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# Adoption of Artificial Intelligence within the Financial Services Sector in South Africa

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# Adoption of Artificial Intelligence within the Financial Services Sector in South Africa


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

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# ABSTRACT

Artificial Intelligence (AI) I involves the development of computer software systems that simulate human intelligence. Institutional adoption of AI technology has grown exponentially due to its disruptive potential towards traditional financial sector processes. AI applications have played a positive role in the financial services sector processes by reducing operating costs, improving process efficiency, and managing operating risks these institutions face globally. While these benefits can potentially solve societal problems, such as an unproductive workforce, AI applications could increase social inequalities by using non-representative or biased data in their design. The research study explored the adoption of AI within the financial services sector, with a particular focus on its perceptions, benefits and challenges. Data was collected using a systematic literature review by analysing the relevant academic articles, industry and regulatory reports on AI adoption in South Africa. In addition, semi-structured interviews with four professionals within the financial services sector of South Africa through purposive sampling.

The research study found that the perceptions of AI in the South African financial services sector are negative, which is attributed to the impact of AI towards the job market within this sector. The benefits of AI are mostly observed from the risk management perspectives, customer experience and productivity, which are the major influences on the intention of financial services firms to adopt AI. The challenges found in AI adoption within the financial services sector relate to the lack of AI skills, age and regulatory issues. Lastly, financial services firms that disseminate information about the benefits, use cases and practical implications of AI within their internal operating environment were seen to be drivers of AI adoption. Financial institutions adopting AI should focus on investing employee skills, data management practices and Explainable AI (XAI) to improve efforts towards greater AI adoption in the sector.

# KEYWORDS

**Artificial Intelligence**

**Adoption**

**Financial Services Sector**

**South Africa**

# DECLARATION

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

Name: Kgothatso Masipa Signature: 

Signed at …Paulshof……

On the …10th……. day of …February…… 2025.

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"Discipline over motivation"

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# LIST OF ACRONYMS

**4IR:** Fourth Industrial Revolution

**AI:** Artificial Intelligence

**DL:** Deep Learning

**ML:** Machine Learning

**NLP:** Natural Language Processing

**RPA:** Robotic Process Automation

# 1 INTRODUCTION

## 1.1 Statement of Purpose

This research explored the adoption of Artificial Intelligence (AI) in the South African financial services sector.

## 1.2 Background of the Study

AI involves the development of computer software systems that simulate human intelligence (Biju et al., 2024). The term AI was developed by John McCarthy in 1956 to define systems that can think like humans (Fares et al., 2023). Institutional adoption of AI technology has grown exponentially due to its disruptive potential to existing sector processes (Kasula et al., 2024). This disruption is due to the Fourth Industrial Revolution (4IR), which is the convergence of advanced technologies like AI being introduced across multiple industries (Kasula et al., 2024).

The adoption of AI applications in financial services is rapidly growing, especially in the United States of America (USA), where the majority (over 80%) of banks know the potential benefits of adopting AI applications in their operations to deliver products or services (Fares et al., 2023). By 2023, banks in the United States of America will have saved $447 billion (USD) by introducing AI applications in their operational processes (Fares et al., 2023). This sector contributes heavily to AI investments, evidenced by an approximate $11 billion (USD) investment in 2020 to increase adoption efforts of this technology and realise the potential benefits (Rahman et al., 2023).

East, West and Southern African countries such as Nigeria, Kenya and South Africa are leading the implementation of AI applications within the sector. The sectors of financial services, healthcare and agriculture have seen the most use cases for AI implementation within these African nations (Eke et al., 2023). A study conducted by Deloitte found that 35% of South African executives are less

likely to implement 4IR technology, such as AI, within their business compared to their international peers (Schoeman & Seymour, 2022). While there is an increasing trend to adopt AI applications within financial services, usually to perform tasks better or more accurately than human operators, this does not always translate to individual adoption or trust (Frank et al., 2023).

This research study investigated perceptions on the adoption of AI within the financial services sector; a similar research study has been undertaken within South Africa focusing on the Western Cape's Financial Technology (FinTech) sector (Ndoro et al., 2020). This research study explored these perceptions in the context of financial services institutions in South Africa to produce key findings that may provide additional insights into AI adoption within the financial services sector.

## 1.3 Research Problem

AI applications have played a positive role (and have contributed) to the financial services sector by reducing operating costs, improving process efficiency, and managing operating risks these institutions face globally (Ramamurty et al., 2021).

While these benefits can potentially solve societal problems, such as an unproductive workforce, AI applications could increase social inequalities by using non-representative or biased data in their design. The most widely used AI applications today are built by institutions in the USA and Europe, increasing concerns regarding the existing bias of individuals and the training data used in 'teaching' AI by institutions, which can negatively impact implementations across Africa (Gwagwa et al., 2020).

AI adoption is becoming more prevalent within the financial services sector for the delivery of various products and services; this means that individuals are increasingly faced with the opportunity to use AI during their interactions with financial institutions to satisfy their financial needs. Financial institutions would

need to understand the impact of AI adoption within the sector. This research explored the adoption of AI within the financial services sector, with a particular focus on its perceptions, benefits and challenges.

## 1.4 Research Questions

1. What are the perceptions about AI within the South African financial services sector?
2. What are the factors that influence the adoption of AI within the South African financial services sector?
3. How does AI adoption affect the performance of institutions within the South African financial services sector?

## 1.5 Rationale

The adoption of 4IR technologies across the financial services sector continues to rise. Technologies like AI, Internet of Thing (IoT), Robotics, and Cloud Computing are seeing more implementation cases across small to large institutions. These technologies promise various benefits, such as improving organisation efficiency, quality and reducing costs (Javaid et al., 2021). However, the cultural and individual implications of introducing these technologies within the workforce challenge 4IR adoption (Ribeiro et al., 2021). In contributing to the body of knowledge of AI, this research study investigated the perceptions on AI adoption within the financial services of South Africa. This information is valuable to financial institutions investing in these technologies to integrate them into their products or services.

## 1.6 Delimitations

This research study focused on financial services institutions that operate within the South African finance market and provide retail financial services to South African individuals. The financial services institutions that would be part of this research study include the following sub-sectors: retail banking, investment banking, insurance, lenders, and Fintechs.

This research study excluded financial services institutions owned by the government, including those within the following domains: banking, social services, funding, and grants. This research study further excludes financial services institutions that have a presence in South Africa but do provide retail financial services products or services, such as international banks.

## 1.7 Definition of Terms

**Artificial Intelligence (AI):** Software applications that can make predictions, recommendations, and decisions with a degree of autonomy given particular human-defined objectives (Gwagwa et al., 2020).

**Algorithmic Trading (Algo Trading):** This field, also called Algo Trading, involves software algorithms that can automate financial instrument trading, such as currencies, stocks, bonds, and derivatives. Algorithms are 'trained' using historical data sets to determine the desired decision-making outcomes for trades (Pothumsetty, 2020). Algorithmic trading can also be defined as automated trading strategies, including processing trades and finding trades based on predefined rules configured on these systems (Addy et al., 2024).

**Cognitive Computing:** This field involves developing AI applications that mimic human cognitive functions by creating AI systems to understand and engage with humans in a natural setting (Thakker & Japee, 2023).

**Computer Vision:** This field involves teaching machines to understand visual information through images and videos required to support tasks such as image

recognition and facial recognition in AI (Thakker & Japee, 2023). In robotics, computer vision allows robots to identify and process visual information to interact with their external environment (Soori et al., 2023).

**Deep Learning (DL):** Deep learning uses neural networks and extensive unstructured data sets to identify patterns or classifications in data, which is crucial in learning complex tasks (Biju et al., 2024).

**Expert System:** AI systems that can mimic human expertise to solve problems and provide recommendations to issues based on a knowledge base of similar problems or scenarios documented by experts in a particular domain (Thakker & Japee, 2023). An expert system can further be defined as a computer system that stores or represents human knowledge and expertise to solve problems (Tsoraya et al., 2023).

**Fourth Industrial Revolution (4IR):** The fourth industrial revolution involves the next level of technological transformation that society is undergoing, which involves the use and application of technologies such as Augmented Reality (AR), Virtual Reality (VR), AI, Internet of Things (IoT) and Autonomous Machines (Ross & Maynard, 2021).

**High-Frequency Trading (HFT):** Based on traditional algorithmic trading and involves software algorithms that can process higher numbers of trades than algorithmic trading, these trades are executed within milliseconds (Addy et al., 2024). This field can also be defined as advanced software algorithms that process trades at outstanding speeds compared to traditional algorithmic trades and rely on low latency and execution of trades in milliseconds (Pothumsetty, 2020).

**Machine Learning (ML):** A subset of AI involving software algorithms that can make decisions using user-specified data and improving task execution ability over time (Soori et al., 2023). ML is a broad field that is concerned with the use of algorithms and data sets to 'learn' the operation of complex tasks through additional data and models (Biju et al., 2024).

**Natural Language Processing (NLP):** The field that involves the ability of robots and algorithms to understand and respond to human natural or spoken language (Soori et al., 2023). NLP is AI that enables computer systems to understand, interpret, and process human languages (Zhou et al., 2020).

**Artificial Neural Networks (ANNs):** A subset of ML that involves the use of interconnected nodes to process and transmit the information required for ML tasks such as speech recognition, NLP, and decision-making (Thakker & Japee, 2023). In robotics, neural networks can assist robots in learning from experience to increase efficiency and decision-making over time (Soori et al., 2023).

**Reinforcement Learning:** A subset of ML that focuses on teaching AI agents in a manner that introduces rewards or punishment for desired or undesired performance outcomes by the agent (Thakker & Japee, 2023). In robotics, reinforcement learning allows robots to learn task completion through multiple iterations; reinforcing positive outcomes by receiving rewards further aids their learning process (Soori et al., 2023).

**Robotics:** The field concerned with the design, development, and operations of robots, which can be classified as machines that can perform tasks or interact with the physical world (Soori et al., 2023). Robotics' foundations lie in Computer Science and Engineering, involving conceptualisation, fabrication, and use of robots to perform tasks autonomously or semi-autonomously (Ness et al., 2023).

**Robotic Process Automation (RPA):** RPA is software robotic technology or 'bots' that can automate or perform specific repetitive or rule-based tasks (Thakker & Japee, 2023).

## 1.8 Assumptions

This research study was conducted with the following assumptions in place:

1. Financial services institutions in South Africa have incorporated AI within their operations.

2. Sufficient secondary information has been generated on AI implementation and adoption within the financial services sector in South Africa.

## 1.9 Research Outline

Chapter 1 of this research report provided the reader with a high-level view of the research topic for this research study. The purpose, background, research problem, and rationale were discussed to give the reader the context of the research study, along with the preliminary set of research questions. Furthermore, the delimitations and assumptions were discussed to give the reader an overview of the identified constraints in this research study on AI within the financial services sector.

Chapter 2 reviewed the literature on the concepts of AI, offering a historical overview, theoretical concepts, and a detailed systematic literature review of the concepts of AI within the financial services sector in South Africa.

Chapter 3 detailed the methodology adopted in this research, including the population and sample, data collection and data analysis procedures.

Chapter 4 consists of result discussions based on the systematic literature review and the results of the interviews on the adoption of AI within the financial services sector in South Africa.

Chapter 5 is about the conclusion of this research study on the adoption of AI within the financial services sector in South Africa. Highlighting the key findings, recommendations, contributions to literature, and potential areas of further research.

# 2 LITERATURE REVIEW

## 2.1 Introduction

Chapter 2 provided a literature review on AI within the financial services sector. It also provides insights into the field of AI, its historical background, concepts within AI, and the applications of AI within the context of the financial services sector. Ethical considerations of AI were also discussed to provide the reader with a view of the moral constraints experienced within the domain.

## 2.2 Background of AI in Financial Services

### 2.2.1 Historical Overview of AI

The origins of AI began at the Dartmouth College Conference in the mid-1950s; a group of scholars across the USA embarked on an eight-week workshop later named the Dartmouth Summer Research Project on Artificial Intelligence (DSPRAI). This workshop introduced the term AI and formed the foundation of the domain. The definition of AI was first coined in this workshop as “machines to understand, think, and learn similarly to humans” (Toosi et al., 2021).

Towards the 1970s, after the foundation laid out by scholars from the DSPRAI led by John McCarthy and Marvin Minsky, research and interest in AI surged along with investment by organisations in an attempt to reap the potential rewards. Key to this was the meteoric rise of organisations using expert systems. The 1980s and 1990s proved to be challenging decades for AI, as organisations scaled back on AI investments with budget cuts and the decline of expert systems partly due to overpromised benefits that were not realised. These developments marked a sharp decline in AI popularity, as interest in the domain from an organisation adoption and research perspective reduced (Toosi et al., 2021).

In the 2000s, AI rebounded within the sector and the academic fields. Technological advances in computing processing power, big data systems and advanced algorithms fuelled this resurgence. Investment in AI is at an all-time

high, with new AI start-ups budding, which indicates a fertile time for the domain, while AI research output has also increased (Toosi et al., 2021).

