# Exploring the challenges and opportunities associated with artificial intelligence in the South African banking industry


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Mini-dissertation accepted in partial fulfilment of the requirements for the degree Master of Business Administration at the North-West University

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## DECLARATION

I confirm that this research project, entitled "Exploring the challenges and opportunities associated with artificial intelligence in the South African banking industry," is my original work and is being submitted to partially fulfil the requirements for the Master of Business Administration degree at North-West University. It has not been previously submitted for any degree or examination at any other institution. Furthermore, I affirm that I have secured all requisite authorizations and consent to conduct this study.

## DEDICATION

This work is dedicated to the individuals whose unwavering support and contributions have shaped both my academic and personal journey.

To the participants of this study, your willingness to share your experiences has added depth and authenticity to this research. Your perspectives will forever be appreciated.

To Dr. Ndlovu, my study leader, your guidance and expertise have been a guiding light throughout this academic endeavor. Your mentorship has been instrumental in the completion of this work.

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To all my friends, thank you for your patience and understanding. I look forward to catching up on lost time and creating many more cherished memories together. Your friendship has been a source of strength.

Lastly, I want to express my gratitude to everyone who allowed me the space to pursue my MBA without undue pressure on personal commitments. Your support has been invaluable.

# ABSTRACT

This study investigates the challenges and opportunities introduced by artificial intelligence (AI) in the South African banking industry. Through a comprehensive exploration of current AI applications, challenges in adoption, and the impact on the workforce, the researcher provides valuable insights into the nuanced landscape of AI in banking. Drawing on literature and participant responses, the study identifies the prevalent use of AI-driven chatbots and humanoid robots in customer service, along with challenges such as data privacy concerns and a scarcity of skilled professionals. Findings confirm workforce transformation and potential job displacement due to automation yet reveal a proactive approach by banks in upskilling employees for more complex roles in the AI-driven environment. The study concludes with a set of recommendations, emphasizing the establishment of a robust legal and compliance framework, investment in expertise development programs, transparent communication strategies, leadership education, and strategic workforce transformation. While acknowledging limitations, including a small sample size and regional focus, the study contributes to the understanding of AI in the South African banking industry. Recommendations for future research include expanding the participant pool for a more comprehensive perspective and exploring additional connections between organizational change management techniques and AI adoption strategies.



**Key terms:** *Artificial Intelligence, Banking Industry, AI applications, Workforce transformation, challenges, opportunities*.

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# CHAPTER 1 : INTRODUCTION AND BACKGROUND

## 1.1 Introduction

To sustain competitiveness, organizations need to demonstrate resilience and adaptability in response to shifting environments, competitive challenges, and advancements in innovative technology (Maepa, 2014:1). Artificial Intelligence (AI) has become a critical part of the banking industry globally, and South Africa is no exception. As the adoption of AI in the banking industry increases, it is important to understand the challenges and opportunities that it brings to the industry of South Africa. In any given business, there are often thousands of tasks that require the attention of employees but do not fully utilize their skill sets – such as filing, data entry, or responding to routine emails. These are all essential tasks in running a business but can be repetitive, time-consuming and ultimately an inefficient use of talent. These tasks can be automated, and employees can be allowed to grow into more specialised roles. In the past few years, AI has become a household name and is in demand by banking industry institutions and many other financial service providers (Chui, 2015).

AI has become so in demand since it has the potential to improve how strategic decisions are made as well as the continuous improvement in the capabilities for analytics and automation of business operations such as credit scoring, fraud detections and mitigations and automation of customer loaning with products such as access facilities credit cards and term loans. (Agarwal, 2019). The concept of AI and Machine learning has transformed the value-creation process of financial service providers. The fourth industrial revolution has changed many organizational processes and operations which have combined the physical, biological, and digital domains to ensure a radical transformation which subsequently has influenced how people perform their work creating an improved product and service design (Kokina & Davenport, 2017).

## 1.2 Background to the Study

As South African banking institutions eagerly embrace AI technologies, a pressing concern arises regarding the potential for increased inequality among professionally

skilled and less-skilled employees. While AI promises transformative benefits, its integration raises critical questions about workforce dynamics and equitable opportunities within the industry (Ford, 2016). With the numerous devices within the financial sector which are using innovative technology currently, cybersecurity and privacy have now become significant challenges for many organizations. The effect on employment is no longer limited to the production and manufacturing sectors. AI has become a regularity and a norm of how we go about our lives and our jobs and with structured querying language being automated it makes it much easier for organisations to solve client queries without the implication of Human interaction (Smith & Anderson, 2014). For this reason, we need to keep upskilling ourselves, and therefore it is essential to ensure that we educate our colleges about this study of AI; otherwise, employees will not be replaced but become irrelevant within the financial sector.

The continuous fast-growing improvements in the field of AI have placed many jobs at risk of having to be substituted by AI and intelligent automation technological advancements (Petropoulos, 2017). Technological unemployment has become a common term and it refers to the way people lose their jobs and professions due to technological innovations and the lack of specialised skills. In recent years many jobs have been disappearing as new technologies advance, these jobs include personal assistants, data captures, clerks, and bank tellers.

It is observed that whenever an industrial revolution takes place a high level of concern is noticed about job security (Peters, 2017). New skill sets are required for employees to still be employable and in demand. This affects the banking industry and its workforce. Jobs that can form part of digitisation such as bank clerks and administrators are skills that will become less relevant during the fourth industrial revolution and at the end of the day, financial institutions are required to have a strategic plan to re-skill staff members to equip them with the necessary skills and competencies that will be able to make them remain relevant and in Demand and put them in a position to improve their work productivity and contribute to their employer's long term goals. (World Economic Forum. 2018).

AI has become a true game changer within the world of finance. An AI system will examine millions and billions of knowledge points, realize patterns and trends that

individuals might miss, and even predict future patterns. Artificial Intelligence, along with natural language processing, can even be used to create conversational treesthat let customers converse and perform specific actions, whether by chat or voice application (Chui, 2016).

It is predicted that during Fourth Industrial Revolution (4IR) and the digital era, workloads will be reduced as machines will do most of the work whereas the Human workforce will focus on operating, developing, and innovating machine learning (Peters, 2017). Artificial intelligence has evolved in becoming the way of doing things, (Smith & Anderson, 2014). AI consists of intelligent robotics, machines or software programs that are developed to display human-like features, enabling, and learning from itself to automate human activities. With this in mind, we still need to understand the macroeconomic factors such as the ageing of workforces the motivation and implementation of energy efficiency and salary changes that will also contribute to the banking sector and other business's need for automation (McKinsey & Company. 2019.).

AI, machine learning development and automation will be equipped to create approximately 1.8 million new jobs that are derived from the fact that entities such as banks will continue to strive towards product and service design creating new heights for productivity and quality (McKinsey & Company. 2019). In addition to the above-mentioned statistic, roughly 4.5 million new jobs have a possibility of being created in some industries such as but not limited to the financial sector due to the hunger for improved quality of work and productivity and the evolution of technology (McKinsey & Company, 2019).

### 1.3 Problem Statement

The banking industry is rapidly shifting towards a digital and automated client service interface (Kuroda, 2017). However, while digital adoption has accelerated due to the COVID-19 pandemic, a significant portion of households are still unaware of emerging technology concepts, such as smart home products and 5G mobile. In light of these challenges and opportunities, the banking industry must strike a balance between automation and human interaction when designing its services (le Clair, 2021).

To this end, the proposed study will delve into the specific challenges and opportunities that artificial intelligence presents to the banking industry in South Africa. Through this exploration, the study aims to identify ways in which banks in the country can leverage AI to improve their operations and services, while also mitigating potential risks and ethical concerns. By conducting this research, the study hopes to shed light on the best practices for integrating AI into the banking industry, with a particular focus on the unique needs and challenges facing South African banks.

## 1.4 Research Objectives

The following sections shows the aim of the study and the sub objectives that the study anticipated to achieve.

### 1.4.1 Primary objective

The primary objective of this study was to explore the challenges and opportunities brought by artificial intelligence in the banking industry in South Africa

### 1.4.2 Secondary objectives include the following.

- SO1: To explore current applications of AI in the banking industry of South Africa.
- SO2: To establish the challenges and opportunities that the banking industry in South Africa faces in adopting AI.
- SO3: To explore the effects of AI adoption on the banking industry's workforce in South Africa, including potential job displacement, creation of new jobs, and transformation of existing job roles.

## 1.5 Research questions

The following are the research questions the study seeks to answer:

- RQ1: What are the current applications of AI in the banking industry in South Africa?

- RQ2: What are the challenges and opportunities that the banking industry in South Africa faces in adopting AI?
- RQ3: What are the effects of AI adoption on the banking industry's workforce in South Africa, including potential job displacement, creation of new jobs, and transformation of existing job roles?

## 1.6 Significance of the Study

Concerning the conducted study, employees will gain insights into the need for additional training to ensure their continued employability amid the challenges posed by the fourth industrial revolution. The decision to pursue learning, skill development, and knowledge expansion hinges on the specific industry and the requisite skill levels essential for achieving goals and objectives. This study expects to encourage employers to provide the necessary resources for staff to acquire new skills, leveraging platforms like Udemy Business, which offers a repertoire of over 13,000 certified courses.

## 1.7 Scope/Delimitations of the Study

### 1.7.1 Field of study

In this study, the challenges and opportunities brought by artificial intelligence in the banking industry in South Africa will be explored.

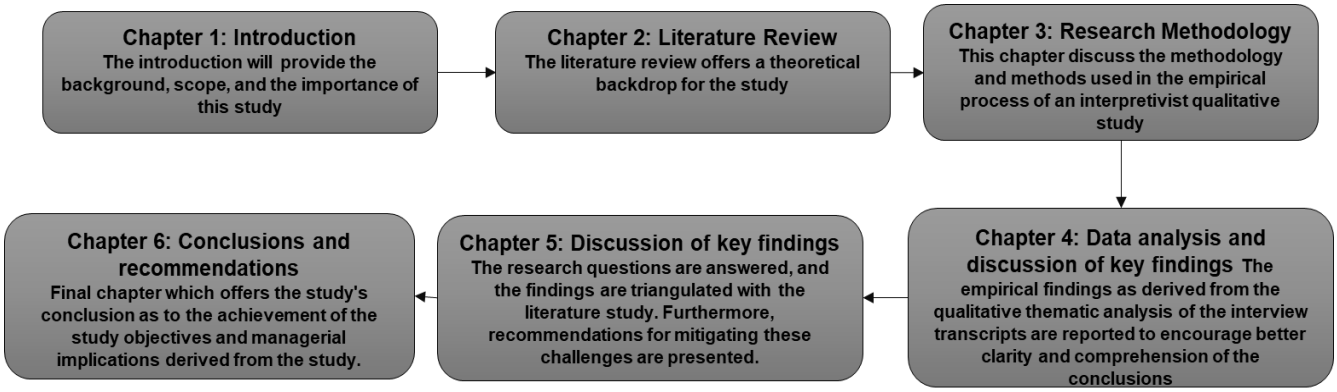
### 1.7.2 Sector/Industry/Business under investigation

The senior leaders and AI specialist who will participate in the study will be permanently employed have been part of the adoption of AI within the banking industry of South Africa

## 1.8 Chapter Outline

Figure 1-1 illustrates the chapter outline of the study, which is thereafter discussed.

**Figure 1-1: Chapter Outline**




Source: Author's own

## 1.9 Chapter summary

The following chapter introduced the study. The problem statement was clearly stated, and the aligned objectives illustrated. The chapter went on to give a brief background of the problem and how the study is significant and worth researching. The methodology was not given as it is detailed in chapter three of the dissertation. The following section explored the literature and related work to this study.

# CHAPTER 2 : LITERATURE REVIEW

## 2.1 Chapter introduction

The following chapter is the review of literature and it highlights the importance of employing secondary data obtained from the current body of knowledge, as stressed by Grady et al. (2013:192). This data is predominantly extracted from academic books, peer-reviewed journals, and scholarly dissertations. The study heavily leaned on trustworthy repositories such as the North-West University Library, Ebscohost, Google Scholar, and other databases to retrieve information covering articles, journals, dissertations, and newspapers.

### 2.1.1 Definition of terms:

**Artificial intelligence (AI)**: AI involves the emulation of human intelligence by machines, with the aim of thinking and acting like humans. A concrete example of AI is facial recognition, where an uploaded photo serves as input, facial recognition functions as the AI application, and the output involves the grouping of photos or names of individuals in the photo. Within the realm of AI, the terms "machine learning" and "deep learning" are frequently employed (McLay, 2018).

**Machine learning** constitutes a set of algorithms enabling computers to learn without direct programming (McLay, 2018).

**Deep learning**, a specific type of machine learning, employs neural networks as part of an AI system (McLay, 2018).

### 2.1.2 Demystifying AI: Understanding Machine Learning and Deep Learning in Context

AI, or artificial intelligence, denotes the replication of human intelligence by machines with the intention of mimicking human thought and behaviour. An illustrative instance of AI is facial recognition, where an uploaded photo serves as input, facial recognition functions as the AI application, and the output involves the categorization of photos or names of individuals in the photo. When delving into AI, two commonly used terms are machine learning and deep learning. Machine learning encompasses a set of algorithms enabling

computers to learn without direct programming. Deep learning, a specific facet of machine learning, employs neural networks within an AI system (McLay, 2018).

Machine learning models are designed to learn the mapping of input data to a specific output of interest. For instance, an email spam filter analyses an email to determine if it is spam or not. The machine learning model assesses whether a new email is spam by referencing a substantial dataset of past emails, known to be either spam or not spam. Through studying historical emails, the model identifies characteristics that distinguish between spam and non-spam emails, establishing rules or criteria to classify a new email. It's important to note that no machine learning model achieves perfect accuracy, especially initially. Models are routinely updated with new data to enhance accuracy over time (McLay, 2018).

Deep learning is a specific type of machine learning that uses neural networks. A neural network contains various layers of neurons that map the input variables to the output variable. In a network with a single layer of neurons, each neuron represents some combination of the model's input variables, and a combination of the neurons is used to predict the output variable. Real-world neural networks contain very large numbers of neurons, potentially thousands of neurons or more spread across multiple layers of neurons. The advantage of a neural network is that we don't need to know what the neurons represent, or how many there should be. The algorithm works this out automatically. Neural networks are used for complicated applications of artificial intelligence (Gupta, 2019).

An illustration of this concept is evident in facial recognition, where a computer interprets an image as an extensive series of numerical values, with each number denoting the brightness of a pixel. The algorithm demonstrates its ability to analyze unstructured data, such as an image, by transforming it into a numeric format comprehensible to a computer. Automation has been a longstanding practice in banking institutions, and there is a growing focus on the significant potential of artificial intelligence (AI) to enhance value through improved revenue, customer service, efficiency, and risk management in businesses (Donepudi, 2015).

