA ensures customer service is uncompromised and business-as-usual operational efficiencies are improved. All ten participants reported that the bank's decision to embrace RPA and ensure that the services are always available was directly influenced by the pressure to service customers better and effectively. For example, *"Absolutely. Automating our business processes through RPA has impacted how we positively serve our customers. "Automated business processes mean that customer services are always available. It is also important to have RPA software bots always available so that credit collection takes place timeously, accurately, and completely so that profits are increased",* as pointed out by Participant D.

Participant E indicated that *"Customer Experience is key in my business unit. RPA allows my business unit to streamline our processes and services always available as it ensures continuity and improves customer service. Thus, we expect RPA to always be available despite being in a crisis, slow or down. Also, it allows our staff to concentrate on more meaningful tasks and focus on resolving customer complaints."*

Compatible with the literature mentioned above, customer satisfaction is a critical concern for banks, and RPA provides customers with efficiency, speed, resilience, and accuracy (Kamat, 2019).

Overall, the findings displayed in this segment present critical insights into the environmental aspects of the RPA use for business continuity by the bank, and it suggests the impact of these antecedents to understand the decision made by Kaelo Bank to adopt RPA and use it for business continuity. The guiding characteristics applicable to this feature include (i) competitive pressure, (ii) regulatory requirements, and (iii) external vendor RPA support. Furthermore, one aspect emerged from the interview data, which is customer satisfaction.

4.4.4. Findings related to Task, Fit, Utilisation, and Performance Impact Features

This section provides the findings referenced to the TTF framework's task, fit, utilisation, and performance impact element theme. Drawn from the results of this theme, four sub-themes that influence the use of RPA for business continuity were discovered. New sub-themes were not noted as outcomes during the analysis of the interview data.

- *Task: Task suitability for RPA*

Kokina & Blanchette (2019) argue that suitability of tasks for RPA refers to tasks that are repetitive, rule-based, high-volume, mundane, and labour-intensive in digital design utilising numerous IT applications and systems are strong use cases for automation with RPA, including that if these processes are automated, operational costs are reduced. Task suitability for RPA was deemed a strong influence on adoption by the bank. All ten participants revealed that the business unit selected suitable business processes that need to be automated by RPA. For example, Participant B expanded, *"It is key for business to identify key processes that need to be automated as not all business processes are suitable for automation."*

"Business processes that interact with other IT application systems are especially appropriate to be automated by RPA, and several staff members repeat these business processes, and if automated, outcomes are visible when it comes to cost efficiency", shared Participant C.

Participant E elaborated in this manner:
"The essence of the business process influences its suitability for RPA. Common high-volume customer service requests in the credit collection department were identified for automation, for example, account closure, issuing paid-up letters, providing balance updates, and status accounts. These were identified as critical because they directly impact customer experience. If RPA bots are down, these processes are impacted, resulting in financial and reputational loss."

Overall, credit collection business processes prompt a ripe prospect for RPA. Although opportunities are substantial, organisations need to consider an assessment process so that the automation does not include unsuitable business processes (Rutaganda et al., 2017).

- *Fit: RPA fit for the bank*

RPA and task interaction must fit the organisation and each other to reduce cost and increase strategic value (Aydıner et al., 2023; Kokina & Blanchette, 2019). All ten participants also identified RPA fit as an essential component for RPA deployment. This factor refers to a good fit between the business processes that have been automated and RPA so that an improved performance is provided. Thus, there was a fit between RPA and the business processes. RPA adoption assists organisations in completing repetitive tasks, making RPA a good fit for the organisation (Aydıner et al., 2023).

For instance, Participant B specified, *"Because of RPA's benefits, it is a good fit for our bank. For RPA to succeed, identified business processes that need to be automated must be fit for the business unit and bank. Thus, it is ideal for functions covering high-level human data processing."*

"We are under much pressure to compete with other banks locally and internationally, and adopting new technologies is key to service customers better. Adopting technologies such as RPA provides the benefits, we need to have a positive mark in this industry. Since RPA automates business tasks and processes, business processes perfect for RPA are rule-based, repetitive, and high-volume functions. Also, it does not automatically fit all our processes; hence, we follow a rigorous approach to identify suitable processes", as detailed by Participant E.

- *Utilisation: Use of RPA Technology*

Utilisation held consistent use of the RPA (Kokina & Blanchette, 2019). Results of the scrutiny of the qualitative data of this study showed that all ten (100%) participants were knowledgeable about RPA and what it is used for, including the fact that it provides consistent automation processes. The use of RPA stated by participants, comprised of automation of mundane and repetitive business functions, allowed staff to focus on meaningful business activities, increased productivity, and improved customer satisfaction. They also indicated that this technology should always be available. Thus, this suggested that using RPA technology was an influential element for RPA adoption.

For instance, Participants A, C, E, and J commented that RPA is a technology that eliminates tedious functions, transforms how the bank works, and handles repetitive, manual, and high-volume business processes that humans previously carried out.

"RPA is used to automate tedious and mundane processes. The business unit must identify which processes must be automated to maximise efficiency. RPA works around the clock and is not expected to break down", Participant A raised.

Participant C remarked, *"RPA allows the bank to automate business processes. These processes that need to be automated are deemed mundane, rule-based, and labour-intensive. This software works around the clock without getting tired where efficiency is maximised."*

"RPA is used to automate repetitive functions. Common high-volume customer service requests are identified for automation, e.g., account closure, issuing paid-up letters, credit collection, providing balance updates, and status accounts. These were identified as critical as they directly impact customer experience. Robotic Process Automation is a tool that enables businesses to automate repetitive tasks used by the bank to the fullest to maximise efficiency. It assists with a reduction in errors and improves speed and quality. Business functions should always be available to satisfy business continuity", as stated by Participant E.

"RPA helps with business process automation, which lessens human intervention and thereby improves operational efficiency. The direct correlation is that business continuity and recovery depend on the effectiveness and relevance of the business process. Therefore, the impact or effectiveness of RPA is fundamental to business continuity, recovery, and stability of the system if correctly applied, " Participant J mentioned.

- *Performance Impact provided by RPA*

Organisations adopt RPA to improve efficiency, quality, and effectiveness so that there are returns on investments and improved customer experience (Kokina & Blanchette, 2019). All participants expressed that Kaelo Bank believes that the performance impact provided by RPA includes improved efficiency and satisfied customers. For instance, Participant E confirmed that "*Since we adopted RPA, we have been able to process out credit collection processes much faster. This has been noted at our various meetings as customer complaints have decreased."*

"Also, as our processes are automated, quality has improved, including the level of errors. Return on investments is key as RPA is adopted", said Participant C.

Participant D ascertained, *"The bank has decreased the credit collection processes since RPA was deployed, releasing staff from repetitive and mundane tasks. Customer experience has improved significantly, which is a plus for us and the bank. This is aligned with the bank's strategy. Return on investment can definitely be seen, thanks to RPA."*

"Customer service has improved drastically since the rollout of RPA. Staff conducting these repetitive functions now focus on other meaningful functions in the credit collection department. This has also improved customer experience", revealed by Participant E.

Participants G and H confirm, *"The bank's adoption and implementation of business continuity allows us to be always available and RPA to perform at its best capacity. This influences RPA performance as the bank's services are always available, and there is a connection between RPA performance and business continuity."*

To sum up, these results support critical perceptions in the fit and suitability aspects regarding the effective use of RPA for business continuity. Thus, fit and suitability were key areas to research so that the decision to adopt RPA and use it for business continuity is understood. These notable factors include (i) Use of RPA Technology, (ii) Task suitability for RPA, iii) RPA fit for the bank, and iv) Performance Impact provided by RPA. There were no additional components that emerged from the interview data.

4.5. Summary of Chapter

This chapter discussed the research analysis and findings from the research that explored factors influencing RPA use for business continuity in Kaelo Bank. The analysis was carried out with the lens of the TOE and TTF framework factors, with themes from the interview data associated with each feature, including the conceptual framework. Each section in this chapter is categorised based on the key themes. The next chapter discusses and interprets the results collected and pinpoints essential details.

The conclusion from the research was that there is a plethora of elements that are considered by the banks in South Africa when it comes to RPA use for business continuity. Different participants continuously cited crucial elements noted above and revolved around technology, organisation, environment, technology, fit, utilisation, performance impact, and task factors. New factors that emerged from the interview data include RPA stability and availability, RPA business process selection, business-led initiative, collaboration between RPA technical, business, and risk teams, customer satisfaction, as well as RPA maintenance, support, and monitoring were noted by the participants as influential in RPA use for business continuity. All the essential features referenced by the participants align with factors noted in the literature review executed at the start of the study in question. These are discussed in detail in the next chapter.

CHAPTER 5: DISCUSSIONS

5.1. Introduction

The findings in Chapter 4 are articulated in this chapter. This chapter aims to present a deliberation of the research findings based on the data collection and analysis. In other words, this chapter deliberates, interprets, and produces critical findings from the data showcased in the previous chapter. The chapter presents a reflection on the conceptual framework applied in this research. The researcher then recommends the revised conceptual framework developed from the insight from the data collected from the literature review and interview process. The findings are structured according to the features of the TOE and TTF framework. Furthermore, research questions and core research findings are revisited. This chapter undertakes an interpretation of the findings reported in Chapter 4. It clarifies the explanation of the results and correlates the findings of this research to the previously presented literature reported in Chapter 2.

