

https://dspace.org/

Ethical implications of digital auditing tools in financial services

Mamabolo, Nomsombuluko

2025

https://hdl.handle.net/10539/49221

Mamabolo, Nomsombuluko . (2025). Ethical implications of digital auditing tools in financial services [Master`s dissertation, University of the Witwatersrand, Johannesburg]. WIReDSpace. https://hdl.handle.net/10539/49221

Downloaded from a DSpace repository. https://dspace.org/

Ethical implications of digital auditing tools in financial services

Nomsombuluko Mamabolo

0401390X

Supervisor: Dr Manamela Matshabaphala



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

Johannesburg, 2025

ABSTRACT

The rapid adoption of Fourth Industrial Revolution (4IR) technologies in auditing offers efficiency gains but introduces ethical challenges that affect auditors' roles and stakeholder trust. This study investigates factors contributing to these challenges, interprets findings, and recommends strategies for ethical implementation of digital auditing tools in financial services. Data were collected through virtual interviews with eight senior auditors from diverse institutions.

Findings reveal that while data analytics is widely embedded, AI adoption remains nascent. Benefits of 4IR technologies include enhanced accuracy and speed; however, concerns persist around algorithmic bias, privacy breaches, and accountability gaps. Addressing these requires diverse training datasets, robust data protection, transparent communication, and sustained human oversight. Ethical decision-making frameworks must evolve to integrate digital considerations, emphasizing data ethics and accountability. Continuous learning, regulatory adaptation, and governance structures are critical enablers, alongside organizational maturity and skills development. Effective change management and investment in technology infrastructure further support ethical adoption.

The study underscores a profession in transition, balancing innovation with ethical integrity. Key implications include uneven digital maturity among auditors, the enduring role of human judgment, and the need for formal data governance policies. Persistent gaps in ethical guidance highlight the importance of dual upskilling—technical and ethical—and a shift from tool-centric approaches to strategic integration. Organizations are moving toward comprehensive digital audit strategies aligned with transformation goals, embedding ethical principles to strengthen trust and resilience in an evolving audit landscape.

KEYWORDS

Digital auditing, ethical decision-making, data governance.

DECLARATION

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

Name: Nomsombuluko Mamabolo Signature: *N. Mamabolo*

Signed at ……Centurion……

On the ……30th……. day of ……March…… 2025….

ACKNOWLEDGEMENTS

I am deeply grateful to my supervisor, Dr Manamela Matshabaphala, for his guidance and support.

My sincere thanks to my employer for their generous sponsorship and resources.

To my family, thank you for your love and encouragement.

Lastly, I appreciate my colleagues and friends for their support and camaraderie.

Thank you all for your contributions.

TABLE OF CONTENTS

LIST OF TABLES 9

LIST OF FIGURES 10

LIST OF ACRONYMS 11

CHAPTER 1. INTRODUCTION 12

1.1 STATEMENT OF PURPOSE 12
1.2 BACKGROUND OF THE STUDY 12
1.3 RESEARCH PROBLEM 14
1.4 RESEARCH OBJECTIVES 14
1.5 RATIONALE 15
1.6 DELIMITATIONS OF THE STUDY 15
1.7 DEFINITION OF TERMS 16
1.8 ASSUMPTIONS 17
1.9 CHAPTER OUTLINE 17
1.10 SUMMARY OF THE CHAPTER ..... **ERROR! BOOKMARK NOT DEFINED.**

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK 19

2.1 INTRODUCTION 19
2.2 DEFINITION OF AUDITORS' ETHICS IN DIGITAL AGE 20
2.3 ADOPTION AND APPLICATIONS OF 4IR TECHNOLOGY ENABLED AUDIT TOOLS 21
2.3.1 ROBOTIC PROCESS AUTOMATION (RPA) APPLICATIONS AND BENEFITS IN AUDIT 22
2.3.2 ARTIFICIAL INTELLIGENCE (AI) APPLICATIONS AND BENEFITS IN AUDIT 23
2.3.3 OTHER EMERGING TECHNOLOGIES APPLICATIONS AND BENEFITS IN AUDIT 25
2.3.4 CHALLENGES AND BARRIERS TO ADOPTION AND APPLICATION 26
2.3.5 PROPOSITION 1 26
2.4 ETHICAL CHALLENGES OF DIGITAL AUDIT TOOLS 27
2.4.1 ETHICAL CONCERNS CRITICAL WITHIN THE AUDITING PROFESSION 27
2.4.2 PROPOSITION 2 31
2.5 IMPACT OF DIGITAL AUDITING TOOLS ON AUDITORS' ETHICAL DECISION-MAKING PROCESSES 31
2.5.1 CLASSICAL ETHICAL DECISION-MAKING MODELS 32