## 2.2 Evolution of AI in Banking

The following sections explains how AI has evolved in the South African banking sector and how major banks have integrated it into their systems to increase efficiency and effectiveness.

### 2.2.1 Historical overview of AI adoption in banking

Artificial Intelligence (AI) has become a critical part of the banking industry globally, and South Africa is no exception. As the adoption of AI in the banking industry increases, it is important to understand the challenges and opportunities that it brings to the industry of South Africa. In any given business, there are often thousands of tasks that require the attention of employees but do not fully utilize their skill sets – such as filing, data entry, or responding to routine emails. These are all essential tasks in running a business but can be repetitive, time-consuming and ultimately an inefficient use of talent. These tasks can be automated, and employees can be allowed to grow into more specialised roles. In the past few years, AI has become a household name and is in demand by banking industry institutions and many other financial service providers (Chui, 2015).

### 2.2.2 Key milestones and technological advancements

The demand for artificial intelligence (AI) has surged due to its potential to enhance strategic decision-making and continually advance capabilities in analytics and the automation of various business operations. These operations include credit scoring, fraud detection and mitigation, as well as the automation of customer lending through products like access facilities, credit cards, and term loans (Agarwal, 2019). The integration of AI and machine learning has revolutionized the value creation process within financial service providers. The fourth industrial revolution has brought about transformative changes in organizational processes and operations by integrating the physical, biological, and digital domains. This radical transformation has significantly impacted how individuals carry out their work, leading to improved product and service design (Kokina & Davenport, 2017).

## 2.3 AI Applications in Banking

The following section discusses the common AI applications which are being used across the banking sector in South Africa.

### 2.3.1 Customer service and chatbots

To enhance customer service, many banks have adopted the use of chatbots (Manning, 2018). AI chatbots have become a widely employed technological tool across various business sectors. As noted by Moyo (2017), Absa introduced chatbots as a strategy to expand its market share and enhance customer services. In a move to minimize physical transactions, Absa recently introduced Quick Response (QR) payments through platforms like Zapper, SnapScan, and Pay@, enabling customers to make authenticated payments by scanning QR codes (Businesstech, 2021). In 2018, Nedbank introduced its first humanoid robot, "Pepper," equipped with voice recognition, the ability to perceive human emotions, and the capability to engage in conversations and respond to customer queries (Khumalo, 2018). However, the absence of personal empathy and emotion in computer programs can make some customers uneasy when relying on them for purchasing decisions (Dietvorst et al., 2018; Kestenbaum, 2018).

### 2.3.2 Fraud detection and prevention

The banking industry is incorporating AI in middle-office functions to address risk mitigation. Processes such as fraud detection are being enhanced to improve anti-money laundering efforts, and there is a trend toward a comprehensive system that can handle all aspects of the credit analysis process, including credit validations, contracts, and payments (Schwitters, 2016). In the pursuit of monitoring financial risks, FNB has introduced "Manila," an artificial intelligence solution designed to gather customer data from various sources, such as spending activities, to facilitate the decision-making process (Lourie, 2020).

### 2.3.3 Personalized banking experiences

Due to the utilization of diverse systems within the bank, such as internet banking, clients can independently make decisions and conduct transactions without the need for human interaction. This enables clients to manage their business affairs without physically

visiting the bank. Manyika et al. (2017) emphasize that the implementation of AI in a company's production processes is crucial to stay competitive in the industry. As per the interviews, participants highlighted that the various systems provided by the bank assist employees in effectively serving clients by identifying and prioritizing essential information. Banks are actively working to integrate AI to enhance efficiency and productivity among employees (Bhardwaj, 2017). The introduction of automation is anticipated to bring efficiency, productivity, and convenience to the banking industry, benefiting clients (Manyika et al., 2016).

### 2.3.4 Process automation and efficiency improvement

The development of algorithms and systems in the banking sector has resulted in the automation of employees' daily tasks. Tasks that were once performed manually, such as telemarketing and administrative duties, have been taken over by machines. This shift has allowed employees to focus more on strategic management, with certain routine jobs expected to become obsolete as machines take over those functions. Despite the promise of AI creating new job opportunities, experts like Snell (2018), Knapton (2016), Shewan (2017), and Smith (2016) foresee automation replacing employee jobs over the next five decades.

In parallel, the use of various systems within the bank, including internet banking, empowers clients to make independent decisions and conduct transactions without requiring human interaction. This autonomy enables clients to manage their business affairs without physically visiting the bank. Manyika et al. (2017) highlight that the implementation of AI in a company's production processes is crucial for maintaining competitiveness in the industry. Interview participants emphasized that the diverse systems provided by the bank assist employees in effectively serving clients by identifying and prioritizing essential information. Banks are actively working to integrate AI to enhance efficiency and productivity among employees (Bhardwaj, 2017). The introduction of automation is anticipated to bring efficiency, productivity, and convenience to the banking industry, benefiting clients (Manyika et al., 2016).

## 2.4 Challenges of AI Adoption in Banking

The following section discusses the challenges associated with the adoption of AI in the banking industry. These are the most prominent challenges across major banks in South Africa and worldwide.

### 2.4.1 Data privacy and security concerns

Security of information is paramount in banking, and clients rely on banks to safeguard their funds and assets. Establishing trust is crucial, and clients expect assurance that their financial resources are secure both within and outside the bank. Consequently, it is imperative for banks to ensure that the AI systems they implement are not only advanced but also equipped with robust validations and security controls to protect clients' information (Tegmark, 2017).

As clients increasingly engage in cashless activities, the responsibility falls on the bank to guarantee the security of clients' assets and funds. The evolving landscape of AI brings about advancements, but it also correlates with an escalation in cybercrime. In response, financial institutions, such as JP Morgan Chase and Co., have made substantial investments, exceeding USD 600 million, to fortify cybersecurity measures (Hearit, 2018). Enhanced security measures contribute to building trust between clients and the bank, fostering a conducive environment for increased business transactions.

The rising threat of fraud in the banking sector, encompassing credit card fraud, securities fraud, and bankruptcy fraud, has prompted the need for robust security measures. AI, with its capabilities, serves as a potent tool in identifying and thwarting attempts at fraud. As hacking systems become increasingly sophisticated, AI systems play a crucial role in detecting and preventing fraudulent activities, ultimately safeguarding clients' money, assets, and property (Hearit, 2018).

### 2.4.2 Ethical considerations

Certain individuals with expertise in computer systems exploit data and systems for personal gain, leveraging the fact that AI software and machines lack emotions and character. The ongoing improvements in banks, particularly in security measures such as identity authentication and the detection of suspicious bugs, have prompted

cybercriminals to manipulate data and pose cyber threats (Gilbert, 2018). This is a concerning trend, as AI systems, when exposed to criminal activities, can cause widespread destruction and negatively impact numerous individuals (Bhbosale et al., 2020).

Given the continuous digital transformation in the banking industry, there is a heightened susceptibility to cyber threats (Hewitt, 2020). The researcher identifies three primary threat trends in the banking sector:

- Malware: This involves infecting end-user devices with malware to provide cybercriminals with easy access to critical networks and the bank's information.
- Social Engineering: Employees are manipulated into divulging important and sensitive data to social engineers who exploit employees' behavior to obtain information. Phishing is a prevalent attack method in the banking industry, where social engineers use texts, calls, and emails to extract information from employees.
- Data Manipulation: This occurs when crucial and sensitive information falls into the wrong hands. Cybercriminals gain access to target systems and make unauthorized changes that can impact the entire system for their selfish gains. An example is the manipulation of a client's transaction for personal benefit (Hewitt, 2020).

### 2.4.3 Workforce displacement and retraining

The South African banking institution's research warns the inclusion of AI could upswing the inequality among professionally skilled and less-skilled employees. With the numerous devices within the financial sector which are using innovative technology currently, cybersecurity and privacy have now become significant challenges for many organizations (Modiba & Kekwaletswe, 2020). The effect on employment is no longer limited to the production and manufacturing sectors. AI has become a regularity and a norm of how we go about our lives and our jobs and with structured querying language being automated it makes it much easier for organisations to solve client queries without the implication of Human interaction (Anderson, 2018). For this reason, we need to keep upskilling ourselves, and therefore it is essential to ensure that we educate our colleges

about this study of AI; otherwise, employees will not be replaced but become irrelevant within the financial sector.

The continuous fast-growing improvements in the field of AI have placed many jobs at risk of having to be substituted by AI and intelligent automation technological advancements (Petropoulos, 2017). Technological unemployment has become a common term and it refers to the way people lose their jobs and professions due to technological innovations and the lack of specialised skills. In recent years many jobs have been disappearing as new technologies advance, these jobs include personal assistants, data captures, clerks, and bank tellers (Petropoulos, 2017).

It is observed that whenever an industrial revolution takes place a high level of concern is noticed about job security (Peters, 2017). New skill sets are required for employees to still be employable and in demand. This affects the banking industry and its workforce. Jobs that can form part of digitisation such as bank clerks and administrators are skills that will become less relevant during the fourth industrial revolution and at the end of the day, financial institutions are required to have a strategic plan to re-skill staff members to equip them with the necessary skills and competencies that will be able to make them remain relevant and in Demand and put them in a position to improve their work productivity and contribute to their employer's long term goals. (World Economic Forum. 2018).

## 2.5 Opportunities and Benefits of AI in Banking

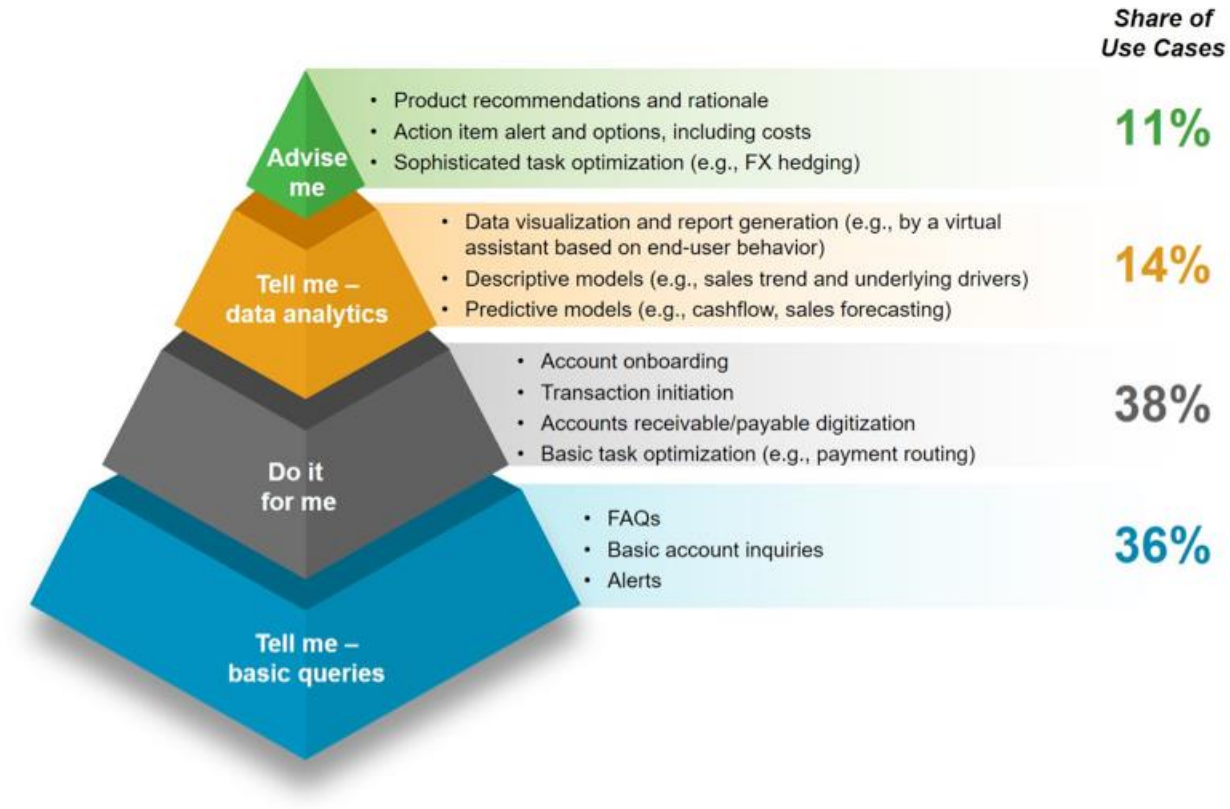
Section 2.5 delves into the opportunities and benefits that AI brings to the banking sector, unravelling its transformative impact on customer experiences, operational efficiency, fraud detection, data-driven decision-making, and the potential for workforce transformation.

### 2.5.1 Enhanced customer experiences

The incorporation of AI in the banking sector has substantially heightened customer satisfaction. Traditional queues in banks are now obsolete, as clients seamlessly conduct transactions from their homes, marking a shift from centralized to decentralized services

in the digital era. AI's role in "decongesting branches" allows simultaneous servicing of multiple clients, enhancing efficiency and reducing the need for physical visits. This not only improves customer experiences but also lightens employee workloads, with studies indicating a positive correlation between customer satisfaction and organizational profits (Asimah et al., 2018). The finance sector in South Africa recorded the highest employment figures at 215,000 in Q1 2021 (Statistics South Africa, 2021). The digital era necessitates the use of digital platforms, and South African banks leverage AI to offer 24/7 seamless customer service, contributing to revenue through personalized products (Chalmers, 2021). Simon (2018) emphasizes a seamless customer experience, accessible online or offline, maintaining consistent branding. AI empowers employees to focus on critical tasks and address personalized customer needs, ensuring convenience and swift correction of service issues.

**Figure 2-1: The Transformation of Customer Experience Through Artificial Intelligence.**




From source: Meara, 2020

Figure 2-1 outlines the application of AI in addressing customer needs in the form of a pyramid. The suggested hierarchy begins at the base:

"***Tell me—basic queries***," representing fundamental customer inquiries like password changes or checking account balances.

"***Do it for me***," encompassing activities such as account on-boarding and basic task optimization, such as initiating electronic payment requests.

"***Tell me–data insights,***" covering both descriptive functions like report generation and predictive analytics, including cash-flow forecasts.

At the summit is "***Advise me,***" involving tailored recommendations for specific needs or issue resolution, such as providing options to address an anticipated cash shortfall.

### 2.5.2 Improved operational efficiency.

AI has emerged as a transformative force in the financial realm, with systems capable of analyzing vast amounts of data, identifying intricate patterns and trends often overlooked by individuals, and making predictions about future trends. Artificial Intelligence, coupled with natural language processing, is also employed to construct conversational trees, enabling customers to interact and execute specific actions through chat or voice applications (Chui, 2016).