5.2. Discussions

Overall, the study's results recommend that TOE and TTF are influential models to study the factors influencing RPA use for business continuity in the banking industry. They demonstrate the relevant meaning of several technological (compatibility, RPA advantage, RPA build and deployment (complexity), business process selection, RPA maintenance, support, and monitoring. As well as stability and availability of RPA), organisational (top management support, strategy, size, business-led initiative, vision, collaboration between business, RPA technical and risk team including skills and experience), in addition to that, environmental aspects (competitive pressure, regulatory requirements, external vendor RPA support and customer satisfaction) including fit (RPA fit for the bank), task (task suitability for RPA), utilisation (use of RPA technology) and performance impact provided by RPA factors are seen as critical predictors of RPA adoption and its usage for business continuity. The five sections articulate the results by focusing on each feature.

The results reflect that TOE and TTF factors are essential in this research, and the intent of the study in question has centred these features on predicting the effective use of RPA for business continuity in a South African bank setting. The deliberation of the findings is split into four components, with each segment articulating the results connected with a specific aspect.

5.3. Discussions of the findings related to Technology Feature

Section 4.4.1 revealed six technological features that participants deemed to influence RPA use for business continuity. Each element incorporating the three that emerged from the semi-structured interviews is discussed in detail in the following paragraphs.

- *RPA Benefits*

Based on the technology innovation adoption literature and current work on RPA use for business continuity (Baker, 2012; Chau et al., 2020; Daniels, 2020; Eze et al., 2019; Ekwealor, 2018; Gangwar et al., 2015; KPMG, 2020; Martin et al., 2012; Matikiti et al., 2018; Nga et al., 2017; Rawashdeh et al., 2022; The BankingScene, 2021; Valgaeren, 2019; Wang et al., 2016; Wojciechowska-Filipek, 2019); the most referenced factors are benefits that adopting of new technology such as RPA provide continuity of operations during a disruption, return on investments, operational efficiency and improved customer experience. This was in line with the revelations noted by the participants in the interview data. Similarly, Brás et al. (2023) confirm that automation such as RPA has been used for business continuity during disruptions such as the pandemic; thus, the results of this study corroborate with the reviewed literature. These findings may indicate that South African banks must be aware of the benefits RPA and business continuity bring to their organisations. This is further supported by the research conducted by Wojciechowska-Filipek (2019), who found that RPA assists banks in maintaining business continuity.

- *Complexity (RPA build and deployment)*

Complexity was highlighted in the literature as a critical feature which influences RPA adoption (Baker, 2012; Chau et al., 2020; Eze et al., 2019; Gangwar et al., 2015; Martin et al., 2012; Matikiti et al., 2018; Nga et al., 2017; Rawashdeh et al., 2022; Singh et al., 2017; Wang et al., 2016;). In the literature reviewed specifically for financial services, including banks, RPA is relatively cheaper and easier to roll out, build, and maintain. It can be made available quickly compared to large IT systems and other types of automation (Villar & Khan, 2021). It was noted throughout the interviews with participants that RPA is easy to learn, understand, build, and use and takes a shorter period to build. This technology does not require the team to have any previous programming skills. Also, Wang et al. (2016) verify that RPA is a computer-coded software which is easy to build. Based on the reviewed literature, in terms of specifically effective use of RPA for business continuity, specific academic research relating to this is limited.

- *Compatibility*

As noted from the interview data, Kaelo Bank continues to depend on legacy systems. This dependency of decommissioning legacy systems is a slow journey. This is because of the complications, potential risks, and threats of changing and adopting advanced technologies. RPA adoption introduces new vulnerabilities, risks, and threats that organisations must understand and remediate (Valgaeren, 2019). Regarding compatibility, the findings of this research indicate that this was one of the noted elements that influenced banks to adopt RPA. This agrees with the results of Chau et al. (2020), Lamberton et al. (2017), Nga et al. (2017), and Wang et al. (2016), which confirm that compatibility is a crucial aspect of technology adoption. From the participants' views, this finding has two potential rationales. Firstly, RPA software bots are integrated with existing legacy systems. However, participants confirmed that technological assessment was conducted before building new bots.

Thus, participants have confirmed that RPA development and implementation did not occur in legacy systems due to being decommissioned. Before building new bots, a rigorous process is in place to ascertain the end-of-life and end-of-support systems. Secondly, the participants confirmed that most of the bank's systems downtime was attributed to legacy systems; thus, a remediation plan for these systems is required. Also, there is a process regarding assessing legacy systems before any RPA software bots are built. Moodley (2022) declares that legacy systems are inefficient and slow, leading to the unavailability of banking services, which frustrates customers and eventually negatively impacts the bank's reputation and profit.

- *Selection of RPA Business Process*

This is a new attribute that emerged during the interviews with the participants. There is a validation in the literature review regarding selecting appropriate business processes that influence RPA effectiveness. According to Rutaganda et al. (2017), success in automation requires automated business processes to be suitable and well-defined. This was prevalent in the response from participants. Participants referenced that business (credit collection) identifies suitable business processes that need to be automated, and no RPA build was done before this involvement was thoroughly completed. Moreover, participants further stated that business drives their agenda and strategies, and they prioritise processes that they want to automate. The selection of appropriate business processes was referenced by all participants as a crucial attribute for the decision to adopt RPA.

- *RPA Maintenance, Support, and Monitoring*

During the interview, RPA maintenance, support, and monitoring were discovered to be another technology feature that influenced the effective use of RPA for business continuity. Also, the interview data confirmed that RPA maintenance, support, monitoring, and selecting appropriate business processes were required to keep services uninterrupted and available 24/7. RPA support, maintenance, and monitoring are critical so that the software bots functioning is not interrupted (Willcocks & Lacity, 2016).

The findings of research by Santos et al. (2019) and Stople & Steinsund (2017) demonstrate that RPA maintenance and support are the vital determinants of adoption. Chandra & Kumar (2018) confirm that RPA is a technology that should always be available with an automated concept of 24/7/365 availability; thus, RPA software bots are expected to function uninterruptedly without a break. Participants cited that RPA software is proactively monitored where there are anomalies; these are investigated, and jobs are rerun. Furthermore, service level agreements (SLAs) have been established between the business (credit collections) and RPA technical team so that RPA technical provides required services and business expectations are met. Moreover, participants said the business is informed when the RPA technical team fails to meet agreed SLAs.

Another possible elaboration for the importance of this element may be based on the fact that RPA technical skills and experience are optional when building, supporting, maintaining, and monitoring this technology.

- *Stability and Availability of RPA*

The availability of RPA, which transpired during the interview process, was a vital attribute influencing adoption by the South African bank. This finding is similar to a previous study into new technology adoption (Schuler & Gehring, 2019), citing that the notion of RPA being always available by larger organisations influences adoption; therefore, with Kaelo Bank being a large organisation, implementing RPA was not an indisputable decision. Albeit the literature demonstrates firm results regarding the impact of RPA availability on the adoption, participants' responses in this qualitative research provided corroboration on the impact of RPA availability. Rutaganda et al. (2017) attest that RPA requires a stable environment to process tasks effectively.

From the discussions above, three technology features were comprised in the initial conceptual framework (discussed in section 2.10.4).

5.4. Discussions of the findings related to Organisation Feature

As noted in section 4.4.2, this research revealed six organisational features that participants deemed to influence RPA use for business continuity. Each element incorporating the two that emerged from the semi-structured interviews is discussed comprehensively in the following paragraphs.

- *Size*

The connection between the adoption of innovative technology and the organisation's size has attracted the attention of information systems researchers (Nguyen & Petersen, 2017; Sun et al., 2016). In this research, the influence of the organisation size needed to be more conclusive. There are mixed results regarding the influence of size on this modern technology. Most of the findings of this study indicated that the size of the organisation and business unit was relatively easy to adopt RPA and use it for business continuity. In the first case, it was discovered that the size of the organisation and department was essential in the RPA adoption and use for business continuity. On the one hand, most participants noted no apparent connection between size and adoption of RPA. Sun et al. (2016) assert that the organisation's size unequivocally influences technology adoption.

Interestingly from another point of view, a small number of participants (20%) found that there is no fundamental significance that the size of the organisation and department impacts RPA implementation and its usage for business continuity. This was attested to in the research conducted by Nguyen & Petersen (2017), where organisation size was not viewed as positively influencing the adoption of e-business and internet technologies, and most participants perceived that size influences RPA adoption and its use for business continuity; this was viewed as a positive determinant in this research.

- *Top Management Support*

This research found top management support to be a pertinent component for the effective use of RPA for business continuity by Kaelo Bank. Similarly, a strong connection between top management support and information systems innovations has been researched in the information systems adoption literature. This result has been demonstrated by the findings of several previous research (Al-jabri & Sohail, 2012; Chau et al., 2020; Eze et al., 2019; Gangwar et al., 2014; Ghaleb et al., 2021; Matikiti et al.,2018; Musawa & Wahab, 2012; Wang et al., 2016) where top management support was crucial in defining new technology adoption. Moreover, this finding declares the results of Baker (2012) and Oliveira & Martins (2011), who reported that top leadership support is imperative in introducing new innovative technologies. Similarly, Järveläinen (2013) confirms that management support and commitment to ensure business continuity is prioritised in most organisations.