### 2.2.2 Evolution of AI in Financial Services

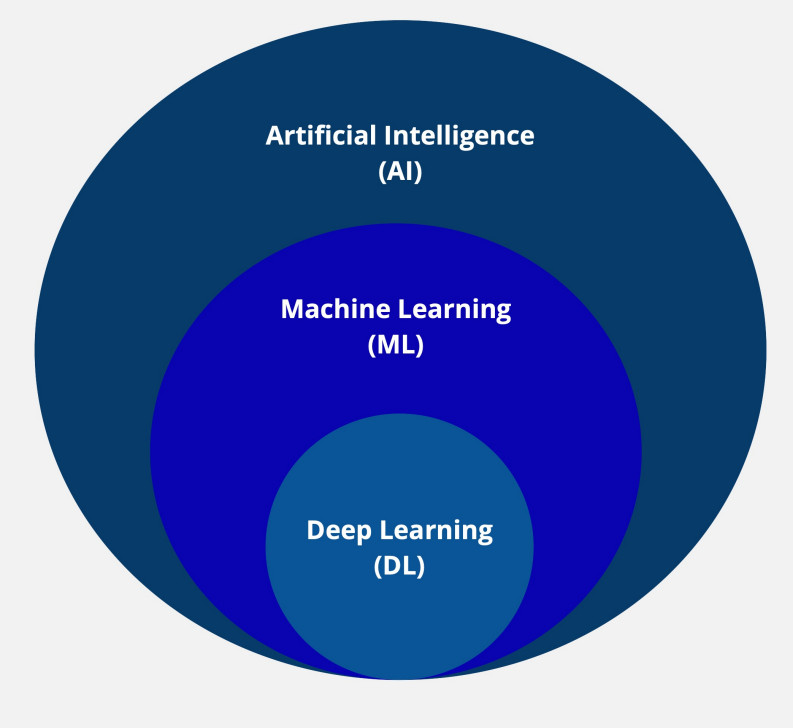
The implementation of AI within the financial services sector can be traced back to expert systems in the early 1980s; these systems were popular within the finance sector and were an early introduction to AI. Expert systems were beneficial in solving organisational-specific problems and decision-making within financial services institutions, thereby enhancing the productivity of employees. One of the challenges with using expert systems was the amount of time and effort required to transfer expert knowledge from individuals into these systems to enable future troubleshooting for specific financial problems. Another challenge of these systems is that they can only respond to what experts have documented, nothing more. These challenges limited the scalability and adoption of expert systems and, ultimately, their decline within the financial services sector (Confalonieri et al., 2021).

Following the decline of expert systems in the 1980s, the 1990s saw an increase in the use of artificial neural networks by financial institutions. The nature of these artificial neural networks, which use interconnected nodes and can analyse large data sets, made these systems beneficial for these organisations (Y. Li et al., 2021). Neural networks were implemented in financial services in the 1990s to use large data sets to make stock price predictions and assess the potential for clients to default on their credit obligations, thereby allowing financial institutions to make informed decisions about offering credit facilities to clients. The challenges of neural networks at the time were mainly related to the replicability of predictions produced by these systems. Financial institutions using neural networks could obtain different results whilst using the same input data set, which proved to be an issue in the consistency of their decision-making. An additional challenge that financial institutions experienced at the time was due to the complexity of learning and using these systems by employees (Swamy et al., 1997).

Algorithmic trading use within financial services in the 1980s accelerated again due to improved computer processing power. Later into the 1990s, technological advances in the development of algorithms and the use of more complex mathematical models gave rise to high-frequency trading (HFT). HFT made waves in the 2000s; as a subset of algorithmic trading, this technology takes the earlier capabilities of algorithmic trading to the next level with faster trade execution times and improved order-to-trade rations compared to its predecessor. In addition to leveraging the computing power of the 2000s, HFT also leans on neural networks to help analyse large data sets to identify patterns and trends, thereby improving the decision-making capabilities of trades (Addy et al., 2024).

The 2010s involved the adoption of advanced AI technologies within the financial services sector, whose detailed uses within financial services are discussed in the following sections of this research report.

**Figure 1: Relationship between AI, ML and DL (Zhuhadar & Lytras, 2023)**



## 2.3 AI Technologies Used in Financial Services

### 2.3.1 Deep Learning (DL)

#### 2.3.1.1 *Convolutional Neural Networks (CNNs)*

Convolutional Neural Networks (CNNs) are AI systems with a multi-layer design based on nodal neural networks. CNNs are built to enable AI tasks such as identifying, classifying and detecting objects in diagrams, which is a crucial function of image recognition AI features (Taye, 2023).

#### 2.3.1.2 *Recurrent Neural Networks (RNNs)*

Recurrent Neural Networks (RNNs) differ from CNNs as they are used for sequential data processing activities based on nodal Neural Networks. This design differs from the multi-layer design in CNNs. RNNs are primarily used in NLP due to their sequential data processing design (Cossu et al., 2021).

### 2.3.2 Machine Learning (ML)

#### 2.3.2.1 *Supervised Learning*

Supervised learning involves providing the machine algorithm with input data sets that have been pre-labelled to teach the machine learning algorithm the desired decision outcome. In this case, the ML algorithm would be required to learn how to map the input received to expected output variables to make future predictions (Rakshit et al., 2022).

#### 2.3.2.2 *Unsupervised Learning*

In unsupervised learning, the ML algorithm is taught to perform predictions based on unlabelled or unstructured data sets. The algorithm is tasked with identifying patterns and relations within this data to perform future predictions based on similar conditions (S. Naeem et al., 2023).

Both supervised and unsupervised learning approaches to teaching ML algorithms use the reinforcement learning technique, whereby an agent (ML algorithm) interacts with its environment (data set) to learn through trial and error to perform predictions (S. E. Li, 2023).

### 2.3.3 Natural Language Processing (NLP)

#### 2.3.3.1 *Text Analysis*

Text analysis refers to deriving valuable insights from data in text form. In order to perform this action, the NLP algorithm is required to interpret, analyse and identify sentiments within the data. These functions within text analysis can support AI, especially within voice assistants and sentiment analysis functions in identifying tone based on text, which is popular with social media data analysis (Raparthi et al., 2021).

#### 2.3.3.2 *Speech Recognition*

Speech recognition is the ability of machines to understand spoken language (Toosi et al., 2021). Through this technology, machines can interpret spoken language and translate those into commands that can be actioned by software or hardware devices.

#### 2.3.3.3 *Natural Language Generation*

Natural language generation refers to the generation of text by software based on human operator prompts or questions; these software algorithms can respond with a phrase or even detailed explanations in text form (Dong et al., 2022).

### 2.3.4 Robotic Process Automation (RPA)

#### 2.3.4.1 *Attended Robotic Process Automation (RPA)*

Attended Robotic Process Automation (RPA) refers to software that relies on a human operator for specific actions as part of the RPA deployment. These RPA deployments are often at an end-user level (end-user machine), where

employees must manage RPA software execution for their own or their organisation's productivity needs (Chugh et al., 2022).

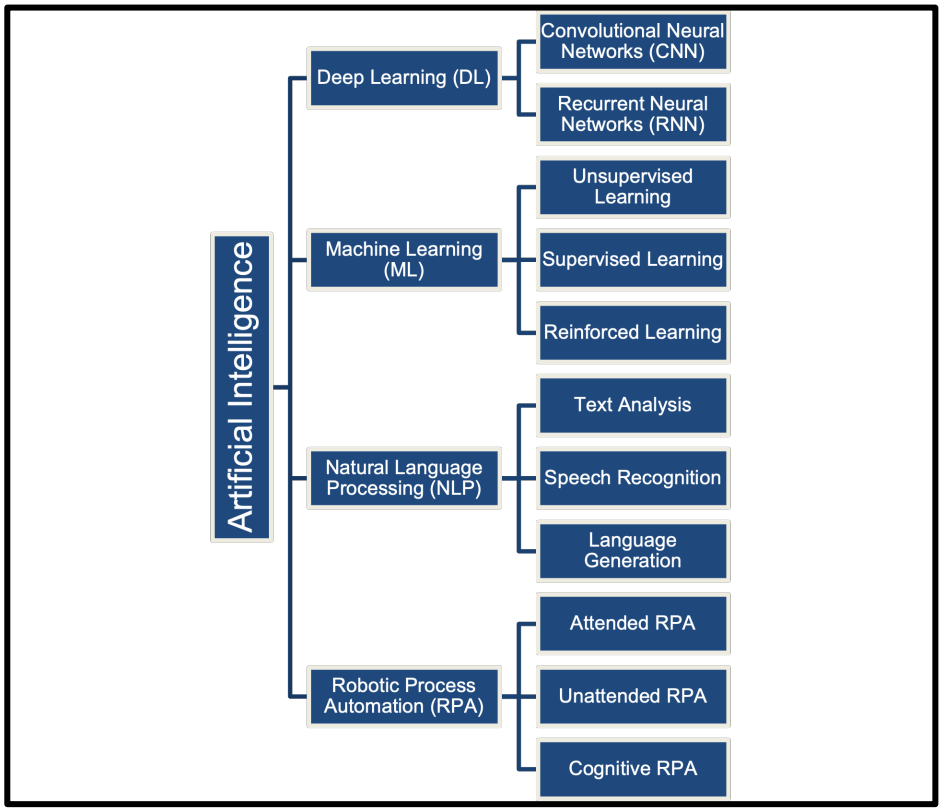
#### 2.3.4.2 *Unattended Robotic Process Automation (RPA)*

Unattended RPA refers to automation controlled through cloud-based processes managed through background tasks instead of being implemented at the workstation layer. These RPA deployments do not require human intervention and can thus be scheduled and controlled automatically (Chakraborty et al., 2023).

#### 2.3.4.3 *Cognitive Robotic Process Automation (RPA)*

Cognitive RPA is an advanced form of software robot that incorporates ML capabilities to embed cognitive knowledge and insights into the RPA software. Cognitive RPA can execute more complex automation tasks by mimicking human-like reasoning through ML (Engel et al., 2022).

**Figure 2: Summary of AI Concepts**



## 2.4 AI Applications in Financial Services

### 2.4.1 Customer Services

#### 2.4.1.1 *Chatbots*

Chatbots are AI tools that enable real-time customer interactions through chat interfaces by using natural language models to facilitate human-like conversations (Adam et al., 2021). Chatbots are used within financial services to automate communication with customers to serve their clients' needs; this can include supporting clients in addressing any queries, providing troubleshooting support, and offering tailor-made products or services based on their usage data (Hentzen et al., 2022). Financial service institutions have seen a sharp uptake of chatbots to improve customer experience and reduce costs related to customer servicing.

#### 2.4.1.2 *Virtual Assistants*

Virtual assistants are AI-driven software that enables automated customer interactions, similar to chatbots. Virtual assistants are not only able to interact with customers through text-based human-like conversations, but they are also able to understand and respond to voice prompts. Customers can use virtual assistants in financial services to process transactions and support their financial needs. Virtual assistants, like chatbots, have seen an increase in adoption by financial institutions for their benefits related to lowering operational costs and improving customer service (Hentzen et al., 2022).

#### 2.4.1.3 *Personalization of Products and Services*

AI has been used within the financial services sector to deliver tailor-made products and services; AI tools do this by mining through large sets of customer usage data, such as spending behaviour and transaction history, to identify patterns in the data and offer personalized products based on predicting

customers financial needs. These personalized products and services can foster higher customer experience and loyalty (Hari et al., 2022).

### 2.4.2 Risk Management

#### 2.4.2.1 *Credit Risk*

AI applications have been used within the financial services sector to assess the credit risk of existing and potential clients. AI does this by processing large amounts of historical and generic consumer data, assessing credit scores from credit bureaus, and determining the customer's credit risk. These models have been used to assess creditworthiness and predict customers' potential to default on their credit, which is helpful to understand before financial institutions grant new or additional credit to customers (Misheva et al., 2021). Financial technology startups such as Jumo are leveraging ML for their credit models which replace outdated models that may have bias, to enhance financial inclusion through better credit risk models (Whelpton, 2021).

#### 2.4.2.2 *Fraud Risk*

AI has been used in the financial services sector to identify fraudulent transactions and activity using complex algorithms and advanced data analytics technologies. Large data sets, which include customers' historical and transactional data, are used by AI to detect patterns and anomalies in data that may have fraud markers and flag those for further investigation. ANNs and ML algorithms are most used within fraud detection; in supervised learning, ML algorithms can learn to identify fraudulent transactions based on labelled data sets. In unsupervised learning, these ML algorithms can identify anomalies and outliers in data deemed out of the norm of traditional transactions and identify those as fraudulent transactions. Of course, reinforcement learning is vital to ensuring that algorithms are rewarded for the correct outcomes. Using AI in fraud detection techniques within financial services is essential to helping these organisations improve their fraud practices, reducing operational costs and financial fraud within the sector (Zanke, 2023).

### 2.4.3 Wealth and Investment Management

#### 2.4.3.1 *Algorithmic Trading and High Frequency Algorithmic Trading*

The use of AI in algorithmic trading within finance, as discussed earlier in this research report, was made in the 1980s to perform financial trades. Later, HFT was the norm through advancements in technology computing power and developments in data analytics (Addy et al., 2024). The use of algorithmic and HFT has advanced today due to further technological advances and mature AI adoption within the sector. Today, this form of trading can be performed more accurately using social media sentiment analysis, making quicker trading decisions and generating higher trading strategies because of complex ML algorithms and vast amounts of data to perform data analysis techniques (Cohen, 2022).