According to Manyika *et al.* (2017), the absence of AI implementation in a company's production processes may expose them to significant competition within the industry. Participants in interviews acknowledged that the various systems provided by banks assist employees in effectively supporting clients, discerning the importance of information through system-driven insights. Organizations in the banking sector are actively adopting AI to enhance efficiency and productivity among employees (Bhardwaj, 2017). The integration of automation is touted as a means to bring about efficiency, productivity, and convenience in the banking industry, ultimately benefiting clients (Manyika *et al.*, 2016)

### 2.5.3 Enhanced fraud detection and prevention

Despite cybercriminals exploiting advancements in banking technology since the advent of AI, AI-based fraud detection systems are actively deployed to identify and prevent these cybercrimes (Soni, 2019). Siddiqui *et al*. (2018) affirm that cybercrimes, including theft and fraud, are escalating with the introduction of AI in the banking sector. Consequently, participants express optimism that AI systems will mitigate fraud cases in South Africa. As reported by Businesstech (2020), the South African banking industry witnessed a surge in robbery and burglary in 2019, attributed to the evolution of the digital landscape. However, the implementation of AI systems and structures has resulted in a 16% decrease in such crimes (Soni, 2019).

### 2.5.4 Data-driven decision-making

AI is presently employed for decision-making in critical scenarios where human expertise alone may not suffice. In these situations, the collaboration between AI systems and human experts results in a decision outcome that possesses greater efficacy than when the two are considered separately (Zhang et al., 2020). The utilization of automated machines in decision-making, facilitated by AI, affords banks a strategic advantage by offering an analytical perspective. This enables management to make well-informed decisions that are optimal for the company, mitigating the potential for human errors. In addition to providing analytical insights, AI plays a crucial role in problem resolution, addressing issues that might have been overlooked, and contributes to the precise prediction of the financial status of the bank (Beaulieu, 2021).

### 2.5.5 Opportunities for workforce transformation

It is anticipated that in the Fourth Industrial Revolution (4IR) and the digital era, workloads will diminish as machines assume a greater share of tasks, allowing the human workforce to concentrate on operating, developing, and innovating machine learning (Peters, 2017). Artificial intelligence has progressed into a tool that enhances operations (Smith & Anderson, 2014), encompassing intelligent robotics, machines, or software programs designed to emulate human features, enabling self-learning for the automation of human activities. While recognizing the potential benefits, it is essential to consider macroeconomic factors such as workforce aging, motivation, energy efficiency, and

salary changes, all of which contribute to the banking sector and other businesses' imperative for automation (McKinsey, 2017).

AI, machine learning development, and automation are poised to generate around 1.8 million new jobs, stemming from entities like banks striving for innovative product and service designs to elevate productivity and quality. Beyond this figure, approximately 4.5 million new jobs may emerge, especially in sectors like finance, driven by the pursuit of enhanced work quality, productivity, and technological evolution (McKinsey & Company, 2019). McLay (2018:5) suggests that the evolution of AI has the potential to enhance employees' lives, fostering increased productivity and reduced business costs. Bessen (2018:16) supports this by highlighting the growing augmentation of human labor with AI, enabling banks and workforces to perform tasks and activities previously beyond their reach.

Erest & Young (2021) conducted a study exploring the creative assistance provided by AI and AI within robots to humans, concluding that, despite rapid advancements, robots will encounter tasks beyond their specifications. Hence, human expertise and creativity will remain indispensable, empowering human talent as the true drivers of value in organizations (le Clair, 2021). The ongoing industrial revolution presents substantial opportunities for companies assuming leadership roles in AI (Schwitters, 2016). Realizing these opportunities depends on their actions at the outset of the 4IR, involving the development of capabilities and the reframing of business and operating models to capitalize on this transformative technological infrastructure (Schwitters, 2016).

## 2.6 Missing gaps

Despite the numerous benefits and opportunities presented by AI in banking, challenges persist. Data privacy and security concerns highlight the importance of robust validations and security controls to protect client information. Ethical considerations address the potential exploitation of AI for personal gain and the vulnerability of the banking sector to cyber threats. Workforce displacement and retraining become crucial issues as AI integration may lead to job obsolescence, emphasizing the need for continuous upskilling. On the flip side, the section on opportunities and benefits of AI in banking sheds light on

the transformative impact of AI on customer experiences, operational efficiency, fraud detection, data-driven decision-making, and the potential for workforce transformation. Enhanced customer satisfaction, automation of traditional banking processes, and improved decision-making capabilities are among the positive outcomes of AI adoption in the banking sector.

## 2.7 Chapter summary

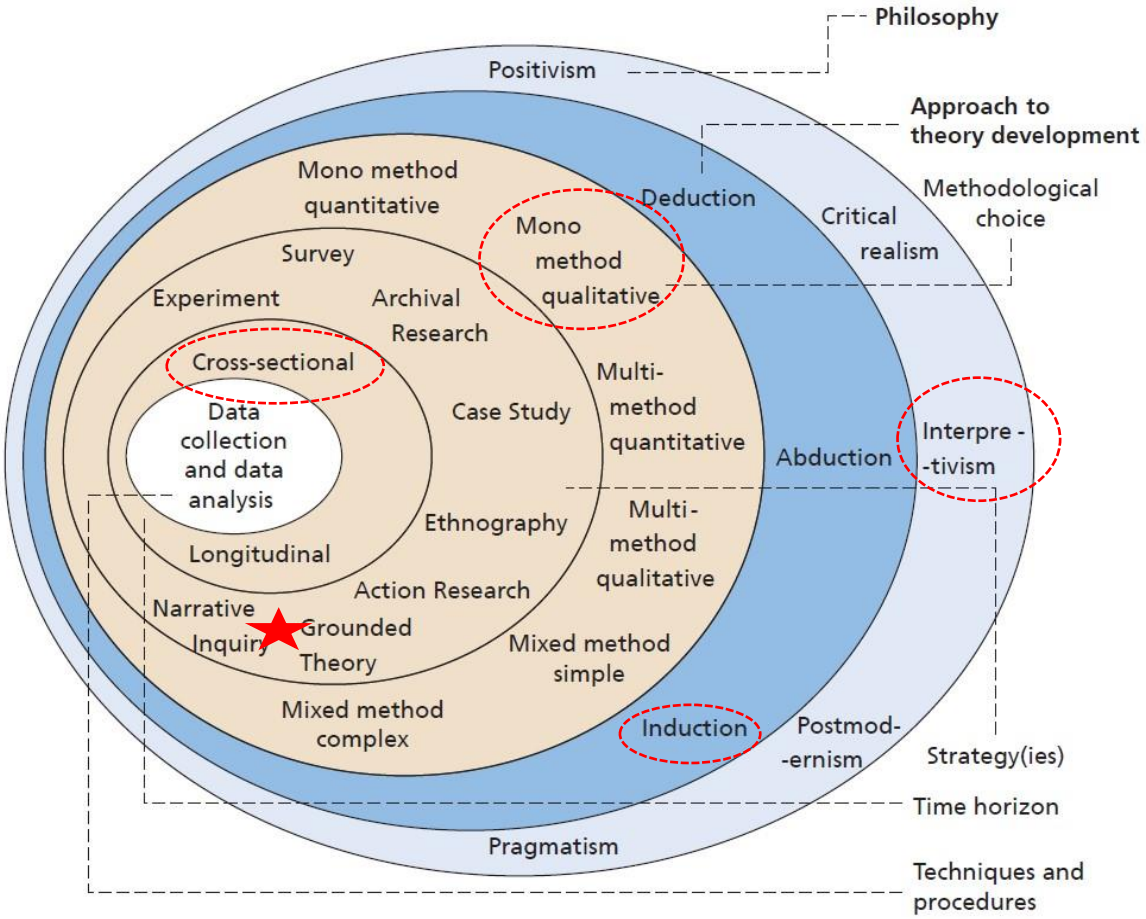
The following chapter gave a detailed literature on AI and its adoption by banking sector. In the evolution of AI in the South African banking sector, a historical overview reveals the critical role AI plays globally and locally. The banking industry faces challenges of repetitive and time-consuming tasks, leading to an inefficient use of talent. Recognizing this, major banks in South Africa have embraced AI to automate routine tasks, allowing employees to focus on more specialized roles. Key milestones and technological advancements demonstrate the surge in demand for AI to enhance strategic decision-making and automate various operations, such as credit scoring, fraud detection, and customer lending. The integration of AI and machine learning has ushered in transformative changes in organizational processes during the fourth industrial revolution.

# CHAPTER 3 : RESEARCH METHODOLOGY

## 3.1 Chapter introduction

This chapter provides an overview of the methodology for the study. This is demonstrated by discussing the study's intended participants, sample size, data collection and measurement instruments, data analysis and interpretation procedures, and finally, reporting, and moral concerns. Saunders et al.'s (2018:130) Research Onion, shown in Figure 3-1, used to describe the present research's methodology and the approach taken for this study is further explained by Table1-1:

**Figure 3-1: Saunders et al.'s Research Onion**




Source: Saunders et al. (2018:130)

The research approach adapted for this study is explained using the following Table1-1:

**Table 3-1: A description of applying Figure 3-1 in this study**

| Layer | Study choice |
|---|---|
| Research philosophy and paradigm | Interpretive Paradigm: The interpretive paradigm, rooted in an interpretivism philosophy, is an epistemological stance that underscores the significance of the researcher understanding the nuances among individuals in their roles as social actors (Samkange, 2012:611). |
| Research approach | **Inductive**. The analysis of qualitative data obtained from interviews aimed to derive conclusions by identifying frequent, dominant, or critical themes emerging from the data, without being constrained by structured methodologies (Thomas, 2006:237). |
| Research strategy | Exploratory and Explanatory: Employing an exploratory qualitative research design enables the researcher to investigate a subject that has been minimally explored in previous studies. Additionally, it offers participants the chance to contribute to the generation of new knowledge within that domain (Reid-Searl & Happell, 2012:1999). |
| Choice of research | Single-Method Qualitative Research is interpretative, as it proves difficult to steer clear of personal interpretations while analyzing qualitative data (Di Matteo, 2019:89). |
| Time horizon of research | Cross-sectional. Data were gathered in a one-time collection (Mayer, 2015:62). |
| Technique and procedure | The investigator conducted semi-structured interviews using pre-determined open-ended questions. Participants were selected through judgmental or purposive sampling, a nonprobability sampling method. Therefore, the findings cannot be extrapolated to the wider population (Saunders et al., 2018:130). |

## 3.2 Research paradigm

A research paradigm involves the integration of philosophies and methodological approaches (Kekeya, 2019:29), encompassing a set of data methods and tools for data analysis (Kekeya, 2019:29). The research paradigm focuses on the fundamental research inquiry rather than being confined to the study's outcomes, with three main paradigms identified: positivism, interpretivism, and critical theory (Kekeya, 2019:30).

The positivist philosophy asserts that a modern scientific approach requires the researcher's perspective to be constrained by observable reality—what is perceptible to the sense organs and instruments of experience. Positivism inquires into tangible and actual phenomena that can be observed (Abdessami & HoussemEddine, 2020:157-158). It is grounded in the belief that studying human behavior should parallel the exploration of nature, aiming to discover, quantify, and assess phenomena through the establishment of causal relationships between different aspects (or variables) tied to a specific theory or practice. Positivism utilizes logical, systematic, and deductive methods to recognize, identify, and explain how individuals respond to external incentives, pressures, and norms (Abdessami & HoussemEddine, 2020:157-158).

The interpretive paradigm proposes that reality, as constructed through accounts and research, is a complex and multifaceted element (Grix, 2002:178). It suggests that a single phenomenon, typically the focus of a study, is constructed through the accounts of those perceiving it, leading to variations in the constructions of the phenomenon (Grix, 2002:178). Given the industry sector and the nature of the questions and objectives outlined in this proposed study, qualitative methodologies associated with an interpretivist paradigm are deemed most suitable for addressing the study's inquiries (Grix, 2002:175).

## 3.3 Research approach

This study employed a generic inductive approach for the qualitative data analysis, allowing for conclusions based on prevalent, dominant, or critical themes without the constraints of structured methodologies (Thomas, 2006:237). The methodological approach in research refers to the process and logic applied throughout the entire research process (Collis & Hussey, 2014:95). In the business context, a decision must be

made on whether the research approach is deductive or inductive, with deductive research involving hypothesis development and testing within a positivist paradigm, and inductive research, within an interpretivist paradigm, studying a situation before forming a hypothesis (Saunders et al., 2019:145; Greener & Martelli, 2018:27).

Considering the nature of the questions, this proposed study adopts an inductive research approach, drawing conclusions from prevalent, overarching, or pivotal themes present in the data while avoiding the constraints of structured methodologies (Thomas, 2006:237). The distinction between inductive and deductive thinking lies in the former proposing the development of a new hypothesis, while the latter seeks to test and build upon an existing idea (Streefkerk, 2019). Inductive research is often chosen when there is limited literature on a topic, starting with the formulation of a hypothesis, whereas deductive reasoning requires existing data for testing hypotheses (Streefkerk, 2019). In this research, a deductive approach will be employed, utilizing existing data as a starting point.

## 3.4 Methodological choices

The proposed research employed a broad qualitative approach, aligning with operationalizations and the inquiry's nature. The primary aim was to investigate challenges and opportunities related to artificial intelligence in the South African banking sector. For this purpose, a qualitative research methodology was deemed most appropriate, as described by Creswell (2007:37), emphasizing assumptions, theoretical perspectives, and exploring the meaning attributed by individuals or groups to social or human problems. This qualitative study facilitated a nuanced understanding of events based on participants' subjective knowledge and experiences (Moser & Korstjens, 2018:12).

Qualitative research, as noted by Di Matteo (2019:89), is interpretive due to the inherent difficulty in avoiding personal interpretations during the analysis of qualitative data. It operates in an emergent fashion, allowing for flexibility in technique modification as unforeseen factors may arise during the study. Thus, qualitative research permits the organic development of relevant features and categories, enabling the researcher, through data collection instruments, to focus on critical issues (Di Matteo, 2019:89)

## 3.5 Research strategy

In-depth interviews, typically associated with phenomenological studies, aimed to extract data on a participant's experience and the influencing factors. Structured interviews adhered to a strict outline, suitable for situations where standardized interview experiences were crucial. Semi-structured interviews, relevant to the proposed study, blended aspects of both styles, allowing flexibility for further discussion while maintaining a structured approach.

In the proposed study, semi-structured interviews were utilized to collect data from individuals contributing to AI adoption in the South African banking sector until reaching data saturation plus one, determining the study's sample size. The interviews were transcribed into written data and subjected to thematic analysis principles.

## 3.6 Time horizon

The study had two options regarding the time horizon: longitudinal or cross-sectional studies. Longitudinal studies involved observing changes over an extended period, akin to a "diary" style, while cross-sectional studies captured a "snapshot" at a specific moment (Saunders et al., 2019:212). This research adopted a cross-sectional design, focusing on a single short-term period, in contrast to longitudinal studies that collect data multiple times over an extended duration (Mayer, 2015:62).