Senior management commitment and support were also noted as critical factors for the effectiveness of business continuity in this study. Consequently, this research indicates that top management support plays a significant role in using RPA for business continuity. Bharti (2020) indicates that RPA is used for business continuity during a disruption such as the pandemic, assisting organisations, including banks, in continuing business operations.

- *Strategy and Vision*

The findings of this research present that strategy and vision were crucial determinants influencing the bank's decision to adopt RPA and apply it for business continuity. In previous research, strategy and vision are critical influencers for technology adoption (Baker, 2012; Chau et al., 2020; Wang et al., 2016). For any adoption of an initiative in the organisation to begin, it is critical to start with a vision. There is a link between vision and technology adoption (Balasubramanian, 2012). It also aligns with the recent research by Wang et al. (2016), demonstrating that strategy and vision positively influence the adoption of recent technology such as RPA. According to Musawa & Wahab (2012), strategy has been noted as a critical variable influencing technology adoption. Furthermore, Wang et al. (2016) found that the organisation's strategy and vision positively influenced introducing innovative technology.

Consistent with this, risk exposure management, including business continuity as a control, is essential for the organisation's strategy and vision (Bakar et al., 2015). Wang et al. (2016) support the idea that the organisation's strategy influences the importance of business continuity. Therefore, the finding of this research illustrates that Kaelo Bank's strategy and vision positively influenced RPA adoption and its utilisation for business continuity.

- *Skills and Experience*

In the interviews with the participants, RPA skills and experience were critical in influencing Kaelo Bank's decision to use RPA for business continuity because the RPA technical team needs to be upskilled. This finding aligns with that noted by Low et al. (2011) and Rutaganda et al. (2017).

Alshamaila et al. (2013) research is in line with that of Chong et al. (2021), citing that having prior RPA skills and experience are essential determinants of adopting RPA. Manyika et al. (2017) declare that RPA skills competency impacts RPA technology adoption. This is because RPA is easy to develop, and the technical team does not need programming knowledge and skills; they need to know and understand business processes (Lacity & Willcocks, 2016). Furthermore, technology competence, such as training programmes, allows organisations to make decisions to adopt innovative technologies (Curran, 2017). Empirical research conducted by Picoto et al. (2014) categorises the concept of technological competence as a critical influential element in the decision to adopt. According to Low et al. (2011), technological competence is needed to manage these new technologies as recent technology (such as RPA) continues to disrupt sectors significantly. Thus, the result of this study depicted that prior RPA skills and experience were not critical factors when deciding to adopt RPA. However, it is noted that the RPA technical team needs continuous self-upskilling, involvement in conferences, and other training interventions provided externally and internally by the bank to remain relevant and competitive.

- *Collaboration between business, RPA technical, and risk team*

The analysis of the interview data shows that collaboration between the business (credit collection department), RPA technical, and risk team was found to be a critical feature that impacts RPA adoption and its use for business continuity. It is worth noting that interrelationships between staff, motivation, communication, support, and teamwork between business partners are essential for adopting innovative technology (Tornbohm & Dunie, 2017). The partnership between the business, RPA technical, and risk team was crucial when Kaelo Bank decided to adopt RPA and apply it for business continuity, which aligns with the research conducted by Tornbohm & Dunie (2017). Moreover, Willcocks & Lacity (2016) and Kokina & Blanchette (2019) reveal that good partnership between stakeholders is essential right from the start of the RPA software configuration. The interview data confirmed this.

- *RPA is a business-led initiative*

In the interviews, participants confirmed that the RPA journey is business-led. This was perceived as an essential determinant that impacts RPA adoption and its use for business continuity. This is because business units initiate the RPA journey by identifying processes that need to be automated, including the fact that they know the pain points in their business. Similarly, the role of business leading the RPA transformation is pertinent in adopting RPA. In the literature reviewed, there needs to be more research that addresses this determinant.

In summary, derived from the discussions mentioned above regarding the illustration of detailed results of the findings, the six organisational features were incorporated into the initial conceptual framework (discussed in section 2.10.4).

5.5. Discussions of the findings related to Environment Feature

As declared in section 4.4.3, four environmental elements were established by Kaelo Bank as key to the effective use of RPA for business continuity. Environmental features impact the adoption of innovative technologies (Oliveira & Martins, 2011). In this research, participants revealed that five environmental elements influenced the bank's decision to use RPA for business continuity. Three environmental components namely competitive pressure, regulatory requirements, and external vendor RPA support were evident in the reviewed literature, while one additional aspect, customer satisfaction, emerged in the interview data. External vendor RPA support was irrelevant as RPA software bots were built, maintained, and supported in-house. The results are explained in-depth in the subsequent subsections.

- *Competitive Pressure*

Competitive pressure is discussed in the literature as RPA is deployed for operational efficiencies (Stople & Streinsund, 2017). Participants cited that since Kaelo Bank is part of a competitive industry, RPA adoption and its use for business continuity gives the bank a competitive edge to remain relevant and stay ahead of its competitors. IS adoption literature has provided extensive empirical results (Awa et al., 2017; Chau et al., 2020; Chiu et al., 2017; Oliveira et al., 2014; Picoto et al., 2014). The empirical research executed by Oliveira et al. (2014) declares that organisations are steadily adopting new technologies to remain relevant and face competitive pressure from their competitors. Awa et al. (2017) affirm that competitive pressure is critical in adopting technology. Therefore, it is deemed that organisations are under pressure to adopt new technologies.

Regarding the importance of organisational resilience when experiencing a disruption, Bakar et al. (2015) corroborate that business continuity is the source of competitive advantage for organisations. The competitive business setting has forced organisations to consider business continuity (Bakar et al., 2015). Additionally, while the majority of participants perceived that RPA gave the bank a competitive edge and were aware of other banks (including other departments within Kaelo Bank) that are using RPA, only a minority of the participants were not aware that the bank is under pressure to adopt RPA. Thus, the findings of this research suggest that competitive pressure has a leading influence on the bank's decision to adopt RPA and its use for business continuity. This finding aligns with previous research (Bharti, 2020; Valgaeren, 2019).

- *Regulatory Requirements*

Regarding the influence of regulatory requirements in the decision to adopt, this has been identified as a critical component influencing the adoption of new technology. In this research, there has been a mixed bag of findings from participants. From one point of view, one participant indicated that they needed to be better informed about system availability and resilience requirements from the regulators. On the other hand, nine participants expressed that they were aware of the regulator's requirements regarding adopting and implementing a new technology such as RPA.

Wong et al. (2020) confirm that laws, regulatory requirements, and policies have a crucial role in encouraging the adoption of new technologies. Furthermore, regulators have obligated organisations, specifically financial services institutions, to make provisions for business continuity. Ewing (2022) affirms that the financial services sector must ensure service continuity in their information systems operations to align with regulatory requirements. Regulatory requirements influence new technology, such as RPA adoption (Tew, 2019).

- *External Vendor RPA Support*

This research found no evidence of the importance of external support in RPA adoption in Kaelo Bank. All participants confirmed that RPA software bots were developed, maintained, and supported in-house. This is because RPA bots have been built, supported, and maintained in-house by Kaelo Bank's RPA technical team. The situation could vary with other innovation technologies such as ERP, AI, and cloud computing, where the extent of technology complexity may require external technical build, support, and maintenance (Lu et al., 2018).

- *Customer Satisfaction*

Customer satisfaction emerged in the interview data as an essential feature that impacts RPA adoption and its use for business continuity in the bank. This finding aligns with the research by Kumar & Balaramachandran (2018) and is supported by more recent research conducted by Chandra & Kumar (2018). Moreover, Daniels (2020) confirms that RPA adoption has improved customer experience. Thus, customer satisfaction and improved customer service were essential for this South African bank to adopt RPA and use it for business continuity. Customer satisfaction was a critical factor for Kaelo Bank, and RPA contributes to the ability to efficiently, accurately, and rapidly process customers' queries to provide exceptional customer service (Kamat, 2019). Bakar et al. (2015) state that system downtime impacts customer loyalty and the organisation's reputation.

In a nutshell, derived from the discussion that suggests a mixed bag of results, the four environmental features were covered in the preliminary conceptual framework (in section 2.10.4).

5.6. Discussions of the findings related to Fit, Utilisation, Task, and Performance Impact Features

These characteristics, which we identified, were noted to have influenced Kaelo Bank's adoption of RPA. These aspects are outlined below.

- *Task: Task suitability for RPA*

Participants indicated that task suitability for RPA is essential so that appropriate business processes are automated, and benefits of this technology are gained. Also, they declared that standard high volume and repetitive customer service requests in the credit collection department were identified for automation, for example, account closure, issuing paid-up letters, providing balance updates, and status accounts.