#### 2.4.3.2 *Robo-Advisors*

Robot advisors or robo-advisors are intelligent virtual assistants who support clients in their financial advisory processes and interactions. These intelligent advisors can provide tailor-made guidance on financial products according to clients' risks and goals through AI and advanced algorithms, thereby reducing the role of traditional financial advisors in the investment management process. Using robo-advisors in finance benefits clients as these tools are much more easily accessible, have higher transparency in their outcomes and offer personalized investment management products to these clients (Huang et al., 2024).

### 2.4.4 Operations Efficiency

#### 2.4.4.1 *Process Automation*

RPA within financial services is one of the most impactful process optimization techniques. RPA can automate routine and complex processes within the financial institution's operations, reducing human intervention and errors whilst

outperforming human operators in their efficiency. RPA is also used in operational fault diagnostics and predictions by performing complex ML algorithms to reduce the likelihood of human errors (Ng et al., 2021).

#### 2.4.4.2 *Compliance Monitoring*

AI is used within the financial services sector by automating compliance processes by performing those actions using RPA and reducing manual human-operator intervention. AI can also leverage advanced data analytics to analyse large datasets, identify anomalies and flag those for rectification by financial professionals. Similarly, AI can identify fraudulent activities in real-time, thus reducing possible compliance risks within financial services institutions (Hasan, 2022).

## 2.5 AI Application Cases in Financial Services

Nedbank introduced an AI chatbot called Enbi, this conversational chatbot powered by AI can be used by customers to perform everyday banking tasks and queries with 24/7 availability (Nedbank, 2024). Standard Bank uses enhanced fraud detection techniques using predictive analytics over their payment platforms to identify and prevent fraudulent transactions in the bank (Hamilton, 2024).

## 2.6 Ethical Implications of AI in Financial Services

### 2.6.1 Transparency and Accountability

Decisions made by AI algorithms are not generally open to the public; this information is proprietary and protected by the institutions that use these applications to automate specific processes. This constraint poses an ethical concern as decisions taken by these AI systems are not transparent, leaving opportunities for bias and discrimination in these decisions (Gwagwa et al., 2020). To improve the transparency of AI algorithms, explainable AI (XAI) techniques need to be employed by institutions to make AI models more understandable to

individuals whilst not hampering their performance. These XAI models can be used to validate whether AI algorithms make decisions based on ethical criteria set by institutions to reduce the likelihood of bias in their decision-making (Ali et al., 2023).

### 2.6.2 Bias and Fairness

AI algorithms and system bias can pose a significant issue, considering financial decisions' impact on communities. Using historical data sets (produced by trainers) to train algorithms is one of the leading reasons for inheriting this bias, which can be seen through discriminatory decisions towards marginalised communities, for example, in credit lending products within financial services (Bartlett et al., 2022). The elements of bias and fairness should also be addressed using XAI techniques to build trust within the AI algorithms' decision-making.

### 2.6.3 Human Rights

AI applications used in financial services institutions need to ensure that they abide by human rights obligations towards the communities they serve. These applications are built using training data sets by human operators and left to their decision-making for financial outcomes, ensuring that these systems make decisions that do not cause human rights violations, which is critical. These violations could include the right to privacy, anti-discrimination and freedom of speech based on the decisions taken by AI applications within the financial services sector (Gwagwa et al., 2020).

## 2.7 ANALYTICAL FRAMEWORK

### 2.7.1 Theoretical Frameworks

#### 2.7.1.1 *Diffusion of Innovation (DOI) Theory*

The Diffusion of Innovation (DOI) model was introduced by Everett Rogers; this theory considers the rate of innovations and the factors that influence the adoption of these innovations within society (Sahin, 2006). For this research study, this theory is suitable to look at the adoption of AI technologies within the financial services sector in South Africa.

#### 2.7.1.2 *Socio-Technical Systems (STS) Theory*

The socio-technical systems (STS) model proposes two subsystems within every institution: the social and technical subsystems. This model explains the interconnected nature of technology and society (Cartelli, 2007). This theory is suitable for exploring the impact of AI usage in financial services institutions on existing social systems within South Africa.

### 2.7.2 Propositions

The propositions of this research study are guided by the theory of DOI and STS listed below:

1. Proposition 1: AI adoption within the financial services sector is impacted by perceptions of its advantages and challenges.
2. Proposition 2: Dissemination of knowledge and observations of AI within the financial services sector influences the adoption and diffusion of the technology in South Africa.
3. Proposition 3: AI adoption within the financial services sector enhances operational procedures and firm efficiency.
4. Proposition 4: AI adoption within the financial services sector reduces operational costs and improves firm efficiency.

# 3 RESEARCH METHODOLOGY

Chapter 3 presented the research methodology deployed in this research study. The research paradigm, design, data collection and analysis approaches were discussed. Furthermore, the elements of quality assurance required and ethical considerations that underpin this research study were discussed.

## 3.1 Research Paradigm

The interpretivism paradigm was chosen for this research study, this was used to examine AI's adoption within the financial service sector. The interpretivism paradigm emphasises that knowledge and reality are socially constructed, and this paradigm is rooted in the philosophy that meaning can be derived from individual perceptions about the world around them (Denzin & Lincoln, 2011). The ontology for this paradigm is grounded on relativism, which is based on the belief that knowledge can be generated by individuals' experiences about the phenomena under study (Ugwu et al., 2021). This paradigm is suitable for studies looking into complex phenomena, such as the adoption of AI within the financial services sector in South Africa.

## 3.2 Research Approach

The qualitative research approach was used for this research study. Qualitative research aims to understand social phenomena by exploring individuals' perspectives and experiences (Oates et al., 2022). Using this research approach, the researcher reviewed non-numeric data from research articles and sector reports to extract meaning. Furthermore, the researcher used semi-structured interviews using qualitative methods. This research approach was suitable for this research study as it enabled the researcher to explore the complex topic of AI within financial services and review secondary research relevant to answering the research questions posed in this research study.

## 3.3 Research Design

Document analysis was used to obtain secondary information needed to answer the research questions in this research study on AI within the financial services sector of South Africa. Document analysis is a technique researchers can use to analyse printed and electronic documents to support the qualitative research process (Armstrong, 2021). Following this technique, the researcher reviews academic literature, sector reports and publications to answer the research questions posed in this research study.

Document analysis enabled the researcher to examine the literature on the adoption of AI within the South African financial services sector, this was crucial to answering the research questions in this research study. AI as the domain has seen massive growth in academic literature and publications within the sector. Document analysis allowed the researcher to review these information-wide and rich data sources, which was cost-effective and less intrusive than other research design techniques (Morgan, 2022).

Furthermore, the researcher used interviews to meet the research objectives of this research study, engaging with experienced professionals in the financial services field to obtain their insights on the use of AI within the sector. Interviews further enriched the data quality of the research report, allowing the researcher to probe participants for deeper insights into a particular question or theme.

## 3.4 Data Collection Method

### 3.4.1 Systematic Literature Review

Part of the data for this research study was collected through secondary research using a systematic literature review approach. The researcher used relevant academic research databases and publicly available reports on the state of AI within the financial services sector in South Africa. The secondary data was relevant to the topic and helped understand the adoption of AI in South African

financial services across a wide range of institutions within the banking, fintech and lending subsectors.

### 3.4.2 Interview

The researcher interviewed professionals within the financial services sector of South Africa. The researcher used semi-structured interviews, whereby the interview questions were pre-determined and open-ended to participants. The interviewer queried participants' responses and further explored particular themes through the semi-structured interview approach. This flexibility in this interview approach is critical to answering the research questions and meeting the research study's research objectives.

## 3.5 Population and Sample

### 3.5.1 Population

The population for this research study was the various financial sector stakeholders within South Africa who are influenced or impacted by the growing use of AI within the sector. This population includes banks, lenders, and FinTechs within the sector that leverage AI in offering services to the South African public. In the case of the interview, professionals within the financial services field were the population group that was interviewed to obtain their insights on the adoption of AI in the financial services sector.

### 3.5.2 Sample and Sampling Method

In developing this research study, the researcher adopted a systematic review of the literature on AI adoption within the financial services sector in South Africa. The researcher used purposive sampling to identify relevant research studies undertaken in South Africa related to the adoption of AI from recognized academic journals, financial service industry reports and publications. Recognized journal databases and grey literature searches were used as a sampling method to identify relevant literature within the field. Purposive sampling

was used as a method to identify and interview four professionals in the financial industry to augment the information gathered through systematic literature.

## 3.6 The Research Instrument

The proposed research instrument for this research study was document analysis through a systematic literature review. In order to follow a methodological approach to extracting the required data, the researcher used a data extraction form to organize and document the findings per the identified research resource. The research data extraction form includes the following data points to assist the researcher in this research study:

- Article
- Purpose
- Author/s
- Year (of publication)
- Sector
- Population (of the research study)
- Research Design
- Key Findings

The research data extraction form was included in Appendix B of this research study.

Secondly, interviews are used as an additional research instrument in this research study. The researcher followed a semi-structured interview approach alongside open-ended questions that allowed the interviewer to probe further on specific questions. There were 18 open-ended questions that covered three themes (in sections) required to address the research objectives and questions.

**Section 1:** Perceived AI Benefits - These questions are to understand the participants' perceptions about the benefits and advantages of using AI technologies within the financial services sector.

**Section 2:** Perceived AI Risks - These questions are to understand the participants' perceptions about the risks, challenges and misconceptions of using AI technologies within the financial services sector.

**Section 3:** Perceived AI Trust - These questions are to understand the participants' perceptions about the attitudes and adoption of AI technologies within the financial services sector.

The interview research guide is included in Appendix C of this research study.

## 3.7 Procedure for Data Collection

During the systematic literature review on AI adoption within the financial services sector, the researcher used the following procedure to collect relevant data:

1. Selected relevant research databases (Google Scholar, Scopus, Industry Publications).
2. Developed a search strategy (Search keywords, Boolean operators). The researcher used the following search terms to extract the initial articles:
    a. "adoption of AI" AND "financial services" AND "South Africa"
    b. "implementation" AND "artificial intelligence" AND "financial services" AND "South Africa"
    c. "adoption" AND "artificial intelligence" AND "banking" AND "South Africa"
    d. "adoption" AND "artificial intelligence" AND "insurance" AND "South Africa"
3. Developed a data extraction form template.
4. Performed searches on selected databases.
5. Selected relevant research articles and industry reports.
6. Organised the research results in Microsoft Excel (research articles and industry reports).

Secondly, participants in this research study were identified and approached on professional virtual platforms such as LinkedIn to partake in the research study.

The participants were presented with the participant information sheet, which provided them with a background of the research study to make a well-informed decision to participate. The participant information sheet is included in Appendix E of this research study.

Once the potential participant reviewed the participant information sheet and elected to partake in the research study, the potential participant was presented with the participant informed consent forms to accept and sign off prior to the interview being held. The participant informed consent form is included in Appendix D of this research study.

The interviews were conducted on the Microsoft Teams virtual audio conference software, and the interview questions were shared with the participants before the scheduled interview so they could acquaint themselves with the questions. The interviews were conducted over 30 to 45 minutes in a semi-structured approach to enable the interviewer to probe further for particular questions. The interview guide is included in Appendix C of this research study.

## 3.8 Data Analysis Strategies and Interpretation

Thematic analysis For this qualitative study, the thematic analysis technique was used as a data analysis approach for the relevant secondary data collected through a systematic literature review. The thematic analysis technique helped the researcher assess the key themes and patterns within the relevant literature on AI within the financial services sector in South Africa. The researcher used thematic analysis in the following step-based approach:

1. Collected relevant research material, i.e. research articles and grey literature.
2. Coded and labelled the research material using the Atlas.ti software.
3. Reviewed the recurring themes based on the research material.
4. Discussed the themes and findings.

To ensure rigour in the research analysis approach, the researcher used various data sources and documented a detailed audit trail within the analysis process.

Thematic analysis was used as a technique to perform the data analysis for the interviews held with participants within the financial services sector. To analyse the interview data, the researcher used thematic analysis in the following step-based approach:

1. Transcribed the audio recordings to written text. The built-in transcription functionality on Microsoft Teams was used for this step.
2. Coded and labelled the research material using the Atlas.ti software.
3. Identified and reviewed the recurring themes based on the research material.
4. Discussed the themes and findings.

## 3.9 Possible Limitations and Challenges of the Study

1. The quality and quantity of secondary data of AI in the financial services sector may pose a challenge if this data is unavailable or difficult to obtain. In addition, the researcher may need to use multiple databases to source all relevant articles for this research study.
2. The research must be completed by the end of December 2024, limiting the comprehensiveness of such a research study within the required time.

## 3.10 Quality Assurance

### 3.10.1 Transferability

Transferability refers to how the findings of this research study can be used in different contexts, sectors or similar studies that could be performed in the future within qualitative research (Kakar et al., 2023). To improve transferability, the researcher used thick descriptions to improve the rigour of this research study. Thick descriptions are included in the quality assurance of this research study by providing the reader with detailed descriptions of the context of the secondary material, such as the participants and research designs of the utilised studies, which is vital to producing rich data (Morse, 2015).