The cross-sectional approach in this study offered advantages, such as data being unaffected by the maturation of business culture or changes in the views of study participants over time. Longitudinal research, on the other hand, might have faced significant shifts in the experiences and perspectives of participants (Ahmadzai, 2020:18).

## 3.7 Study population and sampling

The following section discusses the study population and how the sample size was drawn from the population.

### 3.7.1 Study population

The main target group for the suggested investigation comprised specialists in artificial intelligence (AI) within the South African banking sector. Qualitative research does not demand a specific participant count; rather, researchers aim for data saturation. The selection of participants adhered to inclusion criteria, ensuring individuals had relevant experience and knowledge of the studied phenomena (AI), providing comprehensive and broadly applicable insights (Rosenthal, 2016:511).

### 3.7.2 Sampling technique

The research employed purposive sampling method, which is a non-probability approach. Following Saunders, Lewis, and Thornhill (2019:800), this method enables the selection of participants based on the researchers' judgment of who would provide the most informative insights.

### 3.7.3 Sample size

As recommended by Moser and Korstjens (2017:11) the researcher proposes to interview AI Specialists in different banks until data saturation point plus one has been reached i.e. until no new analytical information is revealed during interviews. This will be the sample size of the study. The inclusion and exclusion criteria of participants is explained using the Table 3-2 below.

**Table 3-2: Inclusion and exclusion criteria for participation**

| Inclusions | Exclusions |
|---|---|
| Leaders of a banking organisation | Any employee not from a specialist position and No experience in AI |
| Senior employee in a bank. | Any employee not from a specialist position and No experience in AI |
| Permanently employed by the bank. | Part time employee |
| Experience in AI within the banking industry. | No experience in AI |
| Must have been part of an AI Project | No Experience in AI |

### 3.7.4 Conducting sampling process.

Contact was initiated with the Human Resources departments of banking firms to identify AI specialists within their organizations. The communications outlined the key aspects of the proposed study, including its objectives and the necessity for informed consent. The informed consent explicitly conveyed the study's purpose to potential participants, detailed measures taken to safeguard confidentiality, and clarified their right to withdraw from the interview. It also informed participants that a summary of the final report would be available upon request.

The data for the study were gathered through semi-structured face-to-face interviews, aligning with the methodology suggested in existing literature. Prior to the interviews, seven to ten questions were formulated, designed to address the research questions and objectives outlined in this proposal. Participant responses were then transcribed to facilitate data extraction and subsequent analysis.

The study population comprised AI specialists who consist of experience from various banking institutions in South Africa and who are currently employed by a banking institution of South Africa, chosen randomly, that either utilized or had the potential to

integrate artificial intelligence into their operations. This encompassed participants from one of South Africa's largest banks with banking operations nationwide.

Regarding sampling methods, the nonprobability approach was categorized into unintentional and purposive types. The majority of sampling methods adopted were purposive, as the sampling process was guided by a specific plan. Thus, the primary distinction among these methods lay in the various types of purposive sampling approaches (Conjoint, 2018).

### 3.7.5 Designing the measuring instrument

Interviews were undertaken with AI specialists in the banking sector, encompassing various hierarchical positions. Through the insights gathered, an assessment will be drawn regarding employees' perspectives on the individual challenges and opportunities introduced by AI. The study aims to elucidate why individuals opt to depart from their roles, pinpointing the factors that influence such decisions, and discerning the factors that contribute to employees choosing to stay in their positions. Furthermore, the investigation seeks their viewpoints on collaborating with new colleagues, undergoing new training initiatives, and their sentiments concerning long-term employment service.

## 3.8 Collection of data

In the course of the project's data collection, no fieldworkers were employed, and information was obtained through an interview guide. Initial contact with the Human Resources departments of various banks sought permission to interview AI specialists, including an informed consent document. Upon receiving contact details of interested AI specialists, invitations with informed consent letters, outlining research objectives and privacy provisions aligned with the Protection of Personal Information Act 4 of 2013 (POPI Act), were sent to participants (RSA, 2013). The target group comprised AI specialists in the South African banking sector, with participant selection following inclusion criteria to ensure relevant expertise and knowledge (Rosenthal, 2016:511).

AI specialists who agreed to participate returned signed informed consent letters. A pseudonym option was provided for participant identification. The face-to-face interviews,

each limited to 45 minutes, were scheduled after obtaining permission from participants. Data from interviews and surveys underwent thematic analysis and descriptive statistics, respectively. Thematic analysis identified patterns and challenges/opportunities in AI adoption within South Africa's banking industry.

Participants were assured of voluntary participation, the ability to withdraw without consequences, and confidentiality of recorded interviews. The study, conducted from June to October 2023, involved nine video-conferenced interviews, reaching data saturation after the sixth interview. One additional interview confirmed data saturation. Thematic analysis, aligned with Braun and Clarke (2006:77), included data familiarization, code development, theme identification, review, construction, and reporting. Atlas.ti facilitated coding, and frequency analytics supported theme reporting through tables and graphs.

### 3.9 Data analysis

After collecting the data, it was input into an Excel sheet, coded, and categorized into variables aligned with the research questions for recognition by the Atlas.ti statistical software (Friese, 2019:10). The categorization process followed a constructive meaning analysis approach outlined by Nowell et al. (2017:4):

- Familiarization with the data: The researcher engaged with the data, employed triangulation, documented thoughts on potential categories, stored data, and kept records of all collected notes.
- Generate initial codes: This involved using a coding framework, maintaining an audit trail of generated codes, and documenting all meetings and debriefs.
- Searching for categories: Triangulation, diagramming, and detailed note-keeping of concepts, categories, and constructive meaning were employed.
- Reviewing the categories: Adequacy of generated categories and constructive meaning was assessed by referring to the raw data.
- Defining and naming categories: This step involved referring to triangulation, debriefing, and documentation of constructive meaning.
- Producing the report.

For thematic analysis, the researcher employed the Atlas.ti online Version software, known for its versatility in the qualitative research process, covering data organization, analysis, and the elaboration of reports and visualizations of findings (Kalpokaite & Radivojevic, 2019:120)

**Table 3-3: Braun and Clarke's thematic analysis framework**

| Phases | Guidelines of the process as suggested by Braun and Clarke (2006:87) | Result | The strategy used by the researcher in the present study |
|---|---|---|---|
| **Phase 1: Familiarising oneself with the data** | Once the data is collected, researchers engage deeply with the data until they are familiar with its depth and breadth. This involves actively and regularly scanning the data for interpretations, patterns, and other insights. Before proceeding to coding, it is recommended to review the entire dataset at least once to grasp a comprehensive understanding. In this phase, preliminary notes and codes may be generated | The researcher is knowledgeable about the data, formulated initial codes, and compiled extensive notes. | The researcher followed Braun and Clarke's (2006) Phase 1 process framework. Prior to coding the interview transcripts, each transcript was carefully examined to identify potential themes and codes that could be derived from the data. During the assessment of each interview transcription, initial comments and codes were generated. |
| **Phase 2: Generating initial codes** | Preliminary codes are generated by identifying patterns' locations and occurrences, a process known as 'data reduction.' This involves systematically condensing the data into concise labels to establish categories for more efficient analysis. The researcher performs this process meticulously throughout the data analysis, providing equal and thorough consideration to each data item. Additionally, the researcher should actively look for interesting data features that could | Initial codes are produced. | Braun and Clarke (2006:87) suggest that the researcher should engage in multiple rounds of coding and recoding of transcripts. In this study, the researcher intentionally combined Phases 2 and 3 of Braun and Clarke's (2006:87) methodological recommendations, discovering higher-order themes and subthemes simultaneously. |

| | | | |
|---|---|---|---|
| | serve as the basis for recurring patterns or a common theme across the dataset. | | |
| **Phase 3: Searching for themes** | The researcher redirects the inquiry towards higher-level subjects, which may involve categorizing the different codes based on their potential themes and structuring all relevant coded data according to the identified themes. Essentially, the researcher begins to explore the connections between themes and different levels of themes. | Potential themes and sub-themes are assigned codes and connected to pertinent excerpts from the transcripts | The researcher integrated Phases 2 and 3 of the process recommended by Braun and Clarke (2006:87). |
| **Phase 4: Reviewing themes** | The researcher begins the process of refining the identified themes, involving two levels of refinement. Level 1 involves scrutinizing the coded data extracts, assessing whether they form a coherent pattern within each theme. At Level 2, a similar process is applied to the entire dataset, evaluating the applicability of specific themes to the collected data. If the analysis appears incomplete, the researcher revisits the data to identify any missing elements (Braun & Clarke, 2006:87). | The researcher comprehends the multitude of themes, their interconnections, and the overarching narrative they communicate | The researcher followed Phase 4 of Braun and Clarke's (2006:87) suggested phases. This stage involved iteration, with frequent revisiting of the data, as several themes were scrutinized multiple times before reaching a conclusion. |

| | | | |
|---|---|---|---|
| **Phase 5: Defining and naming themes** | The researcher conducts a thorough analysis of each theme, assigning a brief phrase to label each theme. | A comprehensive examination of how each theme enhances the understanding of the subject under investigation. | Each theme was characterized and named according to the procedure proposed in Phase 5 of Braun and Clarke's (2006:87) methodology. |
| **Phase 6: Producing the report** | The concluding phase involves composing the report. The report, inclusive of data excerpts, should present a lucid, coherent, logical, non-repetitive, and captivating account of the narrative encapsulated in the data, both within and across themes. The narrative should extend beyond the mere dissemination of information. It must integrate excerpts into a compelling analytic storyline that reflects the narrative the researcher intends to convey about the data. Furthermore, the researcher needs to identify the themes that significantly contribute to understanding the data's essence. Additionally, member verification should be conducted, possibly requiring the researcher to revisit participants to ensure the accurate representation of their descriptions. | The results are intricately and comprehensively explicated in the document. | This stage was conducted in line with the guidelines proposed by Braun and Clarke (2006:87). |

**Source:** Braun & Clarke (2006:87)

### 3.10 Trustworthiness

Creswell (2014:201) emphasizes the importance of employing strategies to ensure the trustworthiness of qualitative research. Trustworthiness in qualitative research is grounded in four criteria: credibility, dependability, confirmability, and transferability (Leung, 2015:326), which will be briefly expounded upon below.

Credibility, considered the most crucial criterion, relates to having confidence in the truth of the study, and this confidence is based on the researcher using acceptable and appropriate research methods (Rose & Johnson, 2020:5). It also encompasses the accuracy and completeness of the findings (Leung, 2015:326). The researcher can augment the credibility of a qualitative study by spending sufficient time with participants, conducting member-checking, and triangulating the findings to ensure an accurate reflection of participants' perspectives. These measures additionally help mitigate researcher bias in data interpretation (Hansen et al., 2017:1505).

To ensure credibility, the researcher consciously avoided bias through reflection and being mindful of their current state, following Shufutinsky's recommendation (2020:52). Moreover, during interviews, the researcher took care to rephrase or repeat information to prevent any potential misconceptions.

Dependability, akin to reliability in quantitative research, pertains to the consistency of findings based on the data. This requires thorough documentation of the research procedure, allowing readers to scrutinize the methods and understand how the findings were derived.

To ensure dependability, the researcher meticulously explicated the approach and methods in the methodology discussion, outlining the method of analysis employed to derive conclusions.

Confirmability signifies the extent to which the researcher's findings are rooted in the data and remain uninfluenced by personal biases. It involves the capacity of other researchers to replicate the study in comparable research settings, yielding conclusions consistent with the original study's findings using the same design, instruments, and analysis techniques (Leung, 2015:326). Therefore, maintaining journals, reflexive field notes, and diaries, establishing audit trails, employing member checking, and utilizing data

triangulation are recommended to enhance confirmability (Cypress, 2017:258). Additionally, providing extracts from the transcripts as evidence for the conclusions is suggested (Rose & Johnson, 2020:5).

In this study, a detailed account of the analysis method and the process leading to conclusions is presented, supported by verbatim extracts from participants' interview transcripts. Field notes taken during interviews were documented and used in the analysis phase for data triangulation. Continuous contact with participants was upheld to ensure the faithful representation of their perspectives in the findings.

Transferability, analogous to generalization in quantitative research, concerns the potential application of findings in another, similar context (Tai & Ajjawi, 2016:180). To address this, the researcher provided comprehensive details about the research setting and fieldwork, enabling readers to assess the potential applicability of the findings to their own contexts (Tai & Ajjawi, 2016:180). The researcher offered detailed descriptions of the study setting and participants, coupled with a paper trail of research methods employed, facilitating readers in evaluating the potential relevance of the findings in their own contexts.

### 3.11 Ethical considerations

The South African counterpart to the EU General Data Protection Regulation (GDPR) is the Protection of Personal Information Act (POPIA), covering sections 2 to 38, 55 to 109, section 111, and sections 114 (1), (2), and (3). This legislation delineates specific obligations that responsible parties—referred to as controllers in certain jurisdictions—must meet before lawfully processing the personal information of data subjects, including both natural and juristic persons.

However, the POPI Act does not proscribe organizations from processing personal information; rather, it mandates obtaining consent from data subjects before processing their personal information. Explicit permission in accordance with the new POPIA Act will be requested from each participant. All study findings will be presented in a manner that prevents any linkage of source documents to the final product, thus safeguarding the reputation of North-West University and the participants. Since the researcher has no pre-existing relationship with participants, there is no conflict of interest. Participants will

receive a letter of consent seeking permission for data collection through interviews, and ethical considerations will be thoroughly discussed with each participant. Consequently, no information will be used without the participants' knowledge, even though all personal information will be anonymized. The study's results will be disseminated through a mini dissertation and a potential article after its completion, with no request for bibliographical information during the interviews as it is unnecessary for this study.

### 3.11.1 Ethical principles considered:

- Identifiable ethical concerns with the potential to harm participants were thoroughly recognized and mitigated to the best extent possible, with explicit disclosure of associated risks to participants. This information was provided alongside the research instrument in the format of the "participant information sheet."
- A consent letter, informed and comprehensive, was formulated and accompanied the research instrument to the selected sample before their engagement in the survey. This step aimed to ensure that participants had a clear understanding of the research's nature, purpose, sponsors, if any, and their rights concerning participation.
- The ethical clearance for this research was an integral part and was obtained through the North West University ethical committee. The ethics clearance number can be found on the research instrument template under annexure 2.
- The research instrument, along with the informed consent letter and the information sheet, was disseminated to participants via email. This distribution allowed participants to acquaint themselves with the research, understand their rights, and grasp the contents of the research instrument.
- To safeguard the identity of participants, data capturing focused solely on variables being measured, avoiding the inclusion of names, race, or organizational names.
- Participants were requested to confirm their voluntary willingness to participate in the interview by sending an email response to the researcher.
- After receiving the willingness response, the researcher scheduled the interview session at a mutually agreeable time, ensuring participants had sufficient time to confirm their availability.