As specified from the literature reviewed, the importance of business process appropriateness when adopting RPA is explored (Kokina & Blanchette, 2019; Leopold et al., 2018; Rutaganda et al., 2017; Watson et al., 2019;) validate that selecting suitable business processes that need to be automated by RPA is essential. Regarding RPA adoption in a bank, the result of this research agrees with the finding noted by Rutaganda et al. (2017), who confirm that not all business processes in the organisation need to be automated through RPA. However, only stable and suitable ones are the relevant candidates. These were identified as critical because they directly impact customer experience. Tasks suitable for automation involve repetitive, high-volume, and rule-based (Hoehle & Huff, 2012; Kokina & Blanchette, 2019; Lacity & Willcocks, 2016). There is consistency between interview data and literature that banks need to assess tasks rigorously so that only appropriate ones are automated.

- *Fit: RPA fit for the bank*

The interviews stated that RPA success depends on identifying suitable and fit business processes. Furthermore, participants declared that for the bank to remain competitive, RPA is a good fit for this bank. The literature cited that RPA changes how banks operate and compete (Hoehle & Huff, 2012; Kumar & Balaramachandran, 2018). In the banking sector, customer experience is essential; therefore, it is critical for the business processes to be automated to fit this and the bank's strategy (Aydıner et al., 2023; Imran et al., 2014; Kokina & Blanchette, 2019; Kumar & Balaramachandran, 2018).

- *Utilisation: Use of RPA Technology*

The finding of this research suggests that this factor has a substantial importance in the bank's decision to adopt RPA. This refers to the findings studied by Lu et al. (2018), Obeidat & Turgay (2012), Rahi et al. (2021), Santos et al. (2019), and Willcocks (2017), which found that RPA use is a crucial factor, so that the organisation can implement it. This is because processing time is reduced significantly, manual errors are decreased, and staff can focus on more meaningful tasks. Another reason the bank uses RPA is reduced costs and improved customer experience. Thus, this finding aligns with the previous studies, which posit that RPA use plays a critical role in the decision to adopt.

- *Performance Impact provided by RPA*

Participants have identified the performance impact provided by RPA as decreased customer complaints, improved efficiency, and positive customer experience. With banks adopting RPA and using it for business continuity, they can improve efficiency, function 24/7 uninterruptedly, and provide a better experience to customers (Kumar & Balaramachandran, 2018; Willcocks et al., 2015; Zeinalizadeh et al., 2015;). This performance impact of RPA literature is based on what participants detailed as RPA achievements. This means that business continuity has a direct influence on the RPA performance. Simply put, there is a relationship that directly impacts business continuity with RPA availability, stability, and performance. With business continuity being more about risk management, adopting new technology impacts its use and performance.

In summary, formulated from the discussions above, this one element was covered in the preliminary conceptual framework (noted in detail in section 2.10.4).

5.7. Revision of the Proposed Conceptual Framework

The conceptual framework recommended in Chapter 2 (section 2.10.4) was improved based on the findings from the interview process and the importance of added elements that the participants cited. The exploratory research was used to examine the elements influencing the effective use of RPA for business continuity through semi-structured interviews with ten participants. Figure 8 indicates that the initial conceptual model contains 15 factors classified features of the TOE and TTF framework. Figure 11 shows a refined conceptual framework relating to using RPA for business continuity by Kaelo Bank. This refined conceptual framework was advanced based on the findings of the interview data in section 4.4, where six additional factors emerged and were considered to have a crucial influence on the use of RPA for business continuity in the bank.

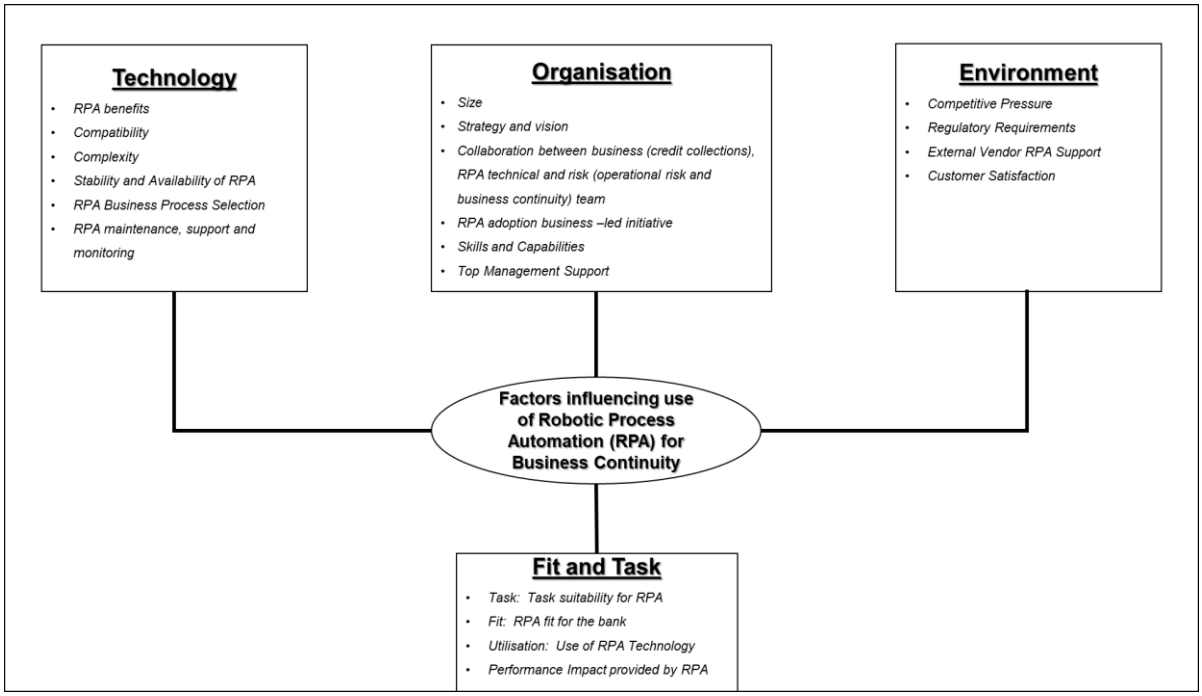

Figure 11: Revised Conceptual TOE-TTF Framework

An analysis of Figure 8 and Figure 11 confirms that technological, organisational, environment, fit, performance impact, utilisation, and task features are more prevalent in the final conceptual framework. This supports the deliberation made in section 1.6 that the adoption of technology is determined by various elements, with the determinants that impact Kaelo Bank, which uses RPA for business continuity, appearing to differ from those influencing the adoption of several IS innovations researched previously. The revised conceptual framework of the effective RPA use for business continuity confirms the significance of all six technological features on the adoption decision: complexity, compatibility, RPA benefits, RPA business process selection, RPA maintenance, support and monitoring, and stability and availability of RPA. Regarding organisational features, seven elements were established and examined.

As noted in the interview data, these factors impacted the decision to adopt RPA and use it for business continuity. Thus, the revised conceptual framework indicates that elements of the organisation have more significance in the decision to use RPA for business continuity. This viewpoint seems to be similar to most previous research on the adoption of several technologies (Flechsig et al., 2021; Gangwar et al., 2015; Lacity et al., 2017; Lopez-Lopez & Giusti, 2020; Rawashdeh et al., 2022; Rutaganda et al., 2017). The refined conceptual framework illustrates the dominance of the environmental feature on the South African bank's decision to adopt RPA and use it for business continuity. Three aspects; namely competitive pressure, regulatory requirements, and customer satisfaction influenced the decision to adopt RPA and its use for business continuity. Meanwhile, another environmental feature, namely the external vendor RPA support element, had no fundamental impact on the bank's adoption or non-adoption of RPA because software bots in Kaelo Bank were built, maintained, and supported in-house. Therefore, the revised and final conceptual framework showcases the dominance of environmental features. For example, research conducted by Chau et al. (2020), Picoto et al. (2014) and Rawashdeh et al. (2022) confirm that environmental determinants have an essential influence on the adoption of new IS innovations.

Concerning the task, utilisation, performance impact, and fit aspects, the revised conceptual framework of RPA adoption and its use for business continuity validates that this new technology use, business process selection and suitability, RPA being fit for the bank, actual use of RPA and performance impact provided by RPA also influenced RPA use for business continuity. This is aligned with the previous studies by Hoehle & Huff (2012), Kumar & Balaramachandran (2018), Leopold et al. (2018), Lu et al. (2018), Willcocks et al. (2015), Rutaganda et al. (2017), Santos et al. (2019), Watson et al. (2019) and Zeinalizadeh et al. (2015) which indicate that TTF elements are fundamental for the new technology to be adopted in financial services. The research objective of this study was to establish whether RPA is used effectively for business continuity in South African banks. The revised conceptual framework could aid banks as they effectively use RPA for business continuity in this ever-changing environment. This is done by assisting banks in ascertaining and understanding TOE and TTF elements that influence the decision to adopt emerging technologies and use them for business continuity.