### 3.10.2 Credibility

Credibility refers to the authenticity of the results produced by the research study and whether the outcomes of this research study can be reasonably believed by the reader (Tracy, 2010). To improve credibility, the researcher used the prolonged engagement technique to increase the quality assurance of the research study. Prolonged engagement in the research study refers to the researcher's ability to engage with the secondary material and the deepened familiarization with the research articles used in the research study (Morse, 2015). The researcher leveraged reflexivity, which refers to the ability of the researcher to continuously assess biases and assumptions used in the research study through thorough documentation. For robustness, data from the interview was used to authenticate the findings from the literature review.

### 3.10.3 Dependability

Dependability refers to the reliability of the findings in the research study; in qualitative research, a detailed research procedure is required to enable replicability of a similar research study by future researchers (Kakar et al., 2023). The researcher introduced a detailed audit trail and triangulation techniques to increase the dependability of this research study. Triangulation involves using

various data sources or methods in the research study to strengthen the element of transferability (Morse, 2015). In this research study, the researcher deployed various sources for the secondary data used, which included academic articles, industry reports, case studies and regulatory reports.

A detailed audit trail in a research data extraction form was used to keep track of the various research articles and industry publications relevant to the research study. To improve the triangulation of the data used in this research study, the researcher used data from interviews, where professionals within financial services were interviewed to confirm the findings from the literature.

## 3.11 Ethical Considerations

To ensure ethics compliance, the researcher provided potential interviewees with consent forms to be signed (physically or virtually) or through verbal consent before interviews were held. The interviewees were kept confidential during the data analysis and discussion sections of this report. Lastly, the researcher obtained ethics approval from the Wits ethics committee to adhere to the university's ethical standards. The ethics clearance certificate was included in Appendix F of this research study.

# 4 PRESENTATION OF RESULTS

## 4.1 Introduction

The results of this research study were presented in this chapter. The researcher provided an overview of the thematic analysis approach that was followed to identify the codes and themes using the Atlas.ti software. Document reviews were used to generate the findings using academic articles and industry reports on AI adoption within the financial services sector. The findings were also generated using interviews with professionals within the financial services sector and linked to the four propositions posed in Chapter 2. This chapter closes with a summary of the findings generated using the thematic analysis approach.

## 4.2 Background Information

To address the research questions and link them to the propositions, the researcher searched for applicable secondary data through searches on databases using keywords, screening secondary articles to reach 22 articles and industry reports on AI adoption in the South African financial services sector. Table 1 highlights the steps followed for the document analysis.

**Table 1: Structured Literature Review Process**

| # | Step | Details |
|---|---|---|
| 1. | Databases Searched | • Google Scholar<br>• Proquest |
| 2. | Search Terms & Results | • "adoption of AI" AND "financial services" AND "South Africa"<br>• "implementation" AND "artificial intelligence" AND "financial services" AND "South Africa"<br>• "adoption" AND "artificial intelligence" AND "banking" AND "South Africa"<br>• "adoption" AND "artificial intelligence" AND "insurance" AND "South Africa"<br><br>The search stage resulted in 93 articles and industry reports being collected. |
| 3. | Inclusion Criteria | • 2019 – 2024.<br>• Peer reviewed articles.<br>• Within South Africa. |
| 4. | Exclusion Criteria | • Articles and industry reports published before 2019<br>• Articles that are not peer reviewed. |
| 5. | Screening | • Initial screening through title and abstract reviews.<br>• Secondary screening through a full text review.<br>• Removal of duplicate articles.<br><br>The screening stage resulted in 22 articles and industry reports for inclusion in the research report. |

Table 2 highlights the reports that were extracted from the documents used in this research study to perform the document analysis and generation of results.

**Table 2: Selected Articles for the Systematic Literature Review**

| # | Article | Author/s | Year | Sector |
|---|---|---|---|---|
| 1 | The Perceived Impact of Artificial Intelligence on Operations Performance in the South African Life Insurance Industry | Thami Kunene | 2021 | Insurance |
| 2 | Management of Disruptive Technologies as Applied in Stages of Long-term Insurance Processes | Thabo Moloi and Antoine F. Mulaba-Bafubiandi | 2024 | Insurance |
| 3 | Artificial Intelligence Technology to Enhance Data Quality Management Practices in the Banking Industry in South Africa | Talifhani Ramaliba and Lorette Jacobs | 2024 | Banking |
| 4 | Exploring Artificial Intelligence in the South African Banking Industry | Vongai Praise Darangwa | 2021 | Banking |
| 5 | Factors Predicting Consumers' Adoption of Chatbots within the Banking Industry in South Africa | Felix Amoah, Christabel Rusike, Laura Novienyo Abla Amoah | 2023 | Banking |
| 6 | Modelling Factors Influencing Bank Customers' Readiness for Artificial Intelligent Banking Products | L. Garekwe, S. J. Ferreira-Schenk, Zandri Dickason-Koekemoer | 2024 | Banking |
| 7 | Transformative Impacts of Automation on the Nature of Work: A Perspective of the Banking Industry in South Africa | Save Akilimalissiga and Nita Inderlal Sukdeo | 2024 | Banking |
| 8 | Understanding the Role of Artificial Intelligence in Banking | Maggie Matsie | 2023 | Banking |
| 9 | Factors Driving Artificial Intelligence Adoption in South Africa's Financial Services Sector | Adewale Samuel Hassan | 2024 | Financial Services |
| 10 | Industry 4.0 in Finance: The Impact of Artificial Intelligence (AI) on Digital Financial Inclusion | David Mhlanga | 2020 | Financial Services |
| 11 | Artificial Intelligence Uses, Benefits, and Challenges: A Study in the Western Cape of South Africa Financial Services Industry | Hakunavanhu Ndoro, Kevin Johnston, Lisa Seymour | 2020 | Financial Services |
| 12 | The Perceived Impact of Artificial Intelligence on Jobs at Financial Services Organisations in Johannesburg | Nyasha Zhou | 2022 | Financial Services |

| # | Article | Author/s | Year | Sector |
|---|---|---|---|---|
| 13 | Determinants of Emerging Technologies Adoption in the South African Financial Sector | Nkhulang T. Matsepe and Elma van der Lingen | 2022 | Financial Services |
| 14 | The Effect of the Fourth Industrial Revolution on Employment in the Insurance Sector in Cape Town, South Africa | Nosiphelo Buyana | 2022 | Insurance |
| 15 | The Impact of Digitalisation on the Employment Rate in the South African Financial Services Industry | Makoma Tiny Mokhabuki | 2023 | Financial Services |
| 16 | The Potential Impact of AI and Generative AI Across Healthcare, Education, Financial Inclusion, and Agriculture in South Africa | Nihmal Marrie, Igor Lakic, Caio Anteghini, Asif Valley, Benjamin Rosman, Martin Bekker, Lexi Shongwe | 2023 | Cross-sectoral (Healthcare, Education, Financial Services, Agriculture) |
| 17 | Is South Africa Ready for AI? | Willie Schoeman, Rory Moore, Yusof Seedat, Dr. Jeff Yu-Jen Chen | 2023 | Cross-sectoral (focus on business, technology, and policy) |
| 18 | The Future of Work in South Africa: Digitisation, Productivity, and Job Creation | Nomfanelo Magwentshu, Agesan Rajagopaul, Michael Chui, Alok Singh | 2019 | Cross-sectoral (Mining, Retail, Banking, and more) |
| 19 | Artificial Intelligence in the Financial Sector and Emerging Consumer Protection Concerns | Nolwazi Hlophe | 2024 | Financial Services |
| 20 | Technological Change in the Insurance Sector in South Africa: Disruption with the Potential for Social Good in a Developing Country Context? | Zaakhir Asmal, Haroon Bhorat, Lisa-Cheree Martin, Chris Rooney | 2023 | Insurance |
| 21 | AI and Data in South Africa's Finance Sector: Toward Financial Inclusion | Mark Gaffley | 2021 | Financial Services |
| 22 | The Adoption of Artificial Intelligence by South African Banking Firms: A Technology, Organisation, and Environment (TOE) Framework | Clayton Mariemuthu | 2019 | Banking |

For the interview section, the participants of this study were professionals within the financial services sector who have exposure to AI within their respective banks. The semi-structured interviews were conducted using Microsoft Teams along with the transcription features available on the software. The four interview

participants were assigned to P1, P2, P3 and P4 to secure their confidentiality and anonymity in the interviews. Table 2 displays the demographics of the interview participants within the research study.

**Table 3: Demographics of Interview Participants**

| Code | Gender | Race |
|---|---|---|
| P1 | Male | African |
| P2 | Male | African |
| P3 | Male | African |
| P4 | Female | African |

## 4.3 Thematic Analysis

Thematic analysis was used to analyse the qualitative data for this research study. The thematic analysis approach is predominantly used to analyse qualitative data to generate codes and identify patterns (or themes) within the data (Clarke & Braun, 2017). The researcher followed the following steps identified by Naeem et al.,(2023b) to complete the thematic analysis for this study:

**Step 1 - Data Familiarisation:** The researcher transcribed the interview data and reviewed the documentary data to explore and get familiarised with the data. During this phase, the researcher identified applied quotations in the interview responses and documents.

**Step 2 - Identification of Keywords:** During this phase, the researcher reviewed the interview data and documentary data to identify recurring keywords from the data.

**Step 3 - Coding:** The researcher performed the coding of the artefacts by using short phrases or simplified words that relate to the research questions.

**Step 4 - Theme Development:** The researcher collated the generated codes in the previous step into meaningful groups.

**Step 5 – Interpretation:** Lastly, the researcher reviewed the keywords, codes and themes to explore the results in relation to the research questions for the research study.

### 4.3.1 Developed Codes and Themes

The researcher generated codes (using Atlas.ti) as represented in Table 3 based on the qualitative data from the interviews and document analysis, underpinned by the research questions. From the coding, the researcher identified the themes presented in Figure 4 based on the data. Moreso the researcher linked the identified themes (and sub-themes), research questions, and propositions and summarised them in Table 3.

**Table 4: Research Questions, Propositions, Themes and Codes**

| # | Research Question | Proposition | Themes | Codes |
|---|---|---|---|---|
| 1. | What are the perceptions about AI within the South African financial services sector? | 1. AI adoption within the financial services industry is impacted by perceptions of its advantages and challenges. | **Perceptions of AI:**<br>a. Job Losses<br>b. Data Bias<br>c. Algorithmic Bias<br>d. Fear<br>e. Job Opportunities<br><br>**Perceived advantages of AI**:<br>a. Risk Management<br>b. Customer Experience<br>c. Productivity<br>d. Task Automation | **Perceptions of AI:**<br>a. Job Losses (55 coded quotations)<br>b. Data Bias (14 coded quotations)<br>c. Algorithmic Bias (11 coded quotations)<br>d. Fear (6 coded quotations)<br>e. Job Opportunities (5 coded quotations)<br><br>**Perceived advantages of AI**:<br>a. Risk Management (61 coded quotations)<br>b. Customer Experience (58 coded quotations) |

| # | Research Question | Proposition | Themes | Codes |
|---|---|---|---|---|
| | | | e. Faster Processing<br><br>**Perceived challenges of AI:**<br>a. AI Skills<br>b. Demographic (Age and Education)<br>c. Regulatory Challenges<br>d. Data Challenges<br>e. Technology Infrastructure | c. Productivity (54 coded quotations)<br>d. Task Automation (33 coded quotations)<br>e. Faster Processing (31 coded quotations)<br>**Perceived challenges of AI:**<br>a. AI Skills (38 coded quotations)<br>b. Demographic (Age and Education) (34 coded quotations for Age and 10 coded quotations for Education)<br>c. Regulatory Challenges (20 coded quotations)<br>d. Data Challenges (19 coded quotations)<br>e. Technology Infrastructure (9 coded quotations) |
| 2. | What are the factors that influence the adoption of AI within the South African financial services sector? | 2. Dissemination of knowledge and observations of AI within the financial services sector influences the adoption and diffusion of technology in South Africa. | **Knowledge Dissemination:**<br>a. Online Training<br>b. Workshops<br>c. Panel discussions<br>d. Knowledge sharing platforms<br>e. Newsletters | **Knowledge Dissemination:**<br>a. Online Training (11 coded quotations)<br>b. Workshops (11 coded quotations)<br>c. Panel discussions (2 coded quotations)<br>d. Knowledge-sharing platforms (1 coded quotation)<br>e. Newsletters (1 coded quotation) |

| # | Research Question | Proposition | Themes | Codes |
|---|---|---|---|---|
| | | | **Observations of AI:**<br>a. Competitive Pressure<br>b. Customer Expectations<br>c. Leadership Support | **Observations of AI:**<br>a. Competitive Pressure (21 coded quotations)<br>b. Leadership Support (20 coded quotations)<br>c. Customer Expectations (4 coded quotations) |
| 3. | How does AI adoption affect the performance of institutions within the South African financial services sector? | 3. AI adoption within the financial services sector enhances operational procedures and firm efficiency.<br><br>4. AI adoption within the financial services sector reduces operational costs and improves firm efficiency. | **Firm Operations**<br>a. Task Automation<br>b. Decision Making<br>c. Large Processing Volumes<br>d. Accuracy<br><br>**Customer Experience**<br>a. Personalized Product Offerings<br>b. Service Availability<br><br>**Cost Management**<br>a. Cost Reduction | **Firm Operations**<br>a. Task Automation (33 coded quotations)<br>b. Decision Making (29 coded quotations)<br>c. Large Processing Volumes (18 coded quotations)<br>d. Accuracy (14 coded quotations)<br><br>**Customer Experience**<br>a. Personalized Products Offerings (30 coded quotations)<br>b. Service Availability (9 coded quotations)<br><br>**Cost Management**<br>a. Cost Reduction (9 coded quotations) |

## 4.4 Presentation of Results

The results of this study are presented following the identified themes in accordance with the propositions explained in Chapter 2.