- Before initiating the interview session, the researcher offered participants a chance to seek clarification on any ambiguous aspects and to confirm their willingness to proceed with the interview.

### 3.11.2 Other ethical considerations

- The data obtained as part of this research was intended solely for the purposes of this study and was not to be shared with external parties. The researcher was willing to enter into a confidentiality agreement if the participant deemed it necessary.
- During the research duration, the researcher was obligated to maintain strict confidentiality of the collected data, adhering to the conditions outlined in the informed consent form.
- The research findings, presented in the form of results, could be shared with participants who expressed an interest.
- The University's information management policy governed the handling of data from submission through archiving.

## 3.12 Chapter summary

This chapter has outlined the research methodology employed in the current study, encompassing the research paradigm, design, strategy, sampling, data collection technique, data analysis method, strategies for ensuring quality research, and the ethical considerations relevant to the study. The subsequent chapter will present the findings of the study.

# CHAPTER 4 : PRESENTATION OF RESULTS

## 4.1 Chapter introduction

This chapter presents the outcomes derived from the analysis of transcripts from the seven qualitative interviews carried out by the researcher. Different methods can be employed for the analysis of qualitative data (Coffey & Atkinson, 1996:3). Patton (2002:432) highlights that the analysis of qualitative data aims to transform data into meaningful insights. Regardless of the specific approach, the overarching goal of qualitative data analysis methods is to interpret the data rigorously and scientifically, ensuring that the findings accurately capture the complexities of the social environment under investigation (Patton, 2002:432).

In this study, the aim was to identify the diverse challenges and opportunities presented by artificial intelligence in the South African banking sector, as perceived by AI experts and management (Samkange, 2012:611). For clarity, the research objectives are restated:

**PRIMARY OBJECTIVE**

- The primary objective of this study is to explore the challenges and opportunities brought by artificial intelligence in the banking industry in South Africa

**SECONDARY OBJECTIVES**

- SO1: To explore current applications of AI in the banking industry in South Africa.
- SO2: To establish the challenges and opportunities that the banking industry in South Africa faces in adopting AI?
- SO3: To explore the effects of AI adoption on the banking industry's workforce in South Africa, including potential job displacement, creation of new jobs, and transformation of existing job roles.

### Allocation of Pseudonyms to Participants

Each participant was allocated a pseudonym to ensure the participants' anonymity.

The pseudonyms of the participants are listed in Table 4-1.

**Table 4-1: Participant pseudonyms**

| Participants | Pseudonyms |
|---|---|
| Participant 1 | P1 |
| Participant 2 | P2 |
| Participant 3 | P3 |
| Participant 4 | P4 |
| Participant 5 | P5 |
| Participant 6 | P6 |
| Participant 7 | P7 |

## 4.2 Biographical information of the participants

Table 4-2 presents the participants' biographical information about position and experience.

**Table 4-2: Biographical information of the participants**

| Pseudonyms | Hierarchical level | Position | Experience in AI |
|---|---|---|---|
| P1 | Senior management | Head: Data Science | Significant(vast) |
| P2 | Senior management | Product Head Conversational Banking | Significant(vast) |
| P3 | Architect | Solutions Architect Conversational Banking | Significant(vast) |
| P4 | Senior management | Data Scientist Risk Management | Significant(vast) |
| P5 | Senior management | Senior Decision Scientist: Risk | Significant(vast) |
| P6 | Data Scientist | Data Scientist Risk Management | Significant(vast) |
| P7 | Senior management | Lead: Strategic Projects and Business Optimisation | Significant(vast) |

## 4.3 Presentation of findings

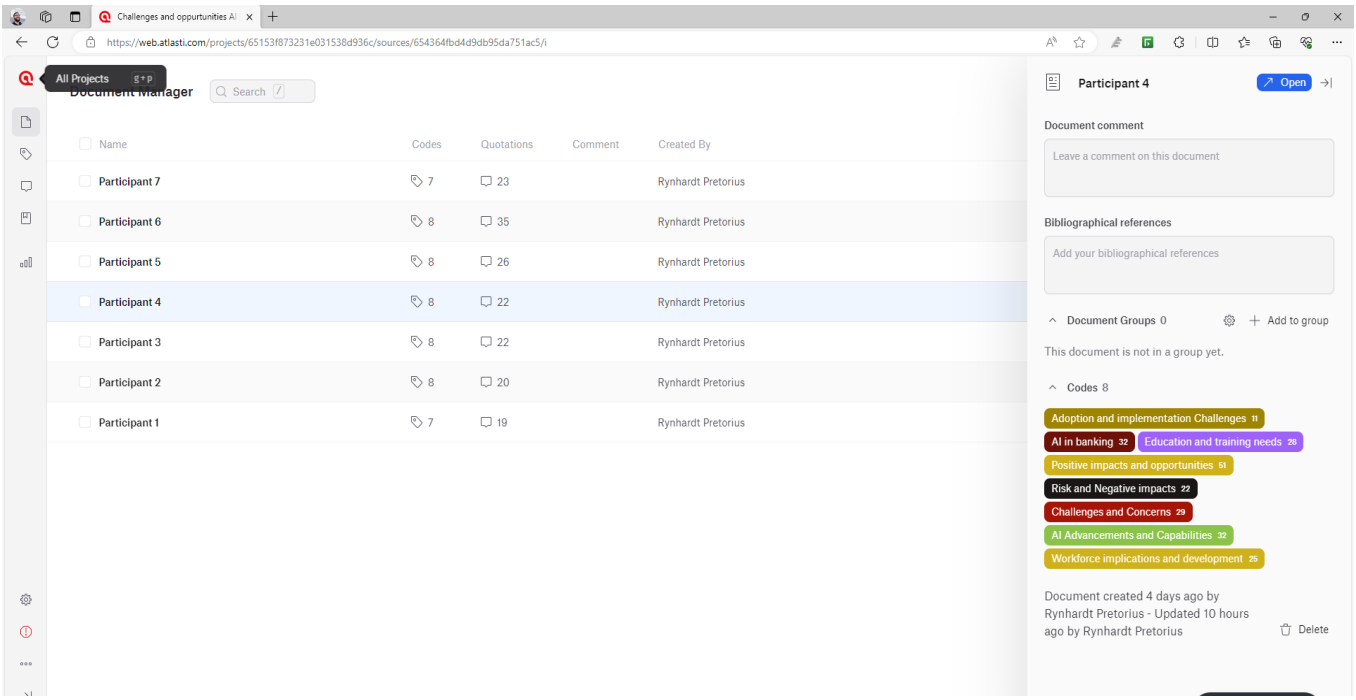
Figure 4-1 illustrates a sample of the thematic analysis conducted with the assistance of Atlas.ti Version 22.1.5.0. Atlas.ti is a comprehensive tool applicable across the entire qualitative research process, facilitating the organization and analysis of data and supporting the development of reports and visual representations of findings (Kalpokaite & Radivojevic, 2019:120).

Table 4-3 furnishes a summary of the primary codes, emerging themes, and their respective frequencies, offering an outline of their occurrence.

**Table 4-3: Main themes and frequencies**

| Main theme | % frequencies |
|---|---|
| Education and training needs | 86% |
| AI Advancements and Capabilities | 86% |
| Adoption and implementation Challenges | 100% |
| Workforce implications and development | 100% |
| Positive impacts and opportunities | 100% |
| Challenges and Concerns | 100% |
| AI in banking | 100% |
| Risk and Negative impacts | 100% |

**Figure 4-1: Atlas.ti thematic analysis**




Via the coding process, an initial set of 126 codes was identified. Following multiple rounds of scrutiny, these codes were categorized into eight themes, as delineated in Table 4-3. Each of these eight themes is expounded upon below, supplemented by pertinent extracts from the interview data.

### 4.3.1 Education and training needs

Given the lag in employee skills compared to AI, it can be deduced that training is imperative, given the complexity of mastering high-level AI skills in a short period (Ping & Ying, 2018). However, a mere 3% of bankers are investing in retraining their workforce for the AI-driven workplace, primarily experimenting with it in customer service (Marous, 2018). Employees should possess IT skills, creativity, and innovation skills that enable them to transition across various job domains. Hence, there is a compelling need for banks to invest in retraining their existing employees due to the swift evolution of technology (Frey & Osborne, 2014). Conversely, Marous (2018) contends that the sluggish adoption of AI in banks stems from a lack of the right talent to lead transformative initiatives. The study indicates that a considerable number of low-skilled employees are at risk of being replaced by robots, thereby hindering employment growth (Jung & Lim, 2020).

This study identifies a clear and widespread demand for education and training in the field of AI, as nearly all participants recognized this as a significant issue.

P3 noted the following:

*"…there's a need to make AI adoption more visible and integrate it into the learning space to help people understand its capabilities and limitations."*

P4 commented:

"*We do face some significant challenges related to the adoption of AI. From a business perspective, one of the primary challenges is the presence of senior stakeholders who have extensive experience in the traditional banking environment. They are accustomed to conventional methods of assessing risk, fraud, and money laundering. Our approach, which relies on modern AI and modelling strategies, is relatively new and unfamiliar to them. Consequently, there is some reluctance to embrace these strategies due to a lack of trust and a fundamental difference in thinking."*

P4 also commented: Ensure alias of participants are the same:

*“In terms of strategies to make the workforce more comfortable with AI adoption, we intend to maintain an open approach. We want to encourage individuals to explore AI in their daily lives, emphasizing that AI, like chatbots, can simplify tasks. This gradual approach may help dispel any apprehensions about AI being complex or threatening.”*

P5 commented:

*“One strategy involves encouraging the workforce, including senior members, to educate themselves on AI-related topics. However, in addition to individual education, other strategies have been implemented.”*

P6 stated:

*“Effective communication and education about AI are crucial. Some individuals may be hesitant about AI due to a lack of clear information and understanding. While there have been steps taken to educate employees, the strategies and communication have room for improvement.”*

P7 noted the following:

*“The bank offers learning journeys and development courses, including certifications and cloud practitioner courses, to help employees upskill themselves. These programs are financially supported by the bank.”*

### 4.3.2 AI Advancements and Capabilities

Owing to the progress of AI in the banking sector, numerous banks encounter the difficulty of lacking proficient engineers to address technical concerns, leading to an impediment in the complete implementation of AI (Fintech News, 2020).

P1 commented:

*“Recent advancements in cloud computing and hardware have made training cutting-edge AI models more accessible. Even startups can rent the necessary resources in the cloud, as we've seen with companies like OpenAI. They trained models that led to significant valuations.”*

P 1 also commented:

*“Recent advancements in generative AI have introduced productivity tools. These assistive technologies benefit various roles, including content creators, marketers, software developers, and document.”*

P5 stated:

*“Regarding the approach we are taking, I would say that we are moving more towards deep learning. We now have a fraud detection model running on neural networks. The decision to move in this direction is influenced by the quality of data available to us, which supports the adoption of deep learning techniques”.*

P6 stated:

*“Opportunities and improvements have arisen from the adoption of AI within the specific division and the organization as a whole. We are breaking new ground in the risk sector, understanding and studying fraudsters, criminals, and weaknesses in products through data analysis.”*

P3 commented:

*“Currently, we are advancing into the realm of Generative AI, where we apply similar principles but with a focus on personalization and a more interactive approach. Instead of static content, we're drawing from multiple knowledge bases to provide answers in a more personalized and human-like manner.”*

P2 commented:

*“We've developed a client-centric perspective that acknowledges the changing needs of future clients, particularly younger generations. These clients prioritize experiences over brand loyalty and demand seamless, automated processes. AI, such as voice notes and automation, aligns well with their expectations.”*

### 4.3.3 Adoption and implementation Challenges

Both workers and employers must reassess their outlook toward AI technology, fostering a flexible and open-minded work environment, and acknowledging the potential influence of AI advancements on job roles and responsibilities. Employees will need to pursue

continuous training to stay abreast of technological developments and the significant transformations they bring (Bhargava et al., 2021).

Certainly, AI presents risks when not effectively managed in the banking industry, especially if systems are granted autonomy to operate independently (Davenport & Kirby, 2016).

P1 noted:

*"Global developments, such as copyright cases concerning deep generative models, can have implications for the industry. Additionally, issues like data privacy, consent, and data handling practices have evolved. Legislation is struggling to keep pace with the rapidly advancing field of AI, so we aim to be compliant while also establishing our internal principles and standards."*

P7 Commented:

"*We have the option to use AI teams in various areas, such as marketing, data, and insurance. However, the primary challenge is not in adopting AI but in having the necessary expertise and knowledge to effectively utilize it, develop it, and obtain a return on the significant financial investment it represents."*

P7 also noted:

*"…people tend to be resistant to change, often fearing that AI adoption might negatively impact their job security."*

P5 commented:

*"…there are challenges in getting senior-level management to understand the concept of AI and the approach we use to leverage it."*

P6 commented:

*"The adoption of AI within the workforce seems to be driven by a strategy to facilitate teams in building products, particularly focusing on the adoption of API AI at scale."*

P3 stated the following:

*“Challenges associated with adopting AI in our division are inevitable because we work with human clients, not predictable data or statistics. Clients can ask questions in various ways, including slang and mixed languages, which makes it challenging but also rewarding. The main obstacles we face involve ensuring that the content and data we have can handle a wide range of dialogues and sentence structures.”*

### 4.3.4 Positive impacts and opportunities

Banks that have initiated the use of AI have witnessed positive effects on their employees, including enhanced work capabilities, increased efficiency, and improved employee quality (Saithibvongsa & Yu, 2018).