5.8. Re-examination of the Research Questions

The findings in this chapter were applied to respond to the research questions. The primary research question is *'What factors effectively influence RPA use for business continuity in a South African bank?'* The sub-research questions are:

1. *How is business continuity established within a South African bank?*
2. *How is RPA used for business continuity?*
3. *What is the impact on the South African bank when RPA is down?*
4. *How is RPA suitable for business continuity?*
5. *To what degree can business continuity be achieved when RPA is used?*

- *How is business continuity established within a South African bank?*

Business continuity history for banks and financial crises has shown that nothing is entirely safe or confident, and disruption can happen anytime. Business continuity strategies are critical for organisations of any size, including Kaelo Bank. From a technology viewpoint, RPA stability and availability fundamentally influence the use of RPA for business continuity. These include the fact that recovery strategies are in place, service level agreements regarding recovery time objectives have been established between the business and the RPA technical department, and when RPA software bots are unavailable, the business can revert to manual processes. Furthermore, RPA maintenance, support, and monitoring impact ensure business continuity is proactively established in Kaelo. Thus, proactive controls to monitor and maintain RPA availability were in place. Some of the challenges that may cause the South African bank not to maintain business continuity include incompatibility with the existing IT infrastructure, such as prolonged legacy systems journey because this affects customer experience negatively, the efficiency of RPA, and the bank's growth.

Organisational components that would impact the establishment of business continuity in the bank include senior management support and RPA skills and experience so that banking services are always readily and easily available in case of technical disruption. Upskilling of RPA technical staff was vital as it allowed the RPA technical team to step in and fill in gaps when other staff members were unavailable, ensuring the continuation of RPA build, support, maintenance, and monitoring. For the bank to remain relevant and gain a competitive advantage in an ever-changing customer market, providing the RPA workforce with upskilling prospects is crucial. The response to this research question proved that top management was the driver behind RPA and business continuity because of profit maximisation, competitive edge, and improved customer experience. Business continuity was fully embedded in the bank as it positively impacts customer experience and profits.

Environmental determinants include collaboration between Kaelo Bank and the regulator to ensure that the bank's operations are always available, even though a disruption is experienced. With the banking sector being so competitive, RPA was noted as a strategic intent for this bank so that it maintained its profits and competitive advantage. Sector coercion exists, impacting technologies such as RPA for business continuity. Customer satisfaction also plays a role as RPA use provides the bank with 24/7 uninterrupted services.

- *How is RPA used for business continuity?*

The use of RPA can assist with business continuity. Thus, RPA software bots are always available 24/7/365 and can work interrupted; hence, the bank rolled it out. Also, it assisted the bank in improving its continuity and customer experience, increasing profit, and reducing costs. With the bank taking advantage of this technology, business processes remain efficient and consistent, more so in the event of a disruption. RPA's advantages for the bank include improved operational efficiency, increased productivity, and enhanced customer service, including the accuracy and availability of the RPA bots 24/7.

With the bank taking advantage of this technology, business processes remain efficient and, more so, in the event of a disruption, enabling the bank to continue delivering services to customers. RPA has been in action in Kaelo Bank, assisting the bank in responding to challenges and demands before, during, and after a disruption. Several credit collection business processes have been automated by RPA, aiding the bank to continue delivering credit collection services during and after a crisis. This improved customer experience has made the bank profitable as collections were made entirely, accurately, and timeously. RPA was utilised to reduce downtime. By automating specific business processes, the bank reduced the downtime caused by manual processes. This minimises the time required to perform business services or tasks and avoids error risks that can result in expensive delays.

- *What is the impact on the South African bank when RPA is down?*

The number one enemy of RPA success is its breakdown. Each time RPA software bots are down, it impacts the bank negatively, leading to financial and reputational loss. The bank has demonstrated that it has proactive measures and plans to monitor, maintain, and support RPA software. For example, when a disruption is experienced, the business (credit collections department) is informed while the RPA technical team works to get the bots up and running. Should the service level agreements in place be breached by the RPA technical team, the business can return to manual processes. RPA technical support, maintenance, and monitoring are crucial to avoid possible system errors that may impact the functioning of RPA bots, leading to downtime. RPA unavailability can cause revenue loss, irate customers, and reputational damage, negatively impacting the organisation's bottom line. Specifically, when RPA is down, Kaelo Bank is at risk of being unable to execute required business operations, impacting customer experiences and leading to reputational and financial loss, including the regulator imposing fines on the bank.

- *How is RPA suitable for business continuity?*

RPA solves everyday business continuity needs. RPA is best appropriate for highly repetitive and manual tasks. Selection of appropriate business processes that need to be automated is vital so that RPA is fit for purpose and the bank benefits from it. The credit collections department determines processes that must be automated before RPA software bots are built. Before RPA software bots were built, relevant stakeholders such as risk subject-matter experts such as business continuity, compliance, cyber, operational risk, information, and technology were engaged and signed off on risk matters. The stability and availability of RPA ensures that the bank is always available. That is why recovery strategies must be in place when RPA is down. The suitability of RPA assists the bank to become more resilient by concentrating on enhancing efficiencies through automation. Furthermore, RPA has been beneficial in executing business continuity during a disruption.

- *To what degree can business continuity be achieved when RPA is used?*

Business continuity is critical as the bank continues to roll out RPA in other business units. In the study in question, it has been demonstrated that despite how and whether RPA is implemented on an existing bank's IT infrastructure, including legacy systems, it needs to be diligent and highly consider recovery and continuity strategies. With RPA, if unforeseen disruptions occur and skilled RPA technical teams are not available, automated business processes can still be sustained and assist the continuity of business operations. Thus, this increases efficiencies, allowing real-time perspective into business operations and cost reduction, and aids the bank to be more agile and flexible when faced with disruptions. Therefore, RPA significantly contributes to the bank's resilience.

5.9. Summary of Chapter

This chapter explored findings of the factors influencing RPA use for business continuity in Kaelo Bank. RPA adoption and its use for business resilience in Kaelo Bank is fully mature. As acclaimed in the interpretation of findings above, the bank has proved that RPA and business continuity are supported by senior leadership as this is incorporated in the bank's strategy and vision; thus, these are a perfect fit for the bank. Also, RPA is being rolled out across the bank, and the business continuity concept forms part of the always-on notion so that customer services are always available even though a disruption is experienced. Business processes that need to be automated have been identified so that there is process streamlining and efficiency so that customer experience is improved.

Collaboration between business (credit collection department), RPA technical, and risk (operational risk and business continuity) has played a critical role in the success and maturity of RPA use for business continuity. Also, the regulator encourages the adoption of new technologies such as RPA, including the fact that there is a need for adequate and effective controls in place as these technologies are adopted. The legacy system journey for Kaelo Bank was in progress and played a critical role in the RPA and business continuity journey. Thus, integrating RPA into the bank's legacy requires all IT systems, infrastructure, and applications to be integrated and managed for efficiency and ease of use. The chapter ends with a review of research questions, including crucial insights about the primary and secondary research questions. The next chapter will conclude this study by summing up key research findings, offering contributions (both practically and theoretically), discussing research limitations, and proposing future research.

CHAPTER 6: THESIS CONTRIBUTION AND CONCLUSION

6.1. Introduction

The previous chapter provided a view of interpreted research findings. The interpretation of the findings was provided per theme and subtheme. The interpretation incorporated research findings and aligned these against the existing literature and theoretical views. This chapter assesses the study through the intended research objectives and goals, which examine the extent to which they were attained. The research problem that motivated the research is recapped first.

6.2. Research Objective

The main research objective was to explore the effective use of RPA for business continuity in a South African bank. Existing literature was reviewed to introduce the conceptual framework where TOE and TTF frameworks were used as a lens for this research. The researcher collected data from the single case study site, and ten (10) participants from business (credit collections), RPA technical, and risk (Operational risk and business continuity) departments were interviewed. Data was analysed to attain the research objective and answer the research question detailed in Chapter 5 (Section 5.8). Overall, these research questions were answered. Twenty-one (21) TOE and TTF factors, which collaborate with the reviewed academic literature, were demonstrated and discovered to be regarded by the South African bank when deciding to adopt or not adopt RPA and use it for business continuity.

The appropriate attributes identified were RPA benefits, compatibility, complexity (RPA build and deployment), top management support, Task suitability for RPA, RPA fit for the bank, use of RPA technology, performance impact provided by RPA, structure, skills and experience, RPA external support, size, vision, strategy, competition pressures, regulatory requirements, customer satisfaction including business, IT and Risk collaboration. These components influenced RPA use for business continuity in the chosen South African bank. The research established a TOE-TTF conceptual model based on the findings to understand RPA adoption and usage of this technology in a bank. Based upon the findings, the study in question established a TOE-TTF conceptual framework (as well as pertinent features) that can be implemented to understand better effective RPA use for business continuity in the mentioned South African bank.

6.3. Limitations of the Study

The researcher recognises that the proposed framework has some limitations. This case study is based on one of the departments (credit collections) of the South African bank. Thus, the findings of this research may be irrelevant to other departments. The study sample was from staff working at only one South African bank. The sample of ten could be more illustrative and should not be applied for generalising the findings. The literature searches confirmed that there is a limited study performed on RPA use for business continuity, and thus, there is a need for more generalisability of the advanced technology available. This was a motivation for this qualitative strategy to ensure the case was explored in detail.