### 4.4.1 What are the perceptions about AI within the South African financial services sector?

#### 4.4.1.1 *AI Adoption in the Financial Services Sector: Perceptions, Advantages, and Challenges*

The first proposition of this study is that AI adoption within the financial services sector is impacted by perceptions of its advantages and challenges. It is linked to research question one, which tends to explore the factors that influence the adoption of AI within the South African financial services sector. Under this proposition, the main themes identified are the attitude towards AI, perceived advantages of AI, and perceived challenges of AI in the financial services sector.

#### 4.4.1.2 Attitude towards AI in the Financial Services sector

From the document analysis, the academic and industry literature surveyed by the researcher extracted crucial perceptions about AI within the financial services sector in South Africa. The analysed 22 academic and industry literature revealed that Job Losses, Data Bias, Algorithmic Bias, Fear and Reduced Job Opportunities are the major perceptions of AI within the financial services sector in South Africa. The following are some of the quotes from the reviewed documents.

> *"Much of the public debate about automation in South Africa and globally tends to focus on fears that technologies such as machine learning, artificial intelligence and advanced robotics will destroy more jobs than they create"*

> *"AI/ML has the capacity to unmask anonymized data through inferences i.e., deducing identities from behavioural patterns."*

*“Limited loan history and demographic data may inadvertently lead to discrimination on the basis of race and gender, with no clear reason or basis provided by AI algorithms as to why a decision was made.”*

The analysis of data collected through interviews reveals, the attitude towards AI adoption within South Africa’s financial services sector is mixed. Participants highlighted the positive benefits of the adoption of AI within their banks but also raised concerns about the fears surrounding the impact of AI on their jobs. Participant 1 (P1) was optimistic about financial services institution’s readiness to adopt AI, given the benefits to its operations and remaining competitive in the market which has informed internal efforts to adopt AI.

*“The attitude in the financial services sector I've seen is extremely positive, people are looking forward to what other organisations are experimenting with AI” - P1.*

There are however concerns with the adoption of AI within the financial services sector, participant 4 (P4) noted the negative perceptions and resistance to adopting AI within their financial services institution linked to their overall strategy. This notion is seen in their organisation, which blocked certain AI-related features within their software landscape such as Microsoft Copilot. This is supported by participant 3 (P3), who highlighted that their organisation is blocking features related to Open AI’s ChatGPT software.

”*So based on what I've seen there's quite a lot of resistance in AI being part of the working environment.” – P4*

*“The blocking one is the main one, we really do not have access to certain AI’s as our laptops are highly monitored” – P3*

#### 4.4.1.3 Perceived Advantages of AI in Financial Services

Under the perceived advantages of AI, analysis of the document revealed that the following benefits are perceived to influence the adoption of AI in the financial

services sector, they include Risk Management, Customer Experience, Productivity, Task Automation and Faster Processing times. Some of the quotes from the literature are as follows:

> *“Financial firms may attain compliance more quickly, in real-time, and with fewer resources by using AI-based models”*

> *“For example, the use of chatbots and VCAs in customer service improves customer experience as customers can interact in their own languages with an FSI firm anytime from anywhere using text or voice conversation agents”*

> *AI is bringing solutions to traditional problems, including through the removal of paperwork, replacing the need for physical ‘know your customer’ documentation with photographs, and providing online platforms that offer accessible financial education*

From the interview perspective, it is found that the adoption of AI within the financial services sector also has some positive advantages (benefits). Risk management and automation of repetitive tasks were recurring themes through the interviews undertaken with the participants. In the risk management area, P1 highlighted the use of AI within the contact centre and branch operations environment to ensure that compliance checklists are performed by operators (call centre agents and financial advisors) when engaging with customers in order to remain compliant with their regulatory obligations set out by the Financial Conduct Authority of South Africa (FSCA). In this case, AI tools act as a mediator between the bank staff and customers to ensure that compliance checklists are complete and ensure the financial institutions towards the regulator are met.

> *”So now when you're dealing with a call centre agent or an individual or financial advisor who has to remember all of these things and in some shape or form provide a service comprehensively to a customer and remain compliant, meaning they don't, they don't violate any of*

*those. Regulatory requirements in the call centre space. What we've seen is being able to build." – P1*

The use of AI to automate repetitive tasks and administrative tasks was observed through interactions with P2, P3 and P4. These respondents highlighted the use of AI within their organisations for administrative tasks such as minute-taking and customised communications towards internal staff and external customers. In using AI for these activities, the respondents highlighted the increased productivity gains (and speed) which allowed employees to focus on other tasks.

*"It saved time and then now people can work on other things or work can be shifted to other things which really matter, not that the minutes don't matter but now you can have a meeting and get the minutes and like in an hour you know with everything and all the things to do list instead of now having to wait for a follow-up meeting and then now you're getting the minutes." – P3*

#### 4.4.1.4 Perceived Challenges of AI in Financial Services

From the document analysis, the academic and industry literature surveyed by the researcher key challenges with the introduction of AI within the financial services sector in South Africa. The analysed 22 academic and industry literature revealed that AI Skills, Education, Regulatory Challenges, Data Challenges, Demographics (Age and Education) and Technology Infrastructure are the challenges that influence the adoption of AI within the financial services sector in South Africa. The following are some of the quotes from the reviewed documents.

*"Skill gaps are a major concern. In order to ensure the successful adoption of technological innovations, organisations either need access to a workforce with the necessary skills or to reskill current employees."*

*"Regulatory support was found to positively influence the adoption of cloud computing technologies in Malaysian SMEs (Amini & Bakri,*

*2015). It is proposed that regulatory support (Proposition P3-2) will positively influence AI, cloud computing and DLT adoption."*

*"Companies find themselves encumbered by legacy technologies and systems, business models, and corporate structures, as well as sunk investments in antiquated infrastructure"*

From the research interviews, the identified challenges of adopting AI in the financial services sector, include skills, resistance to adoption, and security concerns related to AI. P1 and P2 highlighted that there is a shortage of professionals with AI skills that can help financial services institutions adopt AI. According to participants 1 and 2, the lack of necessary skills is a major challenge in the adoption of AI in the financial services sector.

"*The challenge with early adoption is that you don't have the necessary skills. To effectively put this thing up with a little error." – P1*

*"One of the key challenges to AI adoption within our organization is the difficulty in finding and retaining skilled professionals with the right expertise. The demand for AI talent is high, and as a result, there is often a shortage of skilled individuals to drive these initiatives forward." – P2*

The interview results further show that P3 and P4 raised concerns about the resistance to change from employees. This resistance is formed as a result of employees' lack of knowledge about AI and the resistance by older employees to adopt newer ways of working through technology.

"*Resistance in terms of our colleagues who are highly experienced, around the late 50s as well, and it's kind of hard to adopt the new things which have been introduced." – P3*

Lastly, the security of AI applications within the financial services sector was highlighted by the participants notably P1 and P4. The growing use of AI poses security challenges from a bias, data privacy and security standpoint.

> *" You know all these all this data, all these algorithms work on large sums of data, protecting the sovereignty of that information when it leaves your country to other places for processing as quickly as it happens. You know the data does. Leave your geography from time to time for these AI tools to query." - P1*

### 4.4.2 What are the factors that influence the adoption of AI within the South African financial services sector?

#### 4.4.2.1 *Dissemination of Knowledge and Observations of AI within the Financial Services Sector*

The second proposition of this study is that the dissemination of knowledge and observations of AI within the financial services sector influences the adoption and diffusion of the technology in South Africa. The proposition covers research question two of this study, which developed two themes (knowledge dissemination of AI and observations of AI in the financial services industry) as explained below.

#### 4.4.2.2 Knowledge Dissemination of AI in Financial Services

The results from the document review on academic and industry literature on AI highlight the efforts to disseminate knowledge of AI within the financial services sector in South Africa. It was found that there is no contribution to knowledge dissemination towards AI adoption within the financial services sector in South Africa.

From the analysis of interviews, the results show that there are a multitude of interventions that financial services institutions have rolled out to disseminate information and knowledge of AI towards their employees. The majority of the

respondents in the interview highlighted that their financial services organisations have introduced mandatory and non-mandatory training for AI to their employees. These training interventions come in the form of online self-paced training assigned to employees, workshops, panel discussions with AI industry leaders, knowledge-sharing platforms and newsletters on AI adoption within their financial institutions. P1 and P2 highlight that the most impactful of these training interventions on AI was the practical workshops that highlighted their financial institutions' use of AI within their operations. This is supported by P3, who also indicated that the recurring newsletters on AI adoption within their financial institution are most effective in exposing employees to AI knowledge. The following are some of the quotes from the interviews.

> *"It's more practical examples, practical problems that the technology organisation is being asked to look at and position themselves. The training and awareness aspect about the technology is effectively being disseminated. – P1*

> *"The newsletters that we get internally you know from the Managing executives or the CEOs as well to say what's happening or where the industry is heading." – P3*

#### 4.4.2.3 Observations of AI in Financial Services

From the document analysis, the academic and industry literature surveyed by the researcher extracted important observations on the adoption of AI within the financial services sector in South Africa. The analysed 22 academic and industry literature revealed that Competitive Pressure, Customer Expectations and Leadership Support are contributors related to observations of AI implementation that influence the adoption of AI within the financial services sector in South Africa. The following are some of the quotes from the reviewed documents.

> *"In South Africa, some 78% of South African executives say they need to boost their organisation's competitiveness by innovating through*

*investments in AI technologies, notably embedded AI solutions and computer vision."*

*"The evolving requirements of customers have continuously prompted financial services companies to enhance their operations through the adoption of AI-driven digitisation."*

However, the interview analysis revealed the influence of AI adoption across other incumbents in the financial services market towards internal decisions that are taken by their financial services institutions. The financial services market is relatively small, the large banks such as Absa, Capitec, FNB, Nedbank and Standard Bank control the majority of the market share in this sector. The respondents highlighted the influence of AI adoption and efforts across multiple banks towards their own AI decisions. The following are some of the quotes from the interviews.

*"The banking industry is not so big you know; you know what someone else is doing you hear that OK this other bank is doing this and that and there's a new way there's a new thing you hear that. – P3*

*"We closely monitor industry trends and best practices to understand how other organizations are leveraging AI to solve similar challenges, improve efficiency, and enhance customer experience. For instance, seeing how competitors use AI to streamline customer service or automate back-office operations often encourages us to explore similar solutions." – P2*

These decisions, informed by other financial services incumbents in the market are also dependent on the necessary skills, budget and senior support to drive these AI initiatives.

*"The decision to do so would be again driven from a regulatory perspective, then the appetite of the organisation to say when can they go? And the skills and the budget at their disposal." – P1*

### 4.4.3 How does AI adoption affect the performance of institutions within the South African financial services sector?

#### 4.4.3.1 *AI Adoption, Operational Procedures, and Firm Efficiency in the Financial Services Sector*

The third proposition of this study is that AI adoption within the financial services sector enhances operational procedures and firm efficiency, which covers the third research question of this study. The results from the document analysis highlight the following impacts of AI on enhancing procedures and firm efficiency within the financial services sector in South Africa. The identified impacts include Task Automation Personalized Products Offerings Decision Making Large Processing Volumes and Accuracy. Some of the quotes from the documents are as follows:

> *"Technology can free people from routine, repetitive work and enable them to take on higher-level work, decision-making and critical thinking."*

> *"Automation of data collection processes, improving the speed and quality of decisions and enhancing financial institutions readiness to meet regulatory compliance obligations."*

The results of the interview process also highlight the impact of AI towards improved processes and efficiency. A key theme from the interviews was the use of AI to automate operational processes and communication, thereby increasing firm efficiency. Participants 2 and 4 quoted as follows:

> *"One of the key benefits of AI in our organization is automation, particularly when it comes to sending out personalized communication to customers. AI allows us to tailor messages to individual customers at scale and deliver them simultaneously, which significantly saves time and resources." - P2*

*"There are tasks that are, you know, quite straightforward to automate and you can just let AI handle those type of tasks. For instance, to communicate an upcoming software release, right you can automate." – P4*

### 4.4.4 How does AI adoption affect the performance of institutions within the South African financial services sector?

#### 4.4.4.1 *AI Adoption Reduces Operational Costs and Enhances Firm Efficiency in the Financial Services Sector*

The fourth proposition which is also linked to research question three is that AI adoption within the financial services sector reduces operational costs and improves firm efficiency.

From the document analysis, the academic and industry literature surveyed by the researcher extracted crucial findings on the adoption of AI within the financial services sector in South Africa and its influence on the reduction of operational costs and improved firm efficiency. The analysed 22 academic and industry literature revealed that Task Automation, Large Processing Volumes, Cost Reduction and Service Availability are contributors related to AI's impact towards reduced operational costs and firm efficiency within the financial services sector in South Africa. The following are some of the quotes from the reviewed documents.