P7 Commented:

*“…plans to continue supporting its physical footprint, adapt self-service kiosks, and educate these clients about AI-powered services. The financial divide will play a crucial role in addressing this challenge”.*

P1 stated:

*“The anticipated positive impacts of AI within the organization and its specific divisions are quite significant. AI has lowered the entry barrier, allowing more people to engage in creative problem-solving and leveraging their diverse experiences. It broadens horizons and fosters creativity by providing tools and resources to tackle various challenges. In the banking industry, AI can positively impact access to credit and enable the evaluation of creditworthiness through non-traditional means. It also enhances communication by providing language and terminology tailored to individual clients' needs and preferences.”*

P5 stated:

*“The influx of junior employees who possess a deep understanding of AI may encourage senior management to keep pace with advancements in the field. The expectation that junior employees are well-versed in AI topics may also drive senior members to enhance their knowledge. However, specific details regarding how senior management responds to this situation may vary among internal stakeholders.”*

P6 commented:

*“With the implementation of second-generation models, jobs were not lost, but the nature of work changed, especially in the operational side. The AI models predict pay dates, making tasks such as collecting payments on time easier. Also check for another challenge”*

P6 also stated:

*“As for data scientists, AI adoption has made some aspects of their work easier. For example, tasks that required creativity and coding have become more streamlined.”*

P3 noted:

*“AI enhances workforce efficiency and enables clients and agents to be better equipped and more reliable within the banking sector. Conversations and query responses are significantly faster, benefiting clients who get the answers they need quickly, whether through the LL Inbox or client-agent engagement on these platforms. AI also builds trust among clients, as they receive the answers they are seeking. Additionally, AI offers opportunities for agents to upskill and evolve beyond their traditional roles.”*

P2 stated:

*“AI can enhance efficiency by automating tasks, reducing manual workloads, and streamlining processes. Competitive Advantage: AI technologies can provide a competitive edge, enabling smaller banks and neo-banks to challenge larger, traditional banks by offering innovative solutions.”*

P4 stated:

*“In the future, we do see the potential for adopting deep learning frameworks. These models can offer high accuracy, but it will require a certain level of data quality and maturity to prevent misclassification.”*

### 4.3.5 Challenges and Concerns

Individuals with digital literacy are more acquainted with technology compared to those with limited technological skills. Consequently, individuals with digital literacy exhibit less

concern about the necessity for physical banks than their less technologically literate counterparts, as they generally prefer human interaction (Coetzee, 2018).

P7 noted the following:

*"However, the primary challenge is not in adopting AI but in having the necessary expertise and knowledge to effectively utilize it, develop it, and obtain a return on the significant financial investment it represents."*

P1 noted the following:

*"Unlike previous disruptions where newcomers replaced established players, AI's culture is rooted in open source and academia. Even tech giants like Google don't hesitate to publish their algorithms because the real secret isn't the algorithm itself, but the data and the resources needed to train it."*

P5 comments:

*"The challenges associated with the adoption of AI in our division primarily revolve around data quality. One of the significant hurdles we face is the quality of the data we work with. When it comes to machine learning, the old adage "garbage in, garbage out" holds true. In other words, if the input data is of low quality, the results are likely to be of low quality as well."*

P6 stated:

*"The banking sector, in general, is not yet deeply involved in deep learning. We lean more toward machine learning due to limited expertise and the need for quicker product launches. Deep learning projects are challenging and time-consuming."*

P3 noted the following:

*"Building trust in the system is crucial because clients are used to referring to static content, while they now rely on the bot, which may not always provide the same answers."*

P2 commented:

*“Traditional banking mindsets and company politics pose resistance to conversational banking's disruptive approach of reaching clients on multiple platforms.”*

### 4.3.6 AI in banking

The literature suggests that the incorporation of AI in the banking sector involves the substitution of human decision-making with AI. As stated by Kaya (2019), AI refers to the ability of computer programs to acquire and apply information without human intervention. It accomplishes this by autonomously observing and analysing the surrounding environment. Numerous tasks that traditionally relied on human involvement are now automated, rendering certain self-service functions accessible to both employees and clients. The predominant theme in the interviews cantered on AI supplanting human intelligence in drawing inferences and making decisions (Latimore, 2018).

P4 noted the following:

*“Regulatory authorities periodically inspect our strategies to assess their adequacy. Two years ago, during one of these inspections, they raised concerns. They noted that we were classifying clients as high risk without using a data-driven approach, relying primarily on expert-based judgment. Remedying this finding within the required time frame presented an opportunity to introduce a machine learning approach to assist in client risk assessment.”*

P7 commented:

*“We employ chatbots to create personalized experiences for online banking customers, freeing up employee time for more strategic work and increasing efficiency.”*

P1 commented:

*“Regarding biometrics, like fingerprints or facial recognition for client registration, it aligns with banks principle’s, resulting in a smoother customer experience. Biometrics add a second factor of authentication, enhancing security without adding significant friction. The focus is on improving customer experiences and making processes more efficient and secure, both externally for clients and internally for productivity and efficiency.”*

P5 commented:

*“One of the AI models we have implemented is focused on predicting risk without human intervention. This model considers various factors available during onboarding to make predictions. Another model, which I mentioned earlier, is the behaviour risk model. This model assesses clients' transactional behaviour over a specific period, checking for any unusual patterns or changes.”*

P6 Commented:

“Our team is relatively new, and data science applications are still in the early stages of maturity within the company. Due to the immaturity of AI applications, our work tends to be more experimental.”

P6 also commented that:

*“One specific machine learning project I've been involved in focuses on preventing application fraud by detecting fraudulent documents or identities during the loan application process. This involves creating features and dealing with data engineering challenges.”*

P3 stated:

*“Natural Language Processing (NLP). This allowed us to understand how clients ask questions and direct them within a bot's structure to provide answers without requiring them to search manually.”*

P 2 commented:

*“…advancements in AI, particularly in generative AI, have significantly improved client services, operational efficiency, risk management, and personalization within the banking sector.”*

P4 commented:

*“The human element is essential in our environment because AI models are not foolproof and can make mistakes. Without human intervention, these mistakes could have significant reputational and financial consequences. For instance, flagging a client as high risk when they aren't high risk could lead to issues. Human interaction is crucial for*

*maintaining data accuracy and quality. It helps identify and rectify errors in the model's output, ensuring that clients are accurately classified, and potential risks are mitigated".*

### 4.3.7 Risk and Negative impacts

The advent of AI assuming the roles of employees has adverse effects on the workforce, instilling fear of unemployment and resistance to change among employees (Soergel, 2017). AI's influence extends to diminishing employee engagement in the workplace, where individuals no longer find motivation to take responsibility, collaborate with colleagues, or contribute to the organization's success (Anitha, 2014). Employee engagement, as defined by Hughes et al. (2019), involves employees being emotionally connected, motivated, and enthusiastic about their organization, resulting in a genuine concern for their roles. When employees experience a lack of engagement, the repercussions are detrimental to talent management strategies, leading to reduced productivity, customer service, and ethical conduct due to the absence of workforce commitment (South African Board for People Practices [SABPP], 2014). The overall decline in organizational engagement and employee performance is a direct consequence of the deficient workforce engagement (Saithibvongsa & Yu, 2018).

P5 noted:

*"Concerns about stakeholders' influence on data scientists' work, potentially affecting creativity and decision-making. Job Displacement: Acknowledgment of AI's role in automating jobs, leading to a reduction in workforce but creating opportunities for upskilling due to a skill shortage."*

P1 commented:

*"…there are potential negative impacts to consider. Risks of misuse, whether intended or unintended, exist. Bias can be amplified by AI, as biases in algorithms often reflect human biases. There's a risk that regulations and guidelines may not keep pace with the rapid progress in AI, posing reputational risks for banking organizations. To mitigate these risks, organizations can employ rigorous model risk management frameworks, prioritize fairness and ethics, and ensure human oversight of AI decision-making."*

P3 stated:

*“On the negative side, one significant challenge is the need for individuals to acquire the skills necessary to understand and effectively use this rapidly evolving technology. Staying up to date with AI's constant changes and advancements is essential. Misusing or misunderstanding AI can lead to incorrect or ineffective outcomes, following the "garbage in, garbage out" principle. Another challenge is the substantial amount of data required to ensure AI models perform as intended.”*

P2 commented:

*“Regarding concerns about job displacement, while AI has unquestionably improved our operational effectiveness, the current stage of its implementation does not pose a significant threat to jobs within our organization. Nevertheless, as AI technology continues to advance, there is a potential for specific job markets, particularly in content writing and creative fields, to be impacted.”*

P4 commented:

*“From the perspective of our clients, one negative impact we anticipate is the increasing divide between clients who prefer using digital channels and those who stick to traditional cash channels. This isn't conducive to the bank's AI adoption efforts, as we aim to have more clients using digital channels to collect data for AI purposes. This is a negative aspect that needs attention.”*

### 4.3.8 Workforce implications and development

P2 stated:

“*The adoption of AI in our workforce has yielded several notable impacts. First and foremost, it has significantly enhanced our operational efficiency, making our agents 1.8 times more productive compared to traditional voice agents through the utilization of messaging and chatbots. This efficiency gain has been accompanied by a substantial increase in our client base. Remarkably, this growth has occurred without necessitating the recruitment of additional personnel in specific areas, presenting a valuable headcount avoidance benefit.”*

P1 noted:

*"…we must continue investing in AI to stay relevant. The opportunities are vast, from client personalization to cybersecurity and data analysis. AI is a tool for growth, not a threat to jobs…"*

P1 also advised:

*"The impact of AI on the workforce can be divided into two categories: product integration and individual productivity. The bank is in the early stages of AI adoption, with varying levels of maturity across different business areas. Some teams are already using advanced methodologies, such as deep neural networks, while others rely on rule-based approaches as a foundation for future machine learning applications."*

P4 commented:

*"Regarding the generational perspective, there is indeed a difference. In my department, the average age of employees tends to be higher compared to most other departments. Many have long tenures at the bank. However, with age often comes resistance to embracing new and modern techniques such as AI. This age-related resistance to change is a notable challenge that we need to address."*

P2 stated:

*"Within just 11 months of operation, we've already witnessed success stories of employees transitioning from call centre agents to roles like bot engineer. This demonstrates the viability of our approach in upskilling and repositioning our workforce."*

P5 commented:

*"The adoption of AI has had a significant impact on the workforce. One notable effect has been a reduction in false positives. Subject matter experts, or the human translators, previously played a role in validating alerts generated by AI systems. However, this often resulted in many false positives, leading to additional work for the translators. One strategy to combat the risk of this implication on the workforce involves encouraging the workforce, including senior members, to educate themselves on AI-related topics. However, in addition to individual education, other strategies have been implemented."*

P6 stated:

*“We seem to be falling short in upskilling data scientists. Encouraging upskilling is a challenge, as it requires time and effort. Finding constructive ways to facilitate this process is necessary, especially for older employees who may be resistant to change.”*

P3 commented:

*“The adoption of AI has indeed impacted the workforce, but it's essential to clarify that AI will not replace people. In our view, it's important to have people deal with people because AI can never fully understand 100% of what a person asks and grasp the context of the question. Instead, AI should serve as an assistant to humans, not a replacement.”*

P7 stated:

*“Establishing new workforces, there is ongoing initial testing to build new workforces that can support AI adoption.”*

## 4.4 Chapter Summary

This chapter presented the findings of the study. The most prevalent challenges and opportunities brought by artificial intelligence in the banking industry in South Africa. The following chapter discusses the findings of the study.

# CHAPTER 5 DISCUSSION OF KEY FINDINGS

## 5.1 Chapter Introduction

The research questions are answered in this chapter, and the findings are triangulated with the literature discussed in Chapter 2. Furthermore, recommendations for managing the challenges and opportunities bought by the adoption of AI in the literature guided by existing literature.

## 5.2 Discussion of literature review key findings on the adoption of AI

The literature review draws upon secondary data from established sources, including academic books, peer-reviewed journals, and scholarly dissertations, to examine the challenges and opportunities associated with artificial intelligence (AI) in the South African banking industry. The research relies on information accessed from various platforms, such as the North-West University Library, Ebscohost, Google Scholar, and additional databases, covering articles, journals, dissertations, and newspapers (Grady et al., 2013:192).

### 5.2.1 Evolution of AI in banking / AI integration in the South African banking sector

AI has gained prominence in the global banking industry, including South Africa. The adoption of AI presents challenges and opportunities, automating repetitive tasks and allowing employees to focus on specialized roles (Chui, 2015).

### 5.2.2 Key milestones and technological advancements

AI's demand is driven by its potential to enhance strategic decision-making, analytics capabilities, and automation in business operations like credit scoring and fraud detection (Agarwal, 2019). The fourth industrial revolution has transformed financial service providers' value creation processes (Kokina & Davenport, 2017).

### 5.2.3 AI Applications in banking

Customer service and chatbots, fraud detection and prevention, risk assessment, personalized banking experiences, and process automation contribute to the multifaceted applications of AI in the banking sector (Manning, 2018; Schwitters, 2016; Manyika et al., 2017; Bhardwaj, 2017).

### 5.2.4 Challenges of AI adoption in banking

The challenges include data privacy and security concerns, ethical considerations related to biased data and cyber threats, and the displacement and retraining of the workforce (Tegmark, 2017; Gilbert, 2018; Hewitt, 2020).

### 5.2.5 Opportunities and benefits of AI in anking

Opportunities encompass enhanced customer experiences, improved operational efficiency, enhanced fraud detection and prevention, and data-driven decision-making (Chalmers, 2021; Chui, 2016; Soni, 2019; Zhang et al., 2020).

Opportunities for workforce transformation include upskilling, creating new jobs, and utilizing AI to enhance productivity and creativity (Peters, 2017; McKinsey & Company, 2019; le Clair, 2021).

## 5.3 Categorising of the identified challenges and opportunities brought by the adoption of AI

The following sections shows different categories of the identified challenges and opportunities brought by the adoption of AI in the banking industry of South Africa

### 5.3.1 AI Advancements and capabilities

The theme of AI advancements and capabilities highlights the challenges banks face in terms of technological readiness for AI implementation (Fintech News, 2020). This theme aligns with the literature review, which emphasizes the transformative potential of AI in the banking sector (Chui, 2016). The literature also acknowledges that the rapid

advancements in AI can pose challenges, especially when organizations lack skilled engineers to handle technical issues (Fintech News, 2020).

**Integration with participant responses:**

Participant 1 underscores the accessibility of AI model training due to recent advancements in cloud computing and hardware. This aligns with the literature's acknowledgment of the transformative potential of AI in the banking industry (Chui, 2016).

Participant 5 mentions the adoption of deep learning techniques for fraud detection, indicating the practical application of AI advancements within the banking sector.

Participant 6 highlights opportunities and improvements arising from the adoption of AI in risk analysis, emphasizing the positive impact on understanding fraudsters and weaknesses in products through data analysis.

Participant 3 notes the organization's move into Generative AI, focusing on personalization and a more interactive approach. This aligns with the literature's recognition of the evolution of AI, including generative AI (Gupta, 2019).

Participants 2 and 4 emphasize a customer-centric approach, aligning AI capabilities with the changing needs of future clients who prioritize seamless, automated processes. This resonates with the literature's emphasis on AI enhancing customer experiences in the banking sector (Chalmers, 2021).

The integration of participant responses with the literature supports the idea that AI advancements bring both challenges and opportunities to the banking industry. While the accessibility of AI technologies has increased, the need for skilled professionals remains crucial for effective implementation and utilization of AI capabilities (Fintech News, 2020; Chui, 2016).

### 5.3.2 AI in banking

This theme explores the integration of AI within the banking industry, focusing on the replacement of human intelligence with machine-driven decision-making. The literature highlights the capacity of AI programs to acquire and apply information without human intervention. Participants' responses further illustrate the various applications of AI in

banking, emphasizing its role in decision-making, risk assessment, customer service, and fraud detection.