Furthermore, even though the case study site was in South Africa, the findings may only apply to other departments within this bank. Nevertheless, researchers aiming to understand better the RPA and its practical use for business continuity should acknowledge that this framework can produce valuable insights. RPA adoption and its use for business continuity were analysed at the firm level, not the individual level. This cross-sectional study does not determine the longitudinal view of the case. Therefore, the data collected during this research and the current condition may alter. Nevertheless, it guides and interprets an understanding of business continuity when implementing RPA. It does not consider that certain elements, such as the RPA project life cycle, have been vital when RPA is used for business continuity. Therefore, this warrants further research. Additionally, the findings of this research on factors about technology, organisation, and environment context, as well as task, technology, and fit elements, may need to be completed and thus require further exploration.

This study concentrated solely on RPA, not other new technologies such as chatbox, AI, robotics, the Internet of Things (IoT), and machine learning. Other attributes of RPA, such as programming, security, change management, architecture, and business continuity lifecycle, were excluded from the scope. Additionally, the research participants were limited to ten (10) with representatives from business, RPA technical, and risk (operational risk and business continuity) who have previous involvement in RPA and business continuity. This indicates that this research should have considered other different viewpoints from omitted staff members and potentially external partners such as consultants, external suppliers, and former staff consulted or involved in RPA and business continuity-related decisions in the selected case study site.

6.4. Contributions of the Study

The research contribution can be widely categorised into two sections, namely, practical and theoretical. According to Zhou et al. (2017), practical contribution highlights the appropriateness of the research to the industry, including how the research findings contribute to various audiences, while theoretical contribution is the development of the current concept derived from a particular logic and reality.

6.4.1. Practical Contribution

The comprehensive practical contribution of the research in question is that it helps all stakeholders comprehend the complications that new technologies and disruptions bring about in organisations, especially the banking industry. The findings note various considerations that RPA use and business continuity bring about in the banking sector. The practical contribution provides a detailed description of one of the South African banks adopting and implementing RPA and using it for business continuity. Also, two constructs, namely RPA and business continuity, have gained much consideration amongst other practitioners but have yet to be outlined extensively in the literature. However, the integration of RPA use and business continuity is emerging more than ever after the world experienced the coronavirus-induced pandemic disruption.

The established integrated TOE-TTF conceptual framework depicts elements that may influence the effective use of RPA for business continuity, and these may be useful to practitioners who intend to adopt RPA for business continuity. Moreover, the integrated TOE-TTF conceptual framework must be revised in the existing literature. This conceptual model is essential to research future technologies, with technologies such as artificial intelligence, machine learning, blockchain, and robotics. To safeguard against non-compliance with the regulator, banks must comply with the regulator's requirements when adopting new technology and other operational risk standards. Practitioners are urged to understand better the influential nature of any technology, including RPA, where collaboration is critical. RPA can administer a positive tool to trigger value if guided appropriately, and business continuity may assist organisations in reaching higher levels. This refers to the collaboration between all stakeholders, namely business, IT, external vendors, risk, and audit departments. Managers at all hierarchical grades should understand their crucial role, including taking ownership and accountability in using RPA and business continuity. The Potential of reaping value comes with experience. Thus, an RPA technical team equipped with various training interventions should continue to be empowered. South African banks requiring RPA use for business continuity must ensure that they select the correct business processes as candidates to automate and integrate RPA into their existing IT infrastructure. There is a need for compatibility, including meeting the regulator requirements.

6.4.2. Theoretical Contribution

The theoretical contribution of the research report is the enrichment of the current literature regarding the factors that effectively include RPA use for business continuity in one of the South African banks and the advancements of the foundation for further studies on this topic. The systematic literature review has revealed knowledge gaps on what factors effectively influence RPA use for business continuity in a South African bank. The theoretical knowledge gap found at the beginning of the research has been bridged. New theoretical factors have been introduced to the IS literature. The study contributes to the existing body of knowledge by introducing RPA use for business continuity in South African banks and providing a deeper comprehension of the phenomenon. Thus, the study's results present a framework researchers may utilise to understand the factors influencing RPA use for business resilience. The study intends to build a base scenario for future research such that future developments can generalise, contrast and compare findings. The use of the TOE-TTF framework for RPA use for business continuity can also be included in the cases utilised in research. The related research and TOE-TTF frameworks were mainly used for this research. Thus, these theories were applied as a lens in collecting and analysing research data that helped provide rich findings that could inform the theoretical insights for RPA use for business continuity in banking. The qualitative essence of the study in question resulted in better information being collected from participants to understand features influencing RPA use for business continuity. Using a systematic review of the literature and through an understanding of the researcher, RPA use for business continuity is still in its infancy and undeveloped.

Thus, the literature needs to be more extensive. The literature reviewed recommended that IS researchers contribute to the literature by performing further research with more understanding relating to RPA use for business continuity. The framework depicts elements that influence the effective use of RPA for business continuity through the lens of the TOE and TTF framework, and this may appear critical to academic researchers. This research contributes to IS academic researchers' insights into RPA and business continuity adoption in financial services institutions and confirms twenty-one (21) TOE-TTF attributes in a developing country. This study subscribes towards closing the gap regarding the effective use of RPA for business continuity in South Africa identified while reviewing the literature. Moreover, the researcher acknowledges that scholars can enhance collaboration with practitioners by exploring the future of integrating RPA use, including other automation trends such as artificial intelligence and machine learning with business continuity. These advancements contribute to IS theories and assist information systems researchers in better understanding automation and business continuity and their influence not solely at the organisational level but at the individual level.

Kaelo Bank operates in a relatively mature banking sector. Thus, this framework supports a practical basis for understanding RPA and its use for business continuity in the banking sector. Despite this, the researcher believes that the findings of this study may be relevant to other industries, specifically with the same organisational or environmental elements (for example, size, strategy, vision, competition pressure) and technologies where other constructs such as machine learning and AI may have been ambiguously defined. The study contributes to the body of knowledge by presenting factors influencing the effective use of RPA for business continuity in a South African bank and providing a deeper understanding of the phenomenon. The study intends to construct a case for reference for future studies so that future cases can correlate and generalise similarities. The lens of the TOE-TTF framework used in this research can also be supplemented with the cases applied in the study.

6.5. Recommendations for Future Research

Future studies can incorporate an analysis of other RPA business processes. This would enable testing adoption frameworks and establish the similarities and importance of the adoption features. There would be value in performing the study as RPA and other automation technologies, such as intelligent automation maturity in the financial services sector, to understand the influence on business operations and services. A longitudinal approach to RPA use for business continuity can measure if efficiencies have permitted traditional banks to be more digital and more exhaustively aligned with other emerging financial technology services. In addition, future research should consider improving the integrated TOE-TTF conceptual framework established in this research to expand existing knowledge in the IS discipline. Other technology trends such as AI, robotics, blockchains, and machine learning may be the IT components that may be included in future research. Quantitative research, such as questionnaires and longitudinal studies, could be carried out to assess the findings of this research and introduce a theoretical framework to understand RPA adoption and its use for business continuity. Additionally, longitudinal research should take each component of the TOE-TTF framework and investigate its impact in other sectors.

Since this study's main focus was at the organisation level, research at the individual level (for example, customers' role in the adoption and implementation process of RPA and availability of the automated services) would augment the IS body of knowledge on RPA and business continuity adoption and usage.

6.6. Conclusion

This research examined aspects that influence the effective use of RPA for business continuity in a South African bank and was meant to respond to the research question posited in the research objectives. Several factors influence RPA use for business continuity; although the literature regarding this is limited, similar automation technologies have been previously researched. The rationale for performing this study resulted from specific research gaps and weaknesses in the existing literature about the use of RPA for business continuity discovered by the researcher. The researcher believes that the factors from the proposed conceptual framework influence RPA use for business continuity in a South African bank. Qualitative research on this topic was completed, a theoretical framework on this subject matter was compiled to answer the research questions, and specific gaps identified in the study were investigated. The South African bank that was studied has rolled out RPA and used it for business continuity so that customers are serviced better. The proposed conceptual framework introduces factors categorised by technology, organisation, technology, task, and fit factors influencing RPA use for business continuity. RPA benefits, complexity, selection of RPA business processes, compatibility, RPA build, support and maintenance, and stability and availability of RPA are technological features that influence RPA use for business continuity. Top management support, skills, experience, a collaboration between RPA technical, risk, and business teams, size, strategy, vision, and business-led initiative are organisational factors that impact RPA's use for business continuity. Environmental factors influencing RPA use for business continuity include regulatory requirements, customer satisfaction, and competitive pressure. Additionally, task suitability for RPA, RPA fit for the bank, use of RPA technology, and performance factors impact the use of RPA for business continuity.

Interviews were executed with participants who worked at one of the South African banks. The interview data was organised utilising the thematic analysis to classify and analyse. The findings were confirmed with research literature to understand factors influencing RPA use for business continuity. The significant findings of the study in question are that RPA is used for business continuity so that the South African bank can attain the expected benefits, increase profits, and improve customer service. This is consistent with organisations in other sectors utilising similar automation technology. Kaelo Bank is aware of similar concerns about automating inappropriate business processes, lack of support from the leadership, and stakeholders' misalignment. A unique finding is that Kaelo Bank proactively monitors, supports, and maintains RPA bots' operations, including active collaboration between business, RPA technical, and risk teams, to ensure all stakeholders are onboard regarding their roles and responsibilities in this value chain. Other outcomes noted in the review include RPA compatibility with the bank's existing IT infrastructure, ensuring RPA availability and stability, effective and proactive monitoring, and supporting and maintaining the RPA software bots.