*"The themes of cost reduction and increased efficiency recurred throughout the data as the main benefits of AI uses in the FSI. These themes support the literature findings that the overall benefit of using AI tools such as RPA is to reduce cost and increase efficiency"*

*Competitiveness, economies of scale, efficiency, innovation, simplicity, and cost reduction are the key strategic drivers that automation and artificial intelligence*

The results of the interview process indicate the growing use of AI within the financial services sector to drive cost reduction and improve institution efficiency. P1 and P2 raise these driving forces for the adoption of AI within their institutions and the practical use cases in which their organisations have adopted AI to derive these benefits.

> *"They're all looking to leverage it when it comes to cost saving, you know automating or becoming a little bit more efficient and quicker to certain things. So essentially leveraging it in different ways to become more efficient" - P1*

> *"The belief that AI can improve efficiency, reduce operational costs, and provide deeper insights from data has made it a priority for adoption in certain areas, such as customer service, data analysis, and fraud detection." – P2*

## 4.5 Summary of the Results

From the results, there is evidence that the general attitude towards AI adoption within the South African financial services sector is negative, with a growing propensity to use AI towards financial stability whilst fears of job losses by employees are still rife.

The benefits of AI are embodied in the automation of tasks, thereby achieving productivity for internal operations and external communication. The risk and compliance functions within the financial services sector also benefit from the use of AI to ensure that organisations remain compliant within a highly regulated sector. These benefits extend to the ability of financial institutions to reduce their operational costs and help the firm in being operationally efficient. The challenges to AI adoption are due to employees' resistance to new technologies, which aligns with the concerns of job displacement by the organisational use of new technologies.

Financial institutions within South Africa have seemingly sound training and awareness processes for employees related to AI in the sector, with multiple interventions being introduced to employees to build a greater understanding of their staff. Furthermore, observations of initiatives by other market incumbents and customer expectations within the financial services sector inform decisions to adopt AI by financial institutions.

# 5 DISCUSSION OF THE RESULTS

## 5.1 Introduction

This chapter discusses the results presented in Chapter 4 of this research study. The researcher discusses the results according to the propositions, which are linked to the research questions and concludes the chapter with a summary of the discussion.

## 5.2 Perceptions, Advantages and Challenges of AI Adoption

The results of this research study indicate that the perceptions of AI within the financial services sector are primarily negative. This is a result of fears of AI applications replacing humans within the operations of financial services institutions. These concerns are further highlighted with regard to AI's impact on job opportunities towards entry-level jobs. This finding is in contrast to other studies that show that whilst AI has reduced jobs due to automation, it has created more jobs than it has removed from the market (Ekwueme et al., 2023). The potential bias of AI was identified in the research study, and the results show that algorithmic and data bias is a hurdle that influences perceptions of AI adoption because the decisions taken by AI impact the outcomes of financial services and products towards the general public. The negative perceptions of AI within the financial services sector from employees have an adverse impact towards the internal adoption of AI applications.

The benefits of AI applications are a key driver of its adoption within the financial services sector. Particularly within the risk management function, where AI applications are used to detect and prevent fraudulent activities and further enable financial institutions to remain compliant with local regulations. This result from this study is consistent with the findings of other studies which highlight the growing use of AI for risk management activities within accounting firms (Hasan, 2022). Another important area where AI is beneficial to financial institutions is to drive better customer experiences through increased availability of services and

quicker processing of client requests through AI applications, thereby influencing greater adoption of AI within the financial services sector. Internal adoption efforts within financial services firms are mainly influenced by the productivity that AI brings into institutions, automating manual and repetitive tasks to enable employees to focus on more meaningful work, which was a recurring theme identified in this research study. The research study found that the adoption of AI within financial services firms is positively influenced by these benefits.

Furthermore, the research study highlighted the challenges to AI adoption within the financial services sector that continue to be a hindrance to its adoption. The lack of skills is a contributor to the challenges of adopting AI within financial institutions, these skills are scarce and costly to acquire which has a detrimental effect on AI initiatives that are driven by these organisations. Demographic variables such as employee education and age were found to be contributors to the challenges that financial institutions face when implementing AI initiatives to improve their operations. The research study found that older employees and less educated employees perceive AI as a hindrance to their work routines, which could be a possible reason why this group of individuals resists the introduction of AI to their operational procedures. These findings corroborate the results of other studies, which found that younger people have a more positive outlook towards innovation and its adoption (Méndez-Suárez et al., 2023). The financial services sector is highly regulated, which introduces a challenge for the adoption of AI by financial institutions since these applications need to adhere to strict regulatory frameworks set out by the government. Lastly, implementing AI within financial services institutions is influenced by the technology readiness and landscape of these firms. Financial institutions that have inadequate data management processes to ensure quality data and outdated legacy systems negatively impact AI adoption efforts within the sector.

## 5.3 Influences on AI Adoption and Diffusion of the Technology in the Financial Services Sector

To dispel the misconceptions about AI within the financial services sector, knowledge sharing and evidence of AI implementation amongst peer firms is needed to increase levels of AI adoption within the financial services sector. The results of this research study show the continuous efforts that financial services firms have taken to disseminate information about AI to increase the levels of adoption within their organisations and the sector as a whole. Online training is the most popular way that financial services firms are choosing to equip their employees with information about AI within the sector, with some training being mandatory to meet regulatory requirements and some training being self-elected, meaning that employees have the option to participate or not. This research study found that the most effective way to disseminate knowledge about AI is through practical workshops, panel discussions and newsletters. The results are consistent with those of other studies, which assert that knowledge of 4IR innovation influences the adoption of said technologies such as AI (Matsepe & Van der Lingen, 2022). A possible explanation for this is the hands-on exposure that employees prefer to learn within the context of their role or organisation; these have been found to be most impactful in influencing the adoption of AI within financial services firms.

Furthermore, the study found the influence of the observations on AI and its adoption within the financial services sector. The South African financial services sector has few incumbents which have a sizeable market share, highlighting a small group of large banks that control the market. The results show that financial services firms perform market analysis and monitoring, assessing their competitors and the products and services they provide using AI applications. These activities inform adoption efforts across banks in order to remain competitive within the market and avoid becoming laggards. This competitive pressure is evident in the financial services sector and influences the adoption of AI within financial services firm's operations. Another important finding from this

research study is the influence of customer expectations towards the adoption of AI applications within financial services firms. Customers have demands for financial institutions, such as the availability of services and real-time query resolution. These demands put pressure on financial services institutions and their leadership teams to innovate and deliver services that meet the expectations of their customers. The results of this research study highlighted the influence of this factor on financial institutions' adoption of AI.

## 5.4 AI Adoption and Operational Procedure Enhancement

The use of AI to automate repetitive and administrative tasks has been found to be the most prevalent use case in the financial services sector. Financial services firms seek to optimise their operational procedures by reducing manual workflows and human intervention to increase productivity and thereby deliver a better customer experience to their customers. This research study found that the use of RPA and chatbots within the financial services sector are popular AI applications that deliver on this mandate for seamless processes and quicker customer services. The results are consistent with those of other studies, which suggest automation helps organisations reduce human errors in operational workflows (Ng et al., 2021). An important finding regarding the adoption of AI by financial services firms is that these firms are increasingly using AI for enhanced decision-making. As an example, these firms leverage AI to assess customer applications by processing vast amounts of data to produce an outcome. These AI applications use predictive models to determine the likelihood of default by customers, thereby enhancing the firm's risk management capabilities. The research study found that the adoption of AI within financial services firms is positively influenced by these factors to enhance the efficiency of operational processes.

## 5.5 AI Adoption and Reduction of Institutions' Operating Costs

This research study found that the operational efficiency gains as a result of adopting AI within financial services firms are influenced by the potential financial gains towards institutions. Financial services institutions use AI to enhance operational efficiency through automation, thereby reducing their operating costs. This can possibly be explained by the reduced personnel that may be needed to perform specific functions that are now managed through AI applications. Furthermore, AI adoption within the financial services sector allowed for increased availability of services, where 24/7 chatbots enable customers to interact with their products as and when required and robo-advisors have reduced the need for human financial advisors. This finding supports previous research linking chatbot adoption in the financial services sector to increased customer satisfaction and brand experience (Hari et al., 2022). Whilst the initial implementation costs of AI are high, the longer-term prospects of adopting AI within the financial services sector are seen as an investment. The research study found that the adoption of AI within financial services firms is positively influenced by these factors to drive efficiency and reduce the operating costs of these institutions.

# 6 CONCLUSIONS & RECOMMENDATIONS

## 6.1 Introduction

This chapter concludes this research with possible answers to the research questions posed in Chapter 1 of this research study. Furthermore, the researcher presents recommendations to financial institutions based on the findings of this study as well as suggestions for further research on the adoption of AI in South Africa's financial services sector.

## 6.2 Conclusions

### 6.2.1 Perceptions of AI in the South African Financial Services Sector

Based on research question one, which explores the perceptions of AI in the South African financial services sector, it can be concluded that the perception of AI in the South African financial services sector is generally negative, which is attributed to the impact of AI towards the job market within this sector. The results show that older employees, less educated and skilled employees exhibit signs of resistance to the introduction of AI within their job function further fuelling this negative sentiment and impacting the internal adoption of AI within these firms. Adopting AI comes with its challenges, which primarily lie in the scarcity of qualified AI practitioners, complex regulatory requirements and technology infrastructure readiness. The research also found that the benefits of AI are mostly observed from the risk management perspectives, customer experience and productivity, which are the major influences on the intention of financial services firms to adopt AI.

### 6.2.2 Factors that Influence AI Adoption in the Financial Services Sector

Research question two is on the factors that influence the adoption of AI in the financial services industry. It is found from this study that some observed and identified benefits of AI are the major factors that influence its adoption in the financial services industry. The knowledge and observations of AI within the sector were found to be key determinants of AI adoption within firms. Financial services firms that disseminate information about the benefits, use cases and practical implications of AI within their internal operating environment were seen to be drivers of AI adoption.

### 6.2.3 AI Adoption and Institutional Performance in the Financial Services Sector

Research question three delved into the influence of AI towards firm efficiency within the financial services sector. The most important factor driving this efficiency is enhancing operational procedures through automating repetitive and manually intensive workflows within financial services operations. Improving automation levels in financial services firms has a positive effect on internal productivity and the customer experience within these firms. This further enables these institutions to reduce operating costs and deliver faster customer services. The enhanced decision-making capabilities of AI, through better customer insights and access to data, internal decisions can take less time which improves operational procedures for their services such as offering consumer credit. Furthermore, financial services institutions are able to present tailor-made products and services to customers which has a positive impact on their profitability.

## 6.3 Policy Recommendations

Based on the findings of the research, it can be recommended that financial institutions that aim to adopt AI into their financial operations focus on investing in employee skills, education and practical training. This will facilitate the equipment and preparation of staff for the introduction of AI and further help alleviate fears of job losses and displacement. Secondly, it is recommended that financial institutions introduce explainable AI (XAI) techniques in their AI applications to mitigate the concerns about bias within AI models and their decision-making, thereby enhancing the transparency of AI usage with consumers. Thirdly, it is recommended that financial institutions focus on adopting data management practices, which will invariably enable them to improve data collection and adoption quality and reduce the potential friction with AI implementations. Finally, financial institutions should modernise or phase out legacy systems to improve their internal technology infrastructure which can alleviate the challenges of introducing AI applications in their technology environment and therefore improve their AI implementation efforts.

## 6.4 Recommendations for Further Research

This study was based on qualitative research approaches through a systematic literature review and semi-structured interviews. Further studies can be carried out using quantitative approaches, focusing on financial services employees and their adoption of AI within the sector to understand trends related to the adoption within a larger population. Furthermore, this study focused on the South African financial services sector; further studies could be conducted by extending to other jurisdictions.