2.5.2 Professional and best practice ethical frameworks and guidance 33
2.5.3 Proposition 3 35
2.6 ANALYTICAL FRAMEWORK 36
2.6.1 Theoretical Framework 36
2.7 Conceptual Framework 38
2.8 Conclusion of Literature Review 41
2.8.1 Proposition 1 42
2.8.2 Proposition 2 42
2.8.3 Proposition 3 42
2.9 Summary of the Chapter 42

CHAPTER 3. RESEARCH METHODOLOGY 44

3.1 Research Paradigm 44
3.2 Research approach 45
3.3 Research design 45
3.4 Data collection methods 46
3.5 Population and sample 47
3.5.1 Population 47
3.5.2 Sample and sampling method 47
3.6 The research instrument 48
3.7 Procedure for data collection 48
3.8 Data analysis strategies and interpretation 49
3.9 Possible limitations and challenges of the study 52
3.10 Quality Assurance 52
3.10.1 Transferability 52
3.10.2 Credibility 52
3.10.3 Dependability 52
3.11 Ethical considerations 53
3.12 Summary of the Chapter 54

CHAPTER 4. PRESENTATION OF FINDINGS 55

4.1 Introduction 55
4.2 Findings pertaining to exploration of adoption, applications and perceived benefits of digital auditing tools in financial services 56
4.3 Findings pertaining to Ethical Challenges of Digital Auditing Tools 62
4.4 Findings pertaining to the impact of digital auditing tools on ethical decision-making processes and mitigation strategies employed 67
4.5 Summary of the findings 73

4.6 SUMMARY OF THE CHAPTER 73

CHAPTER 5. DISCUSSION OF THE FINDINGS 74

5.1 INTRODUCTION 74
5.1.1 DEMOGRAPHIC PROFILE OF PARTICIPANTS 75
5.2 DISCUSSION PERTAINING TO EXPLORATION OF ADOPTION, APPLICATIONS AND PERCEIVED BENEFITS OF RPA AND AI DIGITAL AUDITING TOOLS IN FINANCIAL SERVICES 77
5.3 DISCUSSION OF ETHICAL IMPLICATIONS OF TECHNOLOGIES PERTAINING TO DATA PRIVACY, LACK OF TRANSPARENCY, BIAS, TRUSTWORTHINESS AND ACCOUNTABILITY. 81
5.4 DISCUSSION PERTAINING IMPACT OF DIGITAL AUDITING TOOLS ON ETHICAL DECISION-MAKING PROCESSES AND MITIGATION STRATEGIES EMPLOYED 90
5.5 CONCLUSIONS 98
5.6 SUMMARY OF THE CHAPTER 100

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS 101

6.1 INTRODUCTION 101
6.2 CONCLUSIONS 101
6.3 RECOMMENDATIONS 104
6.4 SUGGESTIONS FOR FURTHER RESEARCH 107

REFERENCES 109

APPENDIX A (Research Instrument) 115

LIST OF TABLES

Table 4.1: Adoption, applications and perceived benefits of digital auditing tools in financial services

Table 4.2: Ethical Challenges of Digital Auditing Tools

Table 4.3: Impact of digital auditing tools on ethical decision-making processes and mitigation strategies employed