Therefore, business services must always be available so that RPA is used for business continuity and reduced error rate. Considering the prospective advantages presented by RPA and its use for business continuity, this requires attentiveness from both practitioners and researchers to understand the factors that influence RPA use for business continuity at a firm level. This study has displayed prospective advantages presented by RPA and its use for business continuity, which need attention from practitioners and researchers so that an understanding of the determinants that influence the adoption can be considered at the organisational level. This research is critical for the impacted stakeholders, such as researchers and practitioners. RPA technology is evolving and steadily being adopted faster than in previous years. This research expressed the criticality of technologies like this one in South Africa, specifically in the banking sector. This study adds value by contributing to and enhancing the existing body of knowledge, specifically in the information systems discipline. This research established an integrated conceptual model comprising twenty elements derived from the TOE and TTF framework that can be applied to understand and facilitate RPA use for business continuity in banks. The framework was analysed from a single case study site, and the researcher acknowledges its possible advantages. The practical significance of this research is relevant to organisations in all sectors. RPA software bots for this South African bank have been developed in-house, and there are no interventions for support. Distinctive findings that were noted in this study include the fact that RPA is used for business continuity in the bank; top leadership support and involvement in this process played a critical role in the adoption and use of RPA, appropriate business processes which need to be automated by RPA were identified so that higher returns of investments are gained, and customer service improves.

By re-examining each one of the research questions and how they are addressed by the data analysis and interpretation, including the gaps that exist in the literature reviewed on this topic by the researcher, it is established that research questions posed in this research and the shortcomings identified were undoubtedly worthy of empirical investigation. Studying the research questions in this study through the human agents' experience in the case site and the theoretical base on which this research was performed was certainly appropriate because it allowed the researcher to thematically collect and analyse the data in a way that could address the research questions posed in this research. Future considerations are highlighted to improve the integrated conceptual model exhibited in this study, and it is recommended to be investigated further in other industries. Banks must also consider risks, vulnerabilities, and threats, such as business and technological disruptions associated with RPA introduction and implement adequate and effective controls to mitigate these risks. This research contributes to the existing and limited literature because it studied RPA influences on South African banks and its use for business continuity. It qualitatively considered RPA adoption and its utilisation in the banking sector. Hence, this research complements existing literature and provides a foundation for further research. The reviewed literature has indicated that most existing adoption models for RPA and business continuity were independently considered for countries other than South Africa.

The established integrated conceptual framework in this study addressed the identified knowledge gap. This research has provided new insights regarding RPA and its use for business continuity in the South African bank when digitalisation has become increasingly significant in the banking sector. As a conclusion to the research question "*What factors effectively influence RPA use for business continuity in a South African bank?*" this research explored elements that influence the effective use of RPA for business continuity in a bank, specifically in South Africa. Thus, this has demonstrated that the research objective was met satisfactorily. Since the South African banking sector is concentrating more on innovation, it gains a stronger competitive position in the global market as and when new technologies are adopted.

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APPENDIX A: ETHICS CLEARANCE CERTIFICATE

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

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

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: CBUSE1966**
PROJECT TITLE	Effective use of Robotic Process Automation (RPA) for business continuity in a South African financial institution
INVESTIGATOR	Keitumetse Phage
SCHOOL/DEPARTMENT OF INVESTIGATOR	School of Business Sciences
DATE CONSIDERED	28 January 2022
DECISION OF THE COMMITTEE	Approved Unconditionally
RISK LEVEL	Minimal Risk
EXPIRY DATE	31 December 2023

ISSUE DATE OF CERTIFICATE 04 February 2022 **CHAIRPERSON** _____
(Neetu Ramsaroop)

cc: Supervisor: Dr Thembeklie Mayayise

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 are 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.

Mafutsana Keitumetse Phage
Signature

04 /02 /2022
Date

APPENDIX B: PARTICIPATION INFORMATION

Effective use of robotic process automation (RPA) for business continuity in a South African bank

Name of researcher: Mafutsana Keitumetse Phage (9509843v)

PARTICIPANT INFORMATION SHEET

Faculty of Commerce, Law and Management
1 Jan smuts Avenue
Braamfontein
Johannesburg
2000

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

<Date>

Dear Sir / Madam,

RE: Permission to conduct research at Kaelo Bank

My name is Mafutsana Keitumetse Phage, and I am studying for a Master's degree: Commerce (Information Systems) in the School of Business Sciences at the University of the Witwatersrand. I am seeking permission to conduct research at Kaelo Bank in partial fulfilment of the requirements of the degree.

The title of my research is: Exploring factors which influence effective use of robotic process automation (RPA) for business continuity in a South African bank. Previous research has revealed that the traditional banking industry is threatened by financial technology (fintech) and digital banks which are able to function with reduced cost as well as act quicker to the rapidly changing market including meeting customer needs of providing the best customer service and availability of banking systems and platforms.

So, in response to the technological threats and vulnerabilities, leading financial institutions have rolled out RPA so that their business processes are streamlined and efficient resulting in reduced costs. My research focuses on the following:

- Analyse how business continuity manifests in a South African bank and subsequently explore how RPA can be effectively used for business continuity
- Describe how RPA is appropriate task fit for business continuity in a South African bank
- Determine how business continuity can be achieved through the effective use of RPA in a SA bank

The research will entail collecting data through a case study by interviewing staff members whose business services have been automated by RPA including those who have been involved in rolling out RPA from technical and risk perspective. Interviews will take one hour, and these will be recorded only if consent is obtained from the interviewees. Participants will be asked to give their written or verbal consent before the research begins. Their responses will be treated confidentially and identities (their names and the name of the organisation) will be anonymous unless otherwise explicitly stated. Individual privacy will be maintained in all published and written data resulting from the study.

The results will be communicated in the dissertation. The research participants will not be advantaged or disadvantaged in any way. They will be reassured that they can withdraw their permission at any time during this project without any penalty. There are no foreseeable risks in participating in this study. The participants will not be paid for this study. All research data will be stored for five years after final publication and thereafter, it will be destroyed. I therefore request permission in writing to conduct my research at your organisation. The permission letter should be on your organisation's letter head, signed, and dated and specifically referring to myself by name and the title of my study.

Please let me know if you require any further information. I look forward to your response as soon as is convenient.

Yours sincerely,

Mafutsana Keitumetse Phage
083 389 4991
9509843V@students.wits.ac.za

Dr. Thembekile Mayayise
082 551 4520
thembekile.mayayise@wits.ac.za

APPENDIX C: INTERVIEW INSTRUMENT

Exploring factors which influence effective use of RPA for business continuity in a South African bank

Researcher's Name: Mafutsana Keitumetse Phage (9509843V)

INTERVIEW SCHEDULE

This study follows the interview protocols and development of the instrument determined by by Jacob and Furgerson (2012). According to Jacob and Furgerson (2012), the following protocol were followed so that the research instrument is formulated:

- Research topic needs to interest the researcher
- Research should be the base of the questions
- A script should be used for the beginning and end of the interview process
- Questions should be open-ended
- Kick off with the basics
- Start the conversation with easy to answer questions then proceed towards controversial or difficult ones
- The phrase such as 'tell me about….' is an excellent way to start a question
- Write comprehensive questions
- Utilise prompts
- Consider using on the spot revisions to the interview protocol
- Do a dyr0run with someone
- Schedule shorter follow-up interviews to aid resolve and ask questions that the researcher may have missed after transcription has taken place

Interview questions in this research predominantly analyse elements which influence RPA adoption and its use for business continuity in a South African bank. Written consent to be given by you as a participant who agreed voluntarily to partake in this in this research. Questions below will be asked during the interview carried with you. There are three sections to the interview.

Good day Participant,

Thank you very much for your time today and agreeing to participate in this study. My name is Keitumetse Phage and I am a student at the University of Witwatersrand. I am currently busy with my master's thesis on the topic '*Exploring factors which influence effective use of RPA for business continuity in a South African ban*k'. This study aims to explore determinants that influence the RPA adoption by one of the South African banks and its use for business continuity, thus answering the core research questions raised by this research.

Before we proceed, I would like to reaffirm that some of the information included in the participant information sheet was shared via email. This study including your identity will be kept strictly confidential and your name will be used as fake name or pseudonym in my final research report. Access to all the data collected from this interview will be password protected and stored in the laptop and not unauthorised access will not be allowed. You are free to withdraw from this interview at any point in time or not respond to any question which you may be uncomfortable answering. With your permission, I would like to record this interview as it will assist me transcribe our discussions. Thank you very much for your participation.

Below are a list of demographic and general questions asked to participants:

1. <u>South African Background</u>

1.2. Share a brief career history and your tenure in this organisation.
1.3. What is your role and related responsibilities?
1.4. Who are your key stakeholders and what are their expectations?
1.5. What is your understanding of RPA and how does business continuity affect your operations?
1.6. What experience do you have in terms of RPA, risk and business continuity?
1.7. How long have you been involved in any RPA and business continuity related activity within the organisation?