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# APPENDIX A: Research Consistency Matrix

**Table 5: Research Consistency Matrix**

| # | Research Question | Proposition # | State Proposition | Interview Guide | Data Collection Detail | Data Analysis Method |
|---|---|---|---|---|---|---|
| 1. | What are the perceptions about AI within the South African financial services sector? | 1. | AI adoption within the financial services industry is impacted by perceptions of its advantages and challenges. | 1 – 7, 12 – 15 and 17 – 18 | Systematic Literature Review, Document Search and/or Interview Guide | Document Analysis and/or Thematic Analysis |
| 2. | What are the factors that influence the adoption of AI within the South African financial services sector? | 2. | Dissemination of knowledge and observations of AI within the financial services industry influences the adoption and diffusion of technology in South Africa. | 8 – 10 and 16 | Systematic Literature Review, Document Search and/or Interview Guide | Document Analysis and/or Thematic Analysis |

| # | Research Question | Proposition # | State Proposition | Interview Guide | Data Collection Detail | Data Analysis Method |
|---|---|---|---|---|---|---|
| 3. | How does AI adoption affect the performance of institutions within the South African financial services sector? | 3<br><br>4 | AI adoption within the financial services industry enhances operational procedures and firm efficiency.<br><br>AI adoption within the financial services industry reduces operational costs and improves firm efficiency. | 2 – 3 and 11 | Systematic Literature Review, Document Search and/or Interview Guide | Document Analysis and/or Thematic Analysis |

# APPENDIX B: Data Extraction Form

**Table 6: Data Extraction Form**

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 1 | The Perceived Impact of Artificial Intelligence on Operations Performance in the South African Life Insurance Industry | Thami Kunene | 2021 | Insurance | Participants: This research study focused on employees within the life insurance industry, specifically IT personnel from senior management, middle management and specialists who have been involved in implementing AI within the life insurance sector.<br><br>Sample Size: 9 | Methodology: This research study used qualitative approaches, data collection was performed using interviews and data analysis through thematic analysis using Atlas.ti 22 and Microsoft Excel. | The main findings of this research report highlight AI's effect towards operational improvement within the insurance industry. AI has high initial costs and depends on quality data to ensure seamless integration. The benefits of AI in enhancing business operations are in the areas of cost, quality, speed, flexibility and dependability. In adopting AI, organisations within the insurance sector have been able to reduce costs, improve the accuracy of processes, reduce the time of processing customer requests and increase the availability of services using AI. The author further recommends that institutions that plan on implementing AI within their operations should focus on improving the quality of their data and seek areas to ensure human-machine collaboration in order to balance the use of AI in delivering customer products and services. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 2 | Management of Disruptive Technologies as Applied in Stages of Long-term Insurance Processes | Thabo Moloi and Antoine F. Mulaba-Bafubiandi | 2024 | Insurance | Participants: This research study focused on employees within a long-term insurance company across various levels focusing on their experiences of disruptive technologies in the firm.<br><br>Sample size: 374 | Methodology: This research study used descriptive approaches, data collection was performed using surveys. | The main findings of this research report highlight the benefits and challenges of adopting disruptive technologies within the long-term insurance industry. The authors highlight efficiency, risk management and customer engagement as key benefits of AI. Whilst raising challenges such as data security, regulatory compliance and skill gaps. The authors recommend that the adoption of AI within institutions be aligned with their strategy, leaders should foster an innovative environment, and lastly the organisation structure should be flexible and agile to change. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 3 | Artificial Intelligence Technology to Enhance Data Quality Management Practices in the Banking Industry in South Africa | Talifhani Ramaliba and Lorette Jacobs | 2024 | Banking | This research study used a systematic literature review. | Methodology: This research study used qualitative approaches and scanned through literature to develop a conceptual framework. | The main findings of this research report highlight the importance of AI in enhancing data quality practices by improving decision-making, enhancing customer satisfaction and reducing operational risks through better data quality. The authors further recommend that more robust legal and regulatory support is needed in this environment to support the use of AI for enhanced data quality management practices. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 4 | Exploring Artificial Intelligence in the South African Banking Industry | Vongai Praise Darangwa | 2021 | Banking | Participants: This research study focused on bank employees (across multiple banks) who were managers in the North West province, focusing on their experiences of AI adoption in banking.<br><br>Sample size: 12 | Methodology: This research study used qualitative approaches, data collection was performed using interviews and data analysis through thematic analysis. | The main findings of this research report highlight the use of AI in the banking sector of South Africa. The author notes the positive benefits of AI, such as enhanced operational efficiency, risk management, fraud prevention and compliance. The disadvantages of AI mentioned in the study are data security and increased possibilities of cyber-attacks. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 5 | Factors Predicting Consumers' Adoption of Chatbots within the Banking Industry in South Africa | Felix Amoah, Christabel Rusike, Laura Novienyo Abla Amoah | 2023 | Banking | Participants: This research study focused on bank consumers (across multiple banks) and their experiences of online banking and chatbot adoption in banking.<br><br>Sample size: 151 | Methodology: This research study used quantitative approaches and data collection was performed using questionnaires and data analysis through statistical analysis methods. | The main findings of this research report highlight the significant predictors and non-significant predictors of chatbot adoption by banking consumers. The authors found that perceived compatibility, social influence and perceived ease of use are major predictors of chatbot adoption. In contrast, price value, perceived usefulness and facilitating conditions were found to be insignificant predictors of chatbot adoption by banking consumers. The authors recommend that banks focus on designing easy-to-use chatbots and using social influence to improve consumer adoption of chatbots in banking. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 6 | Modelling Factors Influencing Bank Customers' Readiness for Artificial Intelligent Banking Products | L. Garekwe, S. J. Ferreira-Schenk, Zandri Dickason-Koekemoer | 2024 | Banking | Participants: This research study focused on bank consumers (across multiple banks) and their readiness for AI adoption in banking.<br><br>Sample size: 346 | Methodology: This research study used quantitative approaches through Structural Equation Modeling (SEM). | The main findings of this research report highlight the significant and non-significant factors that influence AI adoption by bank customers. The authors found that age, ethnicity, income level, level of banking knowledge, and representativeness bias influence AI adoption. In contrast, gender and educational attainment have an insignificant influence on AI adoption. The authors recommend more focus on technology infrastructure and socio-cultural factors to improve the readiness of customers towards the adoption of AI. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 7 | Transformative Impacts of Automation on the Nature of Work: A Perspective of the Banking Industry in South Africa | Save Akilimalissiga and Nita Inderlal Sukdeo | 2024 | Banking | Participants: This research study focused on bank employees (across multiple banks) on the impact of AI on the nature of their work in banking.<br><br>Sample size: 223 | Methodology: This research study used quantitative approaches and data collection was performed using online surveys and data analysis through Structural Equation Modeling (SEM). | The main findings of this research report highlight the influence of automation towards the nature of work within the South African banking sector. The authors found that the introduction of automation has an influence on the job roles of bank employees, with new roles being created to support automation efforts. Furthermore, upskilling employees to adapt to new ways of work and the operational changes that are a result of automation were indicated in their study. The authors recommend that banks focus on reskilling programs and establish collaboration with educational institutions to enhance employee skills in preparation for automation. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 8 | Understanding the Role of Artificial Intelligence in Banking | Maggie Matsie | 2023 | Banking | Participants: This research study focused on executives (across multiple banks) focusing on the role of AI in banking.<br><br>Sample size: 12 | Methodology: This research study used qualitative approaches and data collection was performed using interviews and data analysis through thematic analysis methods. | The main findings of this research report highlight the positive influence of AI on increased operational efficiency, better decision-making and customer engagement levels due to AI adoption. The author also suggests that banking firms focus their efforts on governance and employee training to maximize the benefits of AI. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 9 | Factors Driving Artificial Intelligence Adoption in South Africa's Financial Services Sector | Adewale Samuel Hassan | 2024 | Financial Services | Participants: This research study focused on professionals (across multiple banks) focusing on the factors influencing AI adoption in the financial services sector.<br><br>Sample size: 86 | Methodology: This research study used mixed-methods approaches and data collection was performed using literature reviews and surveys and data analysis through binary logistic regression analysis methods. | The main findings of this research report highlight the technology, organisation and environmental factors that influence the adoption of AI in the financial services sector. Based on the results, the technological factors are accessibility to technology infrastructure and quality data influencing AI adoption. The organisational factors include senior management support and organisation readiness. Lastly, environmental factors include regulatory frameworks, competitive pressure and customer expectations which drive AI adoption within financial services institutions. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 10 | Industry 4.0 in Finance: The Impact of Artificial Intelligence (AI) on Digital Financial Inclusion | David Mhlanga | 2020 | Financial Services | This research study used a systematic literature review. | Methodology: This research study used qualitative approaches and scanned through the literature on AI adoption. | The main findings of this research report highlight the influence of AI within the financial services industry. These factors include enhanced risk management such as fraud detection, improved customer insights and enhanced customer support due to the availability of AI applications. The author further highlights the challenges of AI adoption, including data quality and the regulatory support that financial services institutions need to address for enhanced AI adoption. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 11 | Artificial Intelligence Uses, Benefits, and Challenges: A Study in the Western Cape of South Africa Financial Services Industry | Hakunavanhu Ndoro, Kevin Johnston, Lisa Seymour | 2020 | Financial Services | Participants: This research study focused on employees including senior management and middle management (across multiple financial institutions and AI firms) on the adoption of AI in the Western Cape financial services sector.<br><br>Sample size: 11 | Methodology: This research study used qualitative approaches, data collection was performed using interviews and data analysis through thematic analysis using the NVivo software package. | The main findings of this research report highlight the uses of AI which includes chatbots, automation and predictive analytics. The authors raise the benefits of AI which include cost reduction, improved customer experiences and decision-making. Furthermore, the challenges of AI adoption raised by the authors are data quality, skills shortages and bias within AI algorithms and training data. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 12 | The Perceived Impact of Artificial Intelligence on Jobs at Financial Services Organisations in Johannesburg | Nyasha Zhou | 2022 | Financial Services | Participants: This research study focused on employees including senior management and middle management, team leaders, supervisors and operational staff (across multiple financial institutions) on the impact of AI in the financial services sector.<br><br>Sample size: 16 | Methodology: This research study used qualitative approaches, data collection was performed using interviews and data analysis through thematic analysis. | The main findings of this research report highlight the positive impacts and negative impacts of AI on jobs within the financial services industry. The author raises the positive influence of automating repetitive tasks and increased productivity of employees due to AI. Furthermore, the author highlights the concerns related to job security and unwillingness to transfer knowledge to AI applications. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 13 | Determinants of Emerging Technologies Adoption in the South African Financial Sector | Nkhulang T. Matsepe and Elma van der Lingen | 2022 | Financial Services | Participants: This research study focused on employees including senior management and middle management (across multiple financial institutions) on the adoption of AI in the financial services sector.<br><br>Sample size: 17 | Methodology: This research study used qualitative approaches, data collection was performed using interviews and data analysis through thematic network analysis. | The main findings of this research report highlight the determinants of emerging technologies within the financial services sector. The authors found that knowledge, technical skills, perceived complexity, competitive pressure, regulatory support, and leadership support were all vital towards the adoption of AI by financial services firms. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 14 | The Effect of the Fourth Industrial Revolution on Employment in the Insurance Sector in Cape Town, South Africa | Nosiphelo Buyana | 2022 | Insurance | Participants: This research study focused on employees including managers and technology specialists (across multiple financial institutions and AI firms) on the adoption of AI in the insurance sector.<br><br>Sample size: 11 | Methodology: This research study used qualitative approaches, data collection was performed using interviews, case studies and data analysis through thematic analysis. | The main findings of this research report highlight the opportunities of 4IR technologies within the insurance sector. These opportunities include enhanced employee productivity, penetration of new markets and the introduction of new products and services by leveraging AI. The researcher also highlights the challenges related to a lack of skills within insurance firms and technology infrastructure limitations as concerns that need to be addressed by firms. The author recommends that insurance firms focus on setting a clear vision and strategy for the adoption of 4IR technologies to enhance their adoption. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 15 | The Impact of Digitalisation on the Employment Rate in the South African Financial Services Industry | Makoma Tiny Mokhabuki | 2023 | Financial Services | Participants: This research study focused on employees (across multiple financial institutions) and the impact of AI in the financial services sector.<br><br>Sample size: 60 | Methodology: This research study used quantitative approaches, data collection was performed using surveys, and data analysis through descriptive statistics using Qualtrics and SPSS software. | The main findings of this research report highlight the impact of digitalisation on the employment rates within the financial services industry. The authors note the benefits of digitalisation towards operational efficiency in the sector, however they highlight the negative influence towards employment and job displacements. While that is the case, there are new roles and jobs that are being created due to digitalisation. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 16 | The Potential Impact of AI and Generative AI Across Healthcare, Education, Financial Inclusion, and Agriculture in South Africa | Nihmal Marrie, Igor Lakic, Caio Anteghini, Asif Valley, Benjamin Rosman, Martin Bekker, Lexi Shongwe | 2023 | Cross-sectoral (Healthcare, Education, Financial Services, Agriculture) | This research study used case studies and thematic discussions. | Methodology: This research study used literature analysis, expert analysis and case studies. | The main findings of this research report highlight the growing potential of AI within multiple sectors in South Africa. In the financial services sector, the authors highlight the potential of AI in providing access to financial services towards underserved communities and enhancing financial inclusion in the country. The authors further highlight the challenges including regulatory gaps, infrastructure limitations and fears of job displacement that firms need to address to enhance AI adoption. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 17 | Is South Africa Ready for AI? | Willie Schoeman, Rory Moore, Yusof Seedat, Dr. Jeff Yu-Jen Chen | 2023 | Cross-sectoral (focus on business, technology, and policy) | This research study used a systematic literature review. | Methodology: This research study used literature analysis. | The main findings of this research report highlight the challenges and opportunities towards greater AI adoption within South Africa. The authors raise concerns about legacy technologies, infrastructure limitations, and skill gaps as challenges towards AI adoption. The opportunities noted by the authors are economic growth and increased productivity with the use of AI. The authors recommend enhanced data governance frameworks, public-private partnerships and the creation of an innovative environment to support AI adoption in South Africa. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 18 | The Future of Work in South Africa: Digitisation, Productivity, and Job Creation | Nomfanelo Magwentshu, Agesan Rajagopaul, Michael Chui, Alok Singh | 2019 | Cross-sectoral (Mining, Retail, Banking, and more) | This research study used a systematic literature review. | Methodology: This research study used literature analysis, expert interviews, thematic reviews and policy analysis. | The main findings of this research report highlight the opportunities that AI can bring to South Africa, including more jobs, increased economic growth and the transformation of the industry. The challenges raised by the authors are skills shortages, infrastructure limitations and regulation. The authors suggest that organisations focus on investing in digital skills, encouraging employees to learn about new technologies, and further introducing a clear strategy to introduce and manage new technologies within firms. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 19 | Artificial Intelligence in the Financial Sector and Emerging Consumer Protection Concerns | Nolwazi Hlophe | 2024 | Financial Services | This research study used a literature review. | Methodology: This research study used industry analysis, academic literature reviews, global best practices and case studies from major banks in South Africa. | The main findings of this research report highlight the key uses of AI within the financial services industry, which include chatbots, predictive analytics and fraud detection. The author further notes the concerns related to AI, which include algorithm bias, data concerns and regulatory support. Lastly, the author recommends that better governance and explainable AI products be introduced to mitigate the risks of AI adoption within the financial services sector. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 20 | Technological Change in the Insurance Sector in South Africa: Disruption with the Potential for Social Good in a Developing Country Context? | Zaakhir Asmal, Haroon Bhorat, Lisa-Cheree Martin, Chris Rooney | 2023 | Insurance | This research study used case studies and thematic discussions. | Methodology: This research study used qualitative approaches including literature reviews, interviews and analysis of labour market data. | The main findings of this research report highlight the concerns of AI adoption in job security and skill gaps due to new technologies. The authors further recommend clear strategies and policies to support the introduction of new technologies within the insurance sector. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 21 | AI and Data in South Africa's Finance Sector: Toward Financial Inclusion | Mark Gaffley | 2021 | Financial Services | This research study used a systematic literature review. | Methodology: This research study used literature analysis, expert interviews, thematic reviews and policy analysis. | The main findings of this research report highlight the benefits and risks of AI within the financial services sector. Some benefits raised by the authors are the possibility for AI to resolve issues of financial institution trust, lack of documentation and inappropriate products and services. The risks relate to inequality and exploitation of consumers through data. The author further recommends policy changes and ethics related to designing AI applications aligned to human rights, transparency and fairness within the financial services sector. |