**Integration with Participant Responses:**

Participant 4 describes the integration of a machine learning approach in client risk assessment, responding to regulatory concerns. This aligns with the literature's emphasis on AI replacing traditional expert-based judgment in decision-making processes.

Participant 7 mentions the use of chatbots to create personalized experiences for online banking customers, contributing to increased efficiency. This aligns with the literature's notion of AI automating self-service functions and freeing up employee time for more strategic work.

Participant 1 discusses the application of biometrics, such as fingerprints and facial recognition, for client registration, highlighting the focus on improving customer experiences and making processes more efficient and secure. This aligns with the literature's recognition of AI's role in enhancing security measures.

Participant 5 mentions the implementation of AI models for predicting risk without human intervention, considering various factors during onboarding and assessing transactional behavior for unusual patterns. This aligns with the literature's concept of AI automating tasks that previously required human involvement.

Participant 6 describes involvement in experimental data science applications within the company, focusing on preventing application fraud through the detection of fraudulent documents or identities. This aligns with the literature's acknowledgment of the experimental nature of AI applications in their early stages.

Participant 3 discusses the use of Natural Language Processing (NLP) for understanding how clients ask questions and providing answers within a bot's structure. This aligns with the literature's recognition of AI's capacity for language understanding and interaction.

Participant 2 notes that advancements in AI, particularly in generative AI, have improved client services, operational efficiency, risk management, and personalization within the

banking sector. This aligns with the literature's emphasis on the transformative impact of AI on various aspects of banking operations.

Participant 4 emphasizes the human element's essential role in identifying and rectifying errors in AI model output to ensure accurate client classification and mitigate potential risks. This aligns with the literature's recognition that AI models are not foolproof and require human intervention for maintaining data accuracy.

The integration of participant responses with the literature underscores the diverse applications of AI in the banking sector, ranging from risk assessment and fraud detection to customer service and operational efficiency. It emphasizes the collaborative relationship between AI and human expertise for optimal outcomes in decision-making and risk management.

### 5.3.3 Risk and negative impacts

This theme delves into the potential risks and negative impacts associated with the adoption of AI in the banking sector, with a focus on job displacement and concerns related to employee engagement. The participants' responses are analyzed in conjunction with the existing literature to provide a comprehensive understanding of the identified risks and negative impacts.

**Integration with participant responses:**

Participant 5 expresses concerns about stakeholders' influence on data scientists' work and the potential for job displacement due to AI automation. This aligns with the literature's recognition of the fear among employees regarding job loss in the wake of AI adoption (Soergel, 2017).

Participant 1 highlights the risks of misuse, bias amplification, and the challenge of regulations not keeping pace with AI progress. This aligns with the literature's acknowledgment of the ethical and regulatory challenges associated with AI adoption (Hughes et al., 2019).

Participant 3 emphasizes the challenges associated with individuals acquiring the necessary skills for understanding and effectively using AI. This aligns with the literature's

recognition of the need for continuous skill development in the face of evolving AI technologies (Saithibvongsa & Yu, 2018).

Participant 2 acknowledges the potential threat to jobs in specific markets as AI technology continues to advance. This aligns with the literature's recognition of the impact of AI on certain job markets and the need for proactive measures to address potential job displacement (Hughes et al., 2019).

Participant 4 anticipates a negative impact on the client divide between digital and traditional channels. This aligns with the literature's recognition of the challenges in achieving widespread adoption of digital channels, hindering the collection of data for AI purposes (South African Board for People Practices [SABPP], 2014).

The integration of participant responses with the literature highlights the multifaceted nature of risks and negative impacts associated with AI adoption in the banking sector. These include concerns about job displacement, ethical considerations, challenges in regulatory frameworks, and the potential impact on client behavior. It underscores the importance of addressing these concerns proactively to ensure the responsible and sustainable adoption of AI in the banking industry.

### 5.3.4 Education and training needs

The theme of education and training needs aligns with the challenges and opportunities associated with AI adoption in the banking industry in South Africa. The literature review emphasizes the importance of upskilling and training to address the skills gap in AI (Ping & Ying, 2018; Frey & Osborne, 2014). According to Marous (2018), the slow adoption of AI in banks is attributed to the lack of the right talent. This resonates with the finding that only 3% of bankers are investing in retraining their employees for the AI workplace (Marous, 2018).

**Participant responses further emphasize the need for education and training in AI:**

P3 highlights the importance of making AI adoption more visible and integrating it into the learning space to enhance understanding of its capabilities and limitations.

P4 identifies challenges related to senior stakeholders' reluctance to embrace AI due to their familiarity with traditional banking methods. The participant suggests strategies for fostering AI adoption, including maintaining an open approach and gradually introducing AI to dispel apprehensions.

P5 underscores the strategy of encouraging the workforce, including senior members, to educate themselves on AI-related topics.

P6 emphasizes the crucial role of effective communication and education about AI, noting that some individuals may be hesitant due to a lack of clear information.

P7 mentions the bank's initiatives to offer learning journeys, development courses, certifications, and cloud practitioner courses, financially supporting employees in upskilling themselves.

Triangulating these findings with the literature supports the conclusion that education and training are essential components in addressing the challenges and opportunities of AI adoption in the South African banking industry. The slow adoption is linked to both a lack of skilled talent and a need for cultural change within organizations, emphasizing the importance of investing in employee training to bridge the skills gap (Marous, 2018; Jung & Lim, 2020).

### 5.3.5 Positive impacts and opportunities

The theme of positive impacts and opportunities explores the beneficial outcomes of AI adoption in the banking sector. This theme resonates with the literature review, which emphasizes the potential for AI to bring about positive changes in terms of efficiency, customer experience, and competitive advantage (Chui, 2016; Gupta, 2019).

**Integration with participant responses:**

Participant 1 highlights the significant positive impacts of AI, including lowering entry barriers, fostering creativity, and positively impacting access to credit. This aligns with the literature's recognition of AI's potential to enhance various aspects of banking operations (Chui, 2016)

Participant 5 notes that the influx of junior employees with a deep understanding of AI may encourage senior management to keep pace with advancements. This underscores the potential for AI to drive knowledge enhancement across different levels of the organization.

Participant 6 provides insights into how the implementation of second-generation models changed the nature of work without job loss. This aligns with the literature's acknowledgment of AI's potential to streamline tasks and improve the efficiency of certain job aspects (Chui, 2016).

Participant 3 emphasizes the positive impact of AI on workforce efficiency, faster query responses, and trust-building among clients. This aligns with the literature's recognition of AI's ability to enhance customer experiences and workforce efficiency in the banking sector (Chalmers, 2021).

Participant 2 notes that AI can enhance efficiency, automate tasks, and provide a competitive edge, aligning with the literature's emphasis on AI as a tool for streamlining processes and fostering competitiveness (Chui, 2016).

Participant 4 envisions the potential adoption of deep learning frameworks in the future, aligning with the literature's recognition of the evolving nature of AI technologies in the banking industry (Gupta, 2019).

The integration of participant responses with the literature supports the idea that AI adoption in the banking sector presents various positive impacts and opportunities, including improved efficiency, enhanced customer experiences, and a competitive edge. This aligns with the literature's recognition of AI as a transformative force in the industry.

### 5.3.6 Workforce implications and development

This theme explores the impact of AI adoption on the workforce within the banking sector. The findings from the participants are triangulated with the literature review to provide a comprehensive understanding of the workforce implications and development in the context of AI adoption.

**Integration with participant responses:**

Participant 2 highlights the positive impact of AI adoption on operational efficiency, making agents more productive. This aligns with literature emphasizing the potential for AI to enhance workforce efficiency (Chui, Manyika, & Miremadi, 2016).

Participant 1 stresses the need to continue investing in AI for growth, presenting it as a tool rather than a threat to jobs. This aligns with the literature's recognition of AI as a driver of growth and innovation (Bughin et al., 2017).

Participant 4 notes age-related resistance to change among employees, especially in embracing AI. This aligns with the literature's acknowledgment of resistance to new technologies, particularly among older generations (Gupta, 2019).

Participant 5 discusses the reduction in false positives due to AI adoption, emphasizing the need for workforce education. This aligns with the literature's recognition of the importance of workforce development and education in the context of AI (Chui, Manyika, & Miremadi, 2016).

Participant 6 identifies challenges in upskilling data scientists, especially older employees resistant to change. This resonates with the literature's acknowledgment of the challenges associated with upskilling and addressing resistance to change (Gupta, 2019).

Participant 3 emphasizes that AI should serve as an assistant to humans, not a replacement, aligning with the literature's perspective on the complementary role of AI and humans in the workforce (Bughin et al., 2017).

Participant 7 mentions ongoing testing to build new workforces supporting AI adoption. This aligns with the literature's recognition of the need for organizational restructuring and workforce development in the era of AI (Chui, Manyika, & Miremadi, 2016).

The integration of participant responses with the literature supports the idea that AI adoption in the banking sector has multifaceted implications for the workforce. These implications include increased efficiency, the need for ongoing investment, challenges in overcoming resistance to change, and the importance of education and upskilling initiatives. These findings align with the literature's recognition of the complex interplay between AI and the workforce in organizational settings.

### 5.3.7 Challenges and concerns

The theme of challenges and concerns explores the obstacles and issues associated with the adoption of AI in the banking sector. This theme aligns with the literature review, which recognizes challenges such as the need for expertise, legal considerations, data quality, and resistance to change in traditional banking mindsets (Chui, 2016; Gupta, 2019).

**Integration with participant responses:**

Participant 7 identifies the primary challenge as not in adopting AI but in having the necessary expertise and knowledge to effectively utilize it. This aligns with the literature's recognition of the importance of expertise in driving successful AI adoption (Chui, 2016).

Participant 1 points out global developments and legal challenges concerning AI, emphasizing the need for compliance and the establishment of internal principles and standards. This aligns with the literature's acknowledgment of legal and ethical considerations in AI adoption (Gupta, 2019).

Participant 5 highlights challenges related to data quality, emphasizing the crucial role of high-quality data in machine learning. This resonates with the literature's emphasis on the importance of data quality for the success of AI applications (Chui, 2016).

Participant 6 notes the banking sector's limited involvement in deep learning due to challenges and time constraints, aligning with the literature's recognition of the complexities associated with deep learning projects (Gupta, 2019).

Participant 3 emphasizes the challenge of building trust in AI systems, considering the shift from static content to reliance on AI bots. This aligns with the literature's acknowledgment of trust-building as a crucial aspect of successful AI adoption (Chui, 2016).

Participant 2 points out resistance from traditional banking mindsets and company politics, reflecting the literature's recognition of organizational resistance as a common challenge in adopting disruptive technologies (Gupta, 2019).

The integration of participant responses with the literature supports the idea that challenges and concerns in AI adoption in the banking sector include the need for expertise, legal considerations, data quality, resistance to change, and the crucial aspect of building trust in AI systems. These challenges align with the literature's recognition of multifaceted obstacles associated with the adoption of AI in the banking industry.

### 5.3.8 Adoption and implementation challenges

This theme explores the challenges associated with the adoption and implementation of AI in the banking industry. The literature acknowledges the potential threats if AI systems are not well-managed and given the independence to behave autonomously (Grady et al., 2013; McLay, 2018). Participant responses further highlight specific challenges related to global developments, expertise and knowledge gaps, resistance to change, understanding AI concepts among senior-level management, and the complexities of working with human clients.

**Integration with participant responses:**

Participant 1 mentions global developments and legal implications, emphasizing the challenge of evolving issues like data privacy and consent. This aligns with the literature's recognition of potential threats and the need for compliance in the rapidly advancing field of AI.

Participant 7 notes the primary challenge not in adopting AI but in having the necessary expertise and knowledge for effective utilization and development. This aligns with the literature's acknowledgment of the challenges in managing AI systems and obtaining a return on investment. Additionally, resistance to change among employees is highlighted, aligning with the literature's emphasis on potential threats if AI adoption negatively impacts job security.

Participant 5 points out challenges in getting senior-level management to understand the concept of AI and the approach used to leverage it. This aligns with the literature's recognition of expertise gaps and challenges in understanding AI concepts.

Participant 6 discusses the adoption of AI driven by a strategy to facilitate teams in building products, focusing on the adoption of API AI at scale. This aligns with the

literature's acknowledgment of challenges and strategies involved in the adoption of AI within the workforce.

Participant 3 emphasizes challenges associated with adopting AI in the division, particularly the difficulties in handling a wide range of dialogues and sentence structures from human clients. This aligns with the literature's recognition of challenges in working with unpredictable human interactions in AI applications.

The integration of participant responses with the literature underscores the multifaceted challenges in the adoption and implementation of AI in the banking industry. These challenges encompass legal considerations, expertise gaps, resistance to change, understanding AI concepts, and the complexities of working with diverse human interactions. Addressing these challenges is crucial for ensuring the effective and responsible integration of AI technologies in the banking sector. The need for compliance, expertise development, and strategies for workforce acceptance emerges as key themes from both the literature and participant responses.

## 5.4 Chapter Summary

Chapter 5 answered the research questions through triangulation of the study findings with the literature review (discussed in Chapter 2). Recommendations for mitigating these challenges were offered, guided by extant literature. The next chapter contains conclusions, implications for management, the study’s limitations, and avenues for future research.

# CHAPTER 6 CONCLUSION AND RECOMMENDATIONS

## 6.1 Chapter overview

In an era marked by rapid technological advancements, the integration of artificial intelligence (AI) stands as a transformative force within the banking industry. This chapter delves into the intricate landscape of AI adoption in the South African banking sector, seeking to unravel both the challenges and opportunities it presents. Focused on a comprehensive exploration, the study addresses key objectives, including the examination of current AI applications, the identification of challenges in adoption, and an exploration of the consequential effects on the industry's workforce. Through a triangulation of extensive literature review and participant responses, the chapter unfolds a nuanced understanding of AI's impact on the banking landscape in South Africa.

## 6.2 Conclusions regarding the achievement of objectives

The primary objective of the study was to explore the challenges and opportunities brought by artificial intelligence (AI) in the banking industry in South Africa. The secondary objectives were effectively addressed with concrete findings:

***Exploring Current Applications of AI (SO1):*** Through an extensive literature review, the researcher uncovered that South African banks leverage AI for customer service (Chui, 2015). Participant responses aligned with these findings, indicating the widespread use of AI-driven chatbots for personalized customer interactions and issue resolution. Additionally, humanoid robots are employed in some branches to enhance customer engagement.

***Establishing Challenges and Opportunities in AI Adoption (SO2):*** Challenges outlined in the literature, such as data privacy concerns (Tegmark, 2017), were echoed by participants. The researcher noted the paramount importance of compliance with data protection regulations. Furthermore, an unanticipated challenge surfaced: the scarcity of skilled professionals capable of managing and developing AI systems in the banking sector.