2. <u>Participant's Background</u>

1.8. What is the background of your company?
1.9. Share the vision, mission, values and strategic objective primary objectives.
1.10. What is your company's staff complement?
1.11. Discuss the high-level organisational structure.
1.12. What is the role of your department?
1.13. How is your department involved in RPA and business continuity related decisions?

3. Main Research questions

The table below consists of main interview questions, related aspects of the conceptual framework, and specific research questions which these interview questions attempted to collect information on.

Interview Questions	Conceptual framework artefact	Research Sub-question
According to your knowledge, what are the key benefits of automating business processes with RPA and ensuring that these bots are always available? **(RPA Benefits)**	Technology	*How is business continuity established within a South African bank?*
According to your knowledge, what has the effect of legacy systems (end of life and support of legacy systems) been on functionality of RPA bots to how you support business? How do you think this has been managed by the RPA technical team? **(Compatibility)**	Technology	
Is the RPA and business continuity adoption aligned to the bank's strategy and business unit you support? **(Strategy)**	Organisation	
Do you think RPA adoption and business continuity are associated with the bank's vision and ambitions? **(Vision)**	Organisation	
What are your views including those of the bank (and / or your department) regarding RPA adoption? **(RPA Benefits)**	Technology	*How is RPA used effectively for business continuity in a South African bank?*
What is the business recovery strategy when RPA is unavailable? **(Stability and Availability of RPA)**	Technology	
How is the selection of business processes that need to be automated by RPA done? **(RPA Business Process Selection)**	Technology	
What are some of the key business processes which have been automated via RPA? **(RPA Business Process Selection)**	Technology	
Is the business unit that you support the only one in the organisation using RPA? **(Size)**	Organisation	
Do you think that the size of the business unit that you support influences adoption and implementation of RPA and automation of key processes? (Size)	Organisation	
Does top management in your business unit support RPA adoption and business continuity? readiness? How was this support expressed to you? (Top management Support)	Organisation	
In your opinion, how and who drives and leads this RPA journey? (Business-led Initiative)	Organisation	
Are you aware of any competitors who have successfully adopted and implemented RPA? **(Competitive Pressure)**	Environment	

Interview Questions	Conceptual framework artefact	Research Sub-question
Do you think that it complicated to develop, support and maintain RPA software bots **(Complexity – RPA Build and Deployment)**	Technology	*What is the impact on the South African bank when RPA is down?*
How often are RPA bots down or slow? Are you aware of any significant incidents that have been reported where RPA bots are unavailable? **(Stability and Availability of RPA)**	Technology	
Do you think that the RPA support team is experienced and skilled to develop, maintain and support RPA bots when they are slow or down? Is there a training strategy in place for the RPA technical team? **(Skills and Experience)**	Organisation	
How often is the technical team expected to undergo training specifically on RPA? **(Skills and Experience)**	Organisation	
As far as you are aware, is business and operational risk contacted / informed when RPA bots is down? Is there a collaboration between RPA technical team, business and Risk? **(Collaboration between IT, business and risk)**	Organisation	
How does RPA unavailability impact the bank (and / or business unit)? **(Customer Satisfaction)**	Environment	
Is there any reliance on third parties with regards to RPA development, support and maintenance? Are RPA bots maintained inhouse? If yes, how do you manage these third parties' resilience that they provide as far as RPA is concerned? **(External Vendor Support)**	Environment	
Is the RPA and business continuity adoption aligned to the bank's strategy and business unit you support? **(Strategy)**	Organisation	*How is RPA suitable for business continuity?*
Do you think RPA adoption and business continuity are associated with the bank's vision and ambitions? **(Vision)**	Organisation	
Is the business unit that you support the only one in the organisation using RPA? **(Size)**	Organisation	
Do you think that the size of the business unit that you support influences adoption and implementation of RPA and automation of key processes? **(Size)**	Organisation	
Does top management in your business unit support RPA adoption and business continuity? readiness? How was this support expressed to you? **(Top management Support)**	Organisation	
According to your knowledge, is top management aware of the benefits of adopting RPA? **(Top management Support)**	Organisation	

Are you aware of any competitors who have successfully adopted and implemented RPA? **(Competitive Pressure)**	Environment	*How is RPA suitable for business continuity?*
Do you think that business is using RPA for business continuity as a way to establish / create competitive edge? **(Competitive Pressure)**	Environment	
Are you feeling any competitive pressure to adopt RPA and use it for business continuity? **(Competitive Pressure)**	Environment	
Are you aware of the regulator's requirements with regarding adopting and implementing a new technology such as RPA? **(Regulatory Requirements)**	Environment	
Are you aware of the regulators view regarding financial banks' systems resiliency and availability? What does the regulator say about financial service intuitions ensuring that their systems are always available? **(Regulatory Requirements)**	Environment	
Are you aware of times where RPA bots been restored within agreed recovery time objectives / timeframes? Has it been restored within agreed time? **(Stability and Availability of RPA)**	Technology	*To what degree can business continuity be achieved when RPA is used?*
Are there proactive system monitoring in place to trigger and inform RPA support team if RPA is unavailable or slow? **(RPA Support, Maintenance and Monitoring)**	Technology	
Are you feeling any competitive pressure to adopt RPA and use it for business continuity? **(Competitive Pressure)**	Environment	
Do you think that business is using RPA for business continuity as a way to establish / create competitive edge? **(Competitive Pressure)**	Environment	

APPENDIX D: INTERVIEW TRANSCRIPT TEMPLATE

INTERVIEW TRANSCRIPT

Participant: **XXXXXX** Interviewer: **Keitumetse Phage** Interview Date: **XXXXXXX** Time: **HH:MM**	
Interviewer	
Participant	
Interviewer	
Participant	
Interviewer	
Participant	
Interviewer	
Participant	
Interviewer	
Participant	
Interviewer	
Participant	
Interviewer	

APPENDIX E: THEMATIC ANALYSIS SUMMARY

THEME	SUBTHEME	INTERVIEW QUESTION	RESPONSE FROM PARTICPANTS	MENTIONED BY
Technology	RPA Benefits	1.1.1, 1.1.2	10	Participant A - Participant J
	Compatibility	1.1.3	10	Participant A - Participant J
	Complexity	1.1.7	10	Participant A - Participant J
	RPA Business Process Selection	1.1.5, 1.1.6	Business process selection - 10 Example of key business process - 10	Participant A - Participant J
	RPA Maintenance, Support and Monitoring	1.1.10	Proactive RPA monitoring - 9	Participant A, Participant B, Participant C, Participant D, Participant E, Participant F, Participant G, Participant H, Participant I and Participant J
	Stability and Availability of RPA	1.1.4, 1.1.8, 1.1.9	Recovery strategy when RPA is unavailable - 10 Instances where RPA has been down - 10 RPA restored within RTOs - 10	Participant A - Participant J
Organisation	Size	1.2.3, 1.2.4	Single department in the bank using RPA - 10 Size of the department and organisation impact RPA adoption - 8	Single department in the bank using RPA - Participant A - Participant J Size of the department and organisation impact RPA adoption - Participant B, Participant C, Participant D, Participant E, Participant F, Participant G, Participant I and Participant J
	Business led initiative	1.2.7	10	Participant A - Participant J
	Collaboration between business, IT and risk	1.2.10	10	Participant A - Participant J
	Top Management Support	1.2.5, 1.2.6	Top management aware of RPA benefits - 9 Top management support of RPA - 10	Top management aware of RPA benefits - Participant A, Participant B, Participant C, Participant D, Participant E, Participant F, Participant G, Participant I and Participant J Top management support of RPA - Participant A - Participant J
	Strategy	1.2.1	10	Participant A - Participant J
	Vision	1.2.2	10	Participant A - Participant J
	Skills and experience	1.2.8, 1.2.9	Frequency of training - 10 RPA team skilled and experienced - 10	Participant A - Participant J

Environment	Competitive Pressure	1.3.1, 1.3.2, 1.3.3	Competitive edge - 10 Pressure to adopt RPA - 7 Competitors using RPA - 9	*Competitive edge* - Participant A - Participant J Pressure to adopt RPA - Participant B, Participant D, Participant E, Participant F, Participant H, Participant I and Participant J *Competitors using RPA* - Participant A, Participant B, Participant C, Participant E, Participant F, Participant G, Participant H, Participant I and Participant J
	Customer Satisfaction	1.3.4	10	Participant A - Participant J
	Regulatory Requirements	1.3.6, 1.3.7	New technology (RPA Adoption) - 9 Systems resiliency and availability - 4	*New technology (RPA* Adoption) - Participant A, Participant B, Participant C, Participant D, Participant E, Participant F, Participant G, Participant I and Participant J *Systems resiliency and availability* - Participant C, Participant E, Participant I and Participant J
	Third Party (External) RPA Support	1.3.5	10	Participant A - Participant J
Task – Technology Fit	Task suitability for RPA	1.4.1	10	Participant A - Participant J
	RPA fit for the bank	1.4.2	10	Participant A - Participant J
	Use of RPA Technology	1.4.3	10	Participant A - Participant J
	Performance Impact provided by RPA	1.4.4	10	Participant A - Participant J