| # | Article | Author/s | Year | Sector | Population | Research Design | Key Findings |
|---|---|---|---|---|---|---|---|
| 22 | The Adoption of Artificial Intelligence by South African Banking Firms: A Technology, Organisation, and Environment (TOE) Framework | Clayton Mariemuthu | 2019 | Banking | Participants: This research study focused on employees' (across multiple banking institutions) adoption of AI in the banking sector.<br><br>Sample size: 62 | Methodology: This research study used literature analysis. | The main findings of this research report highlight the factors that influence the adoption of AI within the banking sector. This research found that technology skills, senior management support and competitive pressure are factors that influence the adoption of AI within the banking sector. |

# APPENDIX C: Interview Guide

Participant #: ……..

Date: ……

The participants of the research study will answer the below open-ended interview questions:

1. Describe the general attitude towards AI within your organisation /industry?

Response:…….
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2. Are you able to indicate the benefits of AI that you can identify used in your organisation/industry?

Response:…….
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3. Which benefits do you believe are the most persuasive in driving higher levels of AI adoption in your organisation/industry?

Response:…….
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4. Can you identify any challenges to the adoption of AI within your organisation /industry?

Response:……
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5. What are the misconceptions you may be aware of about AI within your organisation/industry?

Response:……
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6. How do you believe that these misconceptions or concerns have changed over time?

Response:……
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7. How do these perceptions of the benefits and challenges of AI influence the decisions to adopt AI within your organisation /industry?

Response:……
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8. Can you list ways in which knowledge/information about AI is disseminated in your organisation /industry?

Response:……
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9. What kind of knowledge/training has been most effective in your experience?

Response:……
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10. How do observations about AI usage across other organisations impact your organisation's decisions about AI?

Response:……
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11. Can you provide some examples of how AI is used within your organisation/industry?

Response:……
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12. What social factors do you believe impact the adoption of AI within your organisation/industry?

Response:……
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13. How do internal technical systems or legacy systems currently in place within your organisation support or hinder AI adoption within your organisation/industry?

Response:……
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14. How does your organisation/industry handle data privacy concerns about the use of AI technologies?

Response:……
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15. What programmes does your organisation/industry employ to build trust in the use of AI technologies?

Response:……
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16. How are investment decisions about AI programmes made in your organisation/industry?

Response:……

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17. How do you believe the role of AI will evolve within the financial services industry?

Response:……

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18. How do you believe leaders should support AI in order to improve higher levels of adoption within your organisation/industry?

Response:……

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# APPENDIX D: Participant Informed Consent

**Title of project:** Adoption of Artificial Intelligence within the Financial Services Sector in South Africa

**Name of researcher:** Kgothatso Masipa

I, …….., agree to participate in this research project.

I agree to the following: (Please circle the relevant options below)

| | | |
|---|---|---|
| The research study was explained to me. I understand what this study is about. | YES | NO |
| I understand that I can volunteer to take part in the study. | YES | NO |
| I agree that the interview may be audio-recorded. | YES | NO |
| I agree that the researcher may use direct quotations from my interview may be used in their research report. | YES | NO |
| I agree that my participation will remain anonymous (my name or other identifying data will not be used by the researcher in their research report | YES | NO |
| I agree that other researchers may use the information I provide in my interview (depending on their own ethics clearance being obtained), but my name and any personal information will not be used or passed on | YES | NO |

…… (signature)

…… (name of participant)

…… (date)

…… (signature)

…… (name of researcher)

…… (date)

# APPENDIX E: Participant Information Sheet

Good day

My name is Kgothatso Masipa. I am a Master's student in Digital Business at the University of the Witwatersrand, Johannesburg. My supervisor is Dr Euphemia Godspower-Akpomiemie I am conducting a research study about AI in Financial Services. The study title is: Adoption of Artificial Intelligence within the Financial Services Sector in South Africa. The purpose of the study is to assess the perceptions about the adoption of AI within the Financial Services sector, reviewing the perceived benefits, risks and trust of AI applications.

I am inviting you to take part in an interview. If you decide to take part, your participation in this research study will last about 30 to 45 minutes. The interview will take place over a Microsoft Teams audio conference. With your permission, I would like to audio record the interview. This data will be stored in a password-protected computer and deleted after one year. Only the researcher will have access to the data. The interview will be confidential and anonymous. When I share the results of the research study, I will not include your name or anything else that could identify you.

If you decide to participate in the research study, it should be because you want to volunteer. You do not have to take part. You can stop being in the study at any time. You do not have to answer any questions if you do not want to. You will not get any direct benefits if you choose to join the research study. You will not lose any services, benefits or rights you would normally have if you decided not to join. Taking part in the research study will not cost you anything. You will not be paid for being in this research study. Your data costs to attend the interview will be reimbursed to a maximum of R150.

If you partake in this study, it will not pose any risk to your safety or your well-being. You may withdraw from the study at any time, if you decide or feel uncomfortable with the interview. If you withdraw, none of your information will be used in the study. This research study will be written up as a research report. If you would like to receive a summary of this report, I will be happy to send it to you.

If you have any questions during or afterwards about this research study, feel free to contact me or Dr. Euphemia on the details listed below. If you have any concerns or complaints about the ethical procedures of this research study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical) by telephone on +27(0) 11 717 1408, email hrecnon-medical@wits.ac.za.

Yours sincerely,

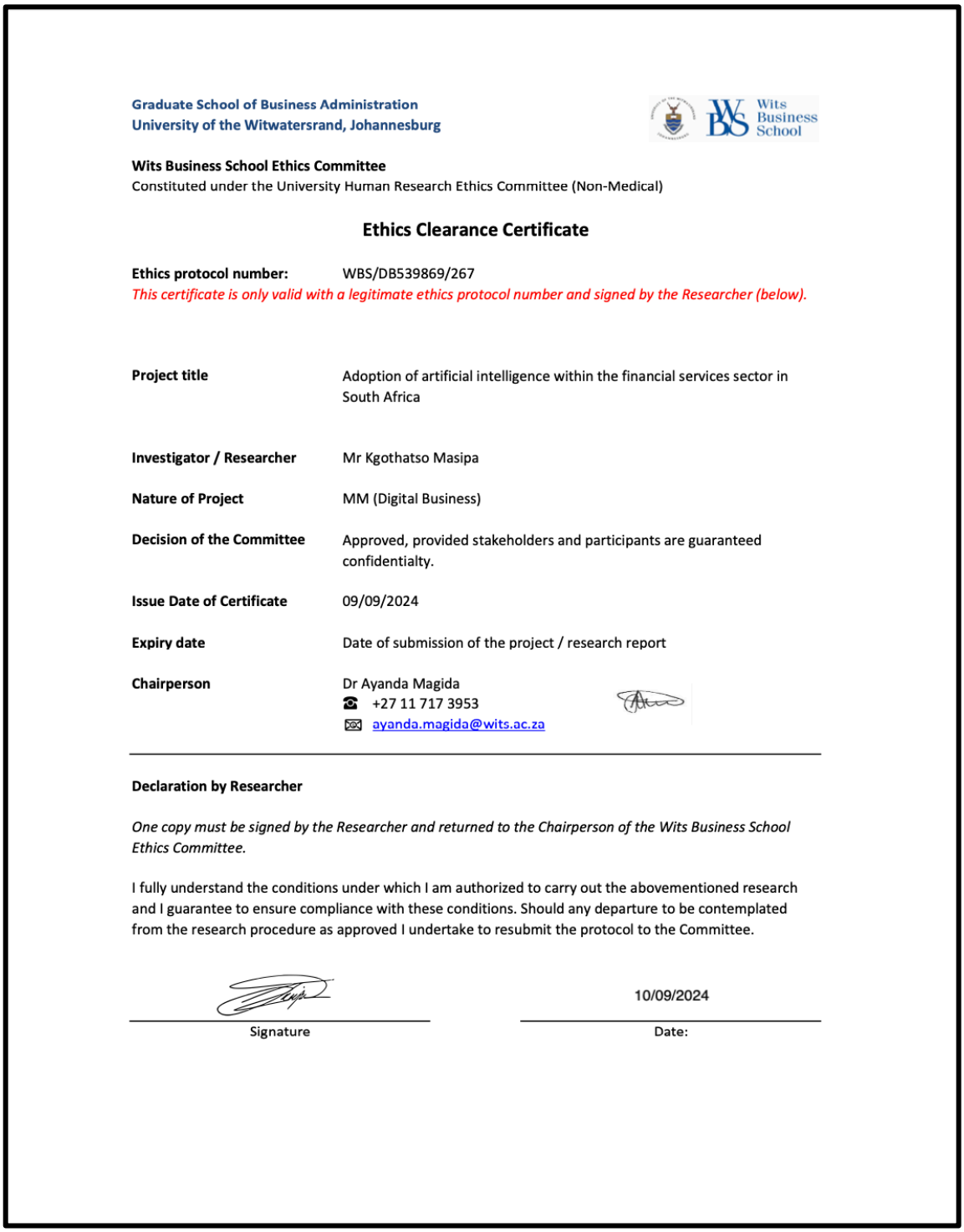
Kgothatso Masipa

Researcher: Kgothatso Masipa, 539869@students.wits.ac.za, +27 (0) 73 770 3172

Supervisor: Dr. Euphemia Godspower-Akpomiemie,
euphemia.godspowerakpomiemie@wits.ac.za, +27 (0) 11 717 3287

# APPENDIX F: Ethics Clearance Certificate

**Figure 3: Ethics Clearance Certificate**



Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

Wits Business School

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

**Ethics Clearance Certificate**

**Ethics protocol number:** WBS/DB539869/267
*This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).*

| | |
|---|---|
| **Project title** | Adoption of artificial intelligence within the financial services sector in South Africa |
| **Investigator / Researcher** | Mr Kgothatso Masipa |
| **Nature of Project** | MM (Digital Business) |
| **Decision of the Committee** | Approved, provided stakeholders and participants are guaranteed confidentialty. |
| **Issue Date of Certificate** | 09/09/2024 |
| **Expiry date** | Date of submission of the project / research report |
| **Chairperson** | Dr Ayanda Magida<br>☎ +27 11 717 3953<br>✉ ayanda.magida@wits.ac.za |

**Declaration by Researcher**

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

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

Signature

10/09/2024
Date:

# APPENDIX G: Research Report Schedule

**Table 7: Research Report Schedule**

| # | Phase | Deadline |
|---|---|---|
| 1. | Research Topic Submission | 31 March 2024 |
| 2. | Supervisor Allocation | 15 April 2024 |
| 3. | Proposal Submission (Chapters 1 – 3) | 22 July 2024 |
| 4. | Panel Review | 1 August 2024 |
| 5. | Panel Outcome | 5 August 2024 |
| 6. | Ethics Approval | 5 August 2024 |
| 7. | Research Title Approval | 7 August 2024 |
| 8. | Research Completion (Chapters 1 – 6) | 20 December 2024 |
| 9. | Supervisor Sign-Off | 31 January 2025 |
| 10. | Research Submission | 28 February 2025 |
| 11. | Examination | 1 March – 30 May 2025 |