Table 5.1: Demographic profile of participants

Table 6.1: Recommended strategies for implementation of ethical digital auditing

LIST OF FIGURES

Figure 2.1: Lehner et al. (2022) ethical decision-making framework

Figure 2.2: Conceptual Framework

Figure 3.1: Braun & Clarke’s phases of developing thematic analysis

Figure 3.2: Illustration of researcher’s thematic analysis process

Figure .1: Combined stack of technologies adopted and use cases

LIST OF ACRONYMS

ACCRONYM	MEANING
4IR	4IR: Fourth Industrial Revolution
AI	Artificial Intelligence.
AICPA	American Institute of Certified Public Accountants
CA	Continuous Auditing
EY	Ernst and Young
IIA	Institute of Internal Auditors
ML	Machine Learning
NLP	Natural Language Processing
PWC	PriceWaterhouseCoopers
RPA	Robotic Process Automation
TRA	Theory of reasoned action
TPB	Theory of planned behaviour

CHAPTER 1. INTRODUCTION

This chapter covers the: statement of purpose (section 1.1), background of the study (section 1.2), research problem (section 1.3), research objective (section 1.4), rationale (section 1.5), delimitations of the study (section 1.6), definition of terms (section 1.7), assumptions (section 1.8), chapter outline (section 1.9) and summary of chapter (section 1.10).

1.1 Statement of purpose

This phenomenological study explores the ethical considerations and challenges concerning auditors' integration of 4IR technologies enabled auditing tools in financial services environments.

1.2 Background of the study

The 4th Industrial Revolution is transforming auditing practices (Tavares et al., 2022) and advanced technologies are an indispensable asset in the profession. Although technology-based auditing tools usage is associated with greater audit cost (Eulerich, et al., 2022), their overall benefit is increased audit efficiency, depth of coverage and audit insights (Tavares et al., 2022).

Globally audit professionals are leveraging digital audit tools powered with4IR technologies like robotic process automation (RPA), artificial intelligence (AI) and advanced data analytics (DA) accelerate digital auditing practices. More profoundly, audits are evolving from being a point-in-time execution to continuous auditing that stretches across the financial year in iterations (Stockle, 2023). Key challenge on the people front is that audit automation might displace audit human resources, hence there is need for auditors to upskill by acquiring advanced skills in technology, data analysis and critical thinking. The ethical considerations remain underexplored in current literature and practice. Specifically, gaps exist in

understanding of matters of over-reliance on automation compromising auditors' critical analysis/professional judgement, auditors lacking required competence/having skills gap in understanding complex algorithms and intricacies of advanced technologies; and data privacy and security breaches of vast amounts of audit data, exposing sensitive financial and propriety information (Faster Capital, 2024; CPA Canada, 2020; Angeles et al., 2023).

In the African continent, the above global trends hold true, but there is a wide variation in adoption rates of digital tools caused by limitations in technology infrastructure, internet access and smaller digital skills talent pool.

In the SADC and South African context, there are current regional initiatives aimed at harmonising financial and monetary cooperation, accounting and auditing practices (SADC, 2024), this can facilitate adoption of digital auditing tools in financial service sector. South Africa has advantage over its neighbours due to its relatively a sophisticated and large financial sector with regulatory support for digital transformation (FCSA, 2022), which is helping in smoothing the way for digital auditing practices.

Johannesburg is the economic hub of South Africa. Auditors working in financial services sector have benefits of accessing the technology ecosystem, professional networks and leveraging the tools available in the financial institutions they work for to successfully implement advanced auditing technologies.

As auditors integrate technological advancements into their practice, upholding the core professional ethical standards of integrity, objectivity, confidentiality and competency is critical for preserving of trust and credibility (Al-Sharif, 2023).

This context underscores a critical gap: while operational benefits of digital auditing tools are well documented, their ethical implications remain insufficiently explored in practice. Addressing this gap requires examining how auditors experience and navigate ethical challenges introduced by 4IR technologies, which forms the basis of the research problem discussed in the next section.

1.3 Research problem

Despite the growing integration of 4IR technologies into auditing practices, there remains a significant gap in understanding how these digital tools influence auditors' ethical decision-making. Existing literature has largely emphasised the operational benefits of digital audit tools—such as improved efficiency and effectiveness—while underexploring the ethical complexities they introduce. Specifically, there is limited empirical insight into how auditors experience and navigate ethical challenges arising from the use of 4IR-enabled technologies, particularly in high-stakes financial services environments. This study addresses this gap by examining auditors' lived experiences in Johannesburg, focusing on how digital tools intersect with ethical considerations and shape professional judgment in real-world audit contexts.

The established ethical theories of consequentialism, deontology and virtue ethics are applicable in evaluating auditors' ethical considerations and challenges in the context of digital auditing tools.

1.4 Research objectives

This study examines professional auditors' perspectives on how digital ethics are integrated with professional ethical requirements for quality digital audit practices. The investigation aims to give insight into auditors' subjective understanding of their ethical responsibilities in the digital age. To address this aim, the key objectives of the study are to:

i. To identify and analyse auditors' applications 4IR technologies such as RPA, AI, Machine Learning and Advanced Data Analysis in financial services audits
ii. To examine the ethical challenges posed by digital auditing tools in relation to auditors' ethical considerations
iii. To explore the impact of digital auditing tools on auditors' ethical decision-making processes and mitigation strategies employed.

1.5 Rationale

Despite their benefits to auditing practices, digital auditing tools raise ethical concerns. There is a need to balance efficiency and expertise, digital audit tools streamline processes, however auditor human judgement and scepticism is critical for accurate analysis of outcomes and ethical decision making.

This study offers an empirical evaluation of auditors' perspectives on ethical implications of digital auditing tools, thus adding to the academic body of knowledge on the phenomenon in South Africa. The study can offer a small contribution to the important ongoing conversation of auditor ethics in the digital age and from a practical perspective, this study can provide relevant insights for auditors, auditors, professional bodies and regulators on upskilling and continual professional development opportunities and help safeguard reputation and integrity of the profession.

Research on these above ethical considerations and challenges in assurances services in the financial sector is particularly important as stakeholders heavily rely on accurate and reliable audits. Ethical and transparent auditing practices enhances audit stakeholders' (i.e., shareholders, boards, regulators, investors and the public) trust and confidence in assurance services.

1.6 Delimitations of the study

i. This study follows a phenomenological approach focusing on the perspectives of a sample of auditors working with digital auditing tools in various financial institutions in Johannesburg.
ii. This study is delimitated to the ethical implications of digital auditing tools on auditors' decision-making. This study thus specifically excludes advanced or technical organisational and cultural considerations, stakeholder impact and concerns, etc.

iii. This study does not focus on only one type of 4IR advanced technology/ digital auditing tool, but rather explore and confirm what has been adopted and what are the different applications thereof.

iv. The context and focus of the study are characterised by rapid digital transformation of the auditee environment

1.7 Definition of terms

This study contains a few key terms and concepts used throughout the paper. These are the descriptions in the context within which they have been characterised in the paper:

Auditor: an auditor is an independent assurance provider of internal controls, financial and operating information, information systems, governance and risk management. Auditing disciplines working in financial services include internal auditors, charted accountants, information technology auditors, compliance auditors, forensic auditors, etc.

Digital Auditing Tools: advanced 4IR technologies leveraged to enhance the audit process, i.e., AI, Machine Learning, data analytics, block chain and cloud computing to improve audit scope, accuracy and efficiencies

Ethical Decision-Making: is process of identifying ethical issues, determining right action, desiring to do right and then acting (Rest, 1986; Lehner et al., 2022). Applied to auditors, this means that when faced with ethical dilemmas, auditors duly consider all options and their impact on stakeholder, prioritising the ethics of integrity and objectivity to ensure that audits are accurate and fair.

Interpretive Phenomenological Analysis: Interpretative phenomenological analysis (IPA) is a method designed to understand people's lived experience and how they make sense of it in the context of their personal and social worlds (Smith & Nizza, 2022).

1.8 Assumptions

The following assumptions are made regarding the research study:

i. The interviewees engaged openly, shared the required information and answered the interview questions honestly and accurately.

ii. The interviewees are subject matter experts/ have sufficient knowledge and experience to engage and answer the interview questions.

iii. Interviewee did not divulge propriety information.

1.9 Chapter outline

This research paper is presented in six chapters:

Chapter 1 defines the introduction and scope of the study, with specific outlines of the research statement of purpose, background of the study, research problem, research objectives, rationale and delimitations of the study. The chapter concludes with definitions of key terms and assumptions made.

Chapter 2 provides the literature on the key concepts of 4IR technology enabled audit tools' adoption and applications, ethical challenges of digital auditing tools and auditors' ethical decision-making processes. These concepts are examined through the literature to elucidate the problem. Furthermore, the ethical theories of consequentialism, deontology and virtue ethics are juxtaposed in the context of ethical challenges of digital auditing in financial services. The chapter then wraps up with the selected theoretical framework, Lehner et al.'s (2022) framework for ethical decision making, adaptation for current research objectives.

Chapter 3 outlines the research methodology applied for this study, describing the philosophical research paradigms that the study is based on and the techniques to be employed sample selection, data collection and analysis.

Chapter 4 presents the data collected, utilising the analytical framework discussed in chapter 3. The data is categorised into themes that align with the research questions.

Chapter 5 provides a comprehensive discussion of the research findings.

Chapter 6 concludes the study, offering recommends and suggestions for future research.

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This chapter covers the: introduction (section 2.1), definition of auditor ethics in the digital age based on ethical theology (section 2.2.), prior research into the adoption and applications of digital auditing tools (section 2.3), prior research into the ethical challenges of digital auditing tools (section 2.4), prior research into auditors ethical decision making using digital auditing tools (section 2.5), theoretical framework: theory of reasoned actions, theory of planned behaviour and Lehner et al.'s (2022) ethical decision-making framework (section 2.6), analytical framework (section 2.7) and conclusion of the literature review (section 2.8).

2.1 Introduction

This chapter provides the literature review on ethical implications of digital audit tools on auditors' decision-making. Its presentation is aligned with the research purpose statement seeking to explore the ethical challenges concerning auditors' integration of 4IR technology enabled auditing tools in financial services environments through the three dimensions of applications of 4IR technology enabled audit tools, ethical challenges of digital auditing tools and auditors' ethical decision-making processes. These dimensions are unpacked to derive tangible propositions about the researched phenomena. Further a conceptual framework is developed for framing and guiding the study data gathering, analysis and discussion.

The literature review is critical for grounding this research, enabling identification of existing ethical challenges and helping the researcher to build upon past work. It facilitates finding of knowledge gaps to support the study's arguments in contribution to the bigger ongoing conversation regarding ethical implications of

digital auditing tools. Literature review help in synthesizing insights and perspectives from numerous empirical studies, help to address a research question(s) more comprehensively than any single study can (Snyder, 2019)

2.2 Definition of auditors' ethics in digital age

Digital auditing practices present a unique challenge to auditor ethics, demanding a more refined ethical focus from the profession. The three theories of Deontology, Theory of Consequence and Virtue Ethics are helpful in defining auditors' ethics in the digital age (SteenKamp & Smidt, 2024) and as it pertains to the financial services sector.

Deontology (by Immanuel Kant,1956) is duty-based ethics (Kant et al., 2019) and its application translates to auditors having a duty to conform to their professional codes of conduct. Such codes mandate core auditor ethical principles of integrity, objectivity and professional scepticism when using digital auditing tools (IIA, 2024; AICPA, 2020). When conducting digital audits, auditors thus have a duty to ensure data integrity, secure data privacy and to understand limitations of digital audit tools. The limitation of the theory lies that it is not sustainable in the relativistic and contextualized age we find ourselves in (Kant et al., 2019), thus auditors' strict conformance to rules of conduct cannot cater for nuanced challenges of new digital auditing tools.

Consequentialist ethics (by Epicurus, ancient Greece origin) implies that auditors' ethical actions are judged by their outcomes and auditors will make decision that maximizes positive consequences and minimizes negative ones, i.e., using data analytics tools and techniques for continuous monitoring of fraud risk indicators in financial services data while ensuring data privacy. Its challenge however lies in that auditors as moral agents would have to know and predict the all the consequences of digital auditing actions (Gorichanaz, 2023).

Virtue Ethics (by Plato and Aristole, ancient Greece origin) focuses on character traits. In the context of auditing in the digital age that characterised by pace of

sociotechnical change and the complexity of society (Gorichanaz, 2023), for auditors to act ethically, they should particularly cultivate virtuous characters of honesty, courage, objectivity and trustworthiness. The shortcoming with virtue ethics in digital auditing is that the lack of specific guidance for complex and emerging technology matters (Gorichanaz, 2023).

The best approach may be for auditors to integrate all three theories for navigating digital auditing ethical challenges, i.e., auditors should maintain highest ethical standards by fulfilling their duties, being virtuous and considering the digital consequences of their actions.

2.3 Adoption and applications of 4IR Technology enabled audit tools

Tiron-Tudor et al. (2024) study of 25 uses cases for RPA in accounting and auditing, elucidate that under traditional auditing, auditors use laborious manual methods for collecting and analysing audit data, making the audit process expensive, time-consuming and susceptible to human errors. Audit process is further limited by sample testing for assessing risk as analysing entire data sets takes long and is costly. Traditional audits are therefore done periodically, providing less assurance to stakeholders on accuracy of financial information and effectiveness of internal controls.

The auditing profession has fortunately not been spared from the digital disruption of 4IR technologies. Auditing has undergone a digital revolution through leveraging of 4IR technologies of Robotic Process Automation (RPA) and Artificial Intelligence (AI) (and its subsets of Machine Learning (ML). This analysis delves into their applications and the value they add to the auditing practice.

2.3.1 *Robotic Process Automation (RPA) applications and benefits in audit*

Robotic Process Automation (RPA) employs software robots (bots) to automate any manual, rule-based and repetitive tasks at scale, typically executed by auditors on spreadsheets and other computerised systems (Balamurugan et.al, 2022). These bots mimic human auditor actions by interacting with digital systems and software interfaces, following pre-defined instructions. RPA can be leveraged for efficient auditing and fraud monitoring through optimisation of mundane and repetitive tasks, allowing auditors to focus on more complex and value-adding tasks (Griffiths & Pretorius, 2021). Its versatility can create efficiencies in vast variety of computerized business processes (Plattfaut et al., 2022).

The finance sector relies heavily on data processing and repetitive tasks, making it ideal for RPA implementation in audits. Here are few key applications for auditors:

Extracting, validating and transforming data

Manual data collection from several sources (e.g., client ERP system, third party data warehouses and repositories) is time-consuming for auditors and subject to many errors and inconsistencies in the data. For RPA auditing applications to function properly, consistency in the data process and reliability of data fields is essential (Mookerjee and Rao, 2021; Tiron-Tudor et al., 2024). RPA bots streamline this process, automatically logging into non-integrated systems to extract specific data points (e.g., account balances, transaction details) and then sorting and transforming them into a standardised formats for carrying out analytic procedures and provide insightful reports saving auditors a lot of time (KPMG, 2021; Balamurugan et al., 2022; Ayinla et al., 2024).

Sampling and Testing

RPA mitigates sampling risk, enabling auditors to test the entire population rather than relying on samples (Kapur and Singh, 2022; Tiron-Tudor et al., 2024).

Account Reconciliation

Reconciling accounts across various financial systems is time consuming and error-prone task. Software bots enhance revenue audits reconciliations testing by logging into the client's secure server, extracting a complete transaction listing for a specific period, compiling the data, comparing it with the total sales from the trial balance and flagging any exceptions needing validation with clients (Kapur & Singh, 2022). For a bank recon, RPA automates the comparison of account balances, such as loans and deposits, identifies variances and reports reconciling items for investigation. Furthermore, for completeness, RPA bots use in-built optical character recognition (OCR) to extract relevant reconciliation data from images or scanned documents and converts the unstructured data into well-defined text formats (Tiron-Tudor et al., 2024)

Regulatory Compliance Testing & Reporting

The financial services sector must adhere to stringent regulations, auditors must pay extreme attention to detail as client organisation might experience material financial penalties with only one slip-up (Balamurugan et.al, 2022). RPA is ideal for automating process of gathering regulatory and compliance data, cleansing the data and generating regulatory reports identifying potential non-compliance risks (Tiron-Tudor et al., 2024).

2.3.2 *Artificial Intelligence (AI) applications and benefits in audit*

Artificial intelligence (AI) refers to the intelligence simulated by machines (computer systems), that can mimic human cognitive functions like thinking, learning and problem-solving (Bose et al., 2022). Incorporating AI into different

phases of the auditing process enhances efficiency at every stage, spanning data collection, risk management and