***Exploring Effects of AI Adoption on Workforce (SO3):*** The study substantiated literature findings on workforce transformation and potential job displacement due to automation (McKinsey & Company, 2019). Participant responses highlighted specific instances where routine tasks were automated, leading to job restructuring. A noteworthy finding was the proactive approach of banks in upskilling employees to take on more complex roles in the AI-driven landscape.

In conclusion, the researcher adeptly achieved the study's objectives by providing a nuanced understanding of AI applications, challenges, and opportunities in the South African banking industry. The triangulation of literature and participant insights offers a comprehensive view, enriching the discourse on AI's impact on the industry. The identified challenges, including the shortage of skilled professionals, underscore the urgency for strategic planning and workforce development in the rapidly evolving AI landscape.

## 6.3 Recommendations based on the outcome of the Study.

In light of the study's findings, the following recommendations are proposed for addressing the challenges and maximizing opportunities in the adoption and implementation of AI within the South African banking industry:

***Legal and Compliance Framework:***

Establish a robust legal and compliance framework that proactively addresses global developments and emerging regulations in the field of AI. Regularly update policies to ensure alignment with evolving legal considerations.

***Expertise Development:***

Invest in comprehensive training programs to bridge the expertise gap highlighted by participants. Focus on enhancing the capabilities of employees to effectively utilize and develop AI technologies, ensuring a skilled workforce capable of maximizing the return on investment.

***Communication and Change Management:***

Implement transparent communication strategies to address resistance to change and job security concerns among employees. Provide clear insights into the benefits of AI adoption and offer targeted training initiatives to alleviate fears and foster a positive attitude toward technological changes.

***Leadership Education:***

Develop strategic communication and educational initiatives targeting senior-level management. Address challenges in understanding AI concepts, fostering a more informed and supportive leadership that can champion the adoption and integration of AI technologies.

***Strategic Workforce Transformation:***

Identify specific areas for AI implementation within the workforce and provide reskilling opportunities. Emphasize a strategic approach to workforce transformation, ensuring that AI technologies are adopted at scale and integrated seamlessly into existing processes.

***Technological Adaptation:***

Recognize the dynamic nature of AI applications, particularly in handling diverse human interactions. Invest in technologies capable of monitoring, adapting, and effectively handling various dialogues and sentence structures encountered in real-world scenarios.

These recommendations are grounded in the realities and challenges identified by participants in the South African banking industry. By strategically addressing these key areas, industry stakeholders can navigate the complexities of AI adoption, ensuring a responsible, compliant, and successful integration that aligns with the study's objectives.

## 6.4 Limitations of the study

The study is subject to several limitations, which are detailed below. A notable limitation is the scarcity of researchers and studies focused on the South African banking industry concerning AI, its impact on employees, employee performance, and the interaction between AI and human skills. Beyond this, it is acknowledged that AI advancements and developments may have disparate effects on banks and provinces.

One significant constraint is the time-consuming nature of the study. Additionally, the sample size may be deemed insufficient for generalizing findings to the entirety of the South African banking industry. The study exclusively featured participants holding managerial positions in the North-West Province, precluding the generalization of findings to the broader banking industry across South Africa, as other provinces were not included. Moreover, limiting the study to participants in managerial positions may narrow the perspectives on how employees perceive AI in the banking industry.

The study interviewed a sample size of 7 participants. While some researchers and academic practitioners may not view small sample research studies as serious (Myers and Newman, 2007), it's important to note that the sample size was determined by data saturation, as emphasized by Moloto (2012). In this context, data saturation was achieved through 7 interviews. Efforts were made to diversify participants in terms of age, and information variation.

Thematic analysis was employed for data analysis, following the approach outlined by Braun and Clarke (2006). However, it is acknowledged that interpretations can vary among researchers, impacting the reliability of the analysis. The researcher's own beliefs and judgments were involved in the analysis, introducing the potential for bias.

Furthermore, a noteworthy limitation is the lack of available information on how AI has been utilized in the South African banking industry and its influence on employees' perceptions of technology in existing studies.

## 6.5 Recommendations for future research

The following are recommendations for future research

***Expand Sample Size:***

Increase the participant pool to provide a more comprehensive understanding of AI adoption challenges in the South African banking sector.

***Explore Organisational Change Techniques:***

Investigate additional connections between organisational change management techniques and AI adoption strategies in the banking industry.

***Focus on Cultural Aspects:***

Given the prominence of culture-related challenges, future research could delve deeper into the cultural implications of AI adoption, specifically in the context of diverse human interactions within the industry.

These succinct recommendations aim to guide future researchers in enhancing the depth and breadth of knowledge regarding AI adoption challenges in the South African banking sector.

## 6.6 Concluding remarks

This chapter navigates the dynamic terrain of artificial intelligence within the South African banking industry, examining the multifaceted dimensions of AI adoption. The study begins by uncovering current applications, revealing the prevalence of AI-driven technologies such as chatbots and humanoid robots for customer service. Challenges in AI adoption, including data privacy concerns and a scarcity of skilled professionals, are then elucidated, echoing both existing literature and participant insights. A profound exploration of the effects on the workforce follows, unveiling not only anticipated job transformations but also the proactive measures taken by banks to upskill employees for a more AI-centric future. As the chapter concludes, it sets the stage for a series of recommendations and acknowledges limitations, paving the way for further exploration into the intricate relationship between AI and the South African banking sector.

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# ANNEXURE A: ETHICS APPROVAL LETTER OF STUDY

Based on approval by the **Economic and Management Sciences Research Ethics Committee (EMS-REC)** on, 23/05/2023 the Economic and Management Sciences Research Ethics Committee hereby **approves** your study as indicated below. This implies that the North-West University Senate Committee for Research Ethics (NWU-REC) grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the study may be initiated, using the ethics number below.

**Study title:** Exploring the challenges and opportunities brought by artificial intelligence in the banking industry in South Africa

**Study Leader/Supervisor (Principal Investigator)/Researcher**): Dr K Ndlovu

**Student:** R Pretorius (26055988)

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| Institution | | | | Study Number | | | | | | Year | | | Status | |

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

**Application Type:**
**Commencement date: 14/06/2023** **Risk:** **Minimal**
**Expiry date: 14/06/2024**
**Approval of the study is initially provided for a year, after which continuation of the study is dependent on receipt and review of the annual (or as otherwise stipulated) monitoring report and the concomitant issuing of a letter of continuation.**

**Special in process conditions of the research for approval (if applicable):**

•

**General conditions:**

*While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:*

- *The study leader/supervisor (principle investigator)/researcher must report in the prescribed format to the EMS-REC:*
  - *annually (or as otherwise requested) on the monitoring of the study, whereby a letter of continuation will be provided, and upon completion of the study; and*
  - *without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.*
- *The approval applies strictly to the proposal as stipulated in the application form. Should any amendments to the proposal be deemed necessary during the course of the study, the study leader/researcher must apply for approval of these amendments at the EMS-REC, prior to implementation. Should there be any deviations from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.*



- *Annually a number of studies may be randomly selected for an external audit.*
- *The date of approval indicates the first date that the study may be started.*
  *n the interest of ethical responsibility, the NWU-SCRE and EMS-REC reserves the right to:*
  - *request access to any information or data at any time during the course or after completion of the study;*
  - *to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process; – withdraw or postpone approval if:*
    - *· any unethical principles or practices of the study are revealed or suspected;*
    - *· it becomes apparent that any relevant information was withheld from the EMS-REC or that information has been false or misrepresented;*
    - *· submission of the annual (or otherwise stipulated) monitoring report, the required amendments, or reporting of adverse events or incidents was not done in a timely manner and accurately; and / or · new institutional rules, national legislation or international conventions deem it necessary.*

The EMS-REC would like to remain at your service as scientist and researcher, and wishes you well with your study. Please do not hesitate to contact the EMS-REC or the NWU-SCRE for any further enquiries or requests for assistance.

Yours sincerely, **Prof Mark Rathbone**

**Chairperson: NWU Economic and Management Sciences Research Ethics Committee**

## ANNEXURE B: INFORMED CONSENT

Dear participant,

**INFORMED CONSENT TO PARTICIPATE IN AN INTERVIEW**

This Informed Consent Statement confirms the following information as it relates to the academic business science MBA and subsequent research on exploring the challenges and opportunities brought by artificial intelligence in the banking industry in South Africa.

This study forms part of a dissertation to be submitted in partial fulfilment of the Master of Business Administration requirements at the North-West University. It is an internationally accredited degree that requires adherence to strict ethical standards as a prerequisite to conducting this research.

1. The procedure to be followed is a qualitative research design, using semi-structured interview questions whereby the participant can communicate their views on the noted topic.
2. The estimated completion time for the interview will be approximately 30 – 45 minutes
3. If, at any point during the interview, the participant should feel uncomfortable, the participant will have the opportunity to make their discomfort known and immediately end their participation.
4. The interview will be voice-recorded for transcripts purposes and with the consent of the participant. The participant's name will not be recorded. At any time, the participant may request to see or hear the information collected. The interviewer will take notes. This is done for data analysis purposes. The recording will be transcribed by the interviewer and

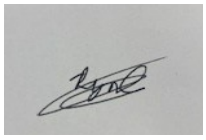
kept confidential in a password-protected computer. The transcripts and recordings will be destroyed after three years.

5. All individual identification will be removed from the hard copy of the transcript. Participant identity and confidentiality will be concealed using coding procedures. Please note that excerpts from the interview may be included in the final dissertation report or other later publications. However, under no circumstances will your name or identifying characteristics appear in these writings.
6. It should also be emphasised that participation in this study is voluntarily and with the consent of the participant without any form of coercion.
7. The confidentiality, anonymity and privacy of participants are guaranteed.
8. I recognize the importance of privacy and the protection of personal information. In all my activities and interactions involving personal data, I commit to all the principles outlined in POPIA.
9. A summarised copy of the final report will be made available to the respondant on request.
10. All data will only be accessed by the reasearcher and Research Supervisor.

I hereby declare that I have read and understood the content of the Informed Consent Statement and give my full consent to Rynhardt Pretorius to use the information gathered in her MBA dissertation and subsequent research.

| | ***Name*** | ***Designation*** | ***Signature*** | ***Date*** |
|---|---|---|---|---|
| **Researcher** | Rynhardt Pretorius | Researcher | | |
| ***Respondant*** | | | | |

**Researcher:** Rynhardt Pretorius
**Mobile number:** 0715008528
**E-mail:** Rynhardt170@gmail.com



**Supervisor:** Dr. Kaizer Ndlovu
**Email:** 35181680@nwu.ac.za
**Tel:** 0184994023

Ethics Code:

Date: _____

Participant code: _____

## ANNEXURE C: INTERVIEW GUIDE

1. In which division are you within the banking organization that you work for and how did you start within the specific division?
    a. Probe: How long has the organisation been operational?
    b. Probe: Can you please describe the main functions of the division?
    c. Probe: What is your role within the specific division?

2. What is the current Application of AI implemented within your specific division of the organization?
    a. Probe: If yes, please provide examples with brief explanations of the specific AI being utilized within your division.

3. Are there any challenges associated with the adoption of AI in your division?
    a. Probe: If yes, briefly elaborate on the challenges.

4. Did any opportunities and or improvements arise from the adoption of AI within the specific division the organization as a whole?

a. Probe: If yes, what are the opportunities and or improvements, and would it be considered to utilize AI in future?

5. How has the adoption of AI impacted the workforce, if at all?

a. Probe: To what extent has the adoption of AI implicated the workforce?

b. Probe: Are there any specific changes or challenges that have emerged as a result of AI implementation?

6. Are there any measures or strategies in place to address the implications brought about by the adoption of AI within the workforce?

a. Probe: Could you provide examples of these procedures or strategies?

b. Probe: How effective have these countermeasures been in mitigating the implications of AI adoption? PW jansen van rensburg

7. What specific skillsets and experiences are considered essential for successful implementation of AI technologies within an organization?

a. Probe: Are there any particular roles or positions that require specialized skillsets related to AI?

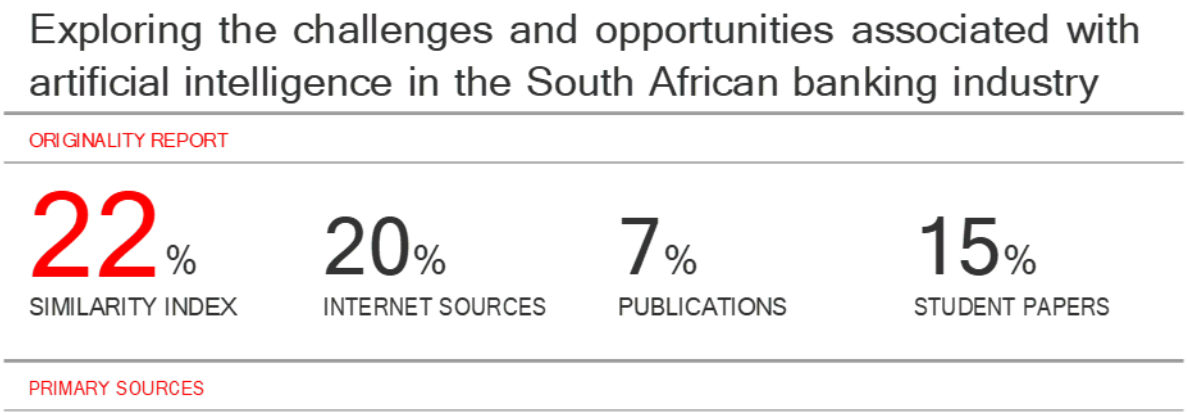
b. Probe: How has the demand for certain skillsets changed with the introduction of AI technologies?

8. What are the anticipated positive and negative impacts of AI within the organization, its specific divisions, and the roles of individuals within the organization?

a. Probe: How do you foresee AI technology benefiting the organization and its divisions?

b. Probe: What potential challenges or drawbacks might arise from the integration of AI technologies in the organization and its divisions?

## ANNEXURE E: TURNITIN REPORT



# ANNEXURE F: LANGUAGE EDITOR CERTIFICATE


*Angela L Mabhena*
Professional Translation & Editing Services
16 Landsdowne Place,
Richmond Hill,
Port Elizabeth
c/o Department of Language and Social Sciences Education
NMU
Email:
thelanguageeditor@yahoo.com;
Cell: 0787560140

24 Nov. 23

**To Whom It May Concern**

This is to confirm that I have done language editing on the required sections of the following mini dissertation:

Title:

**Exploring the challenges and opportunities associated with artificial intelligence in the South African banking industry.**

Author:

**RYNHARDT PRETORIUS (North West University, Student no: 26055988)**

Do not hesitate to contact me if the need arises.

Many thanks and regards,

Dr. A Mabhena (PR: 7664434)

Member:English Academy of Southern Africa (Council member, 2016- )
Research Fellow: School of Languages and Communication Studies, University of Limpopo (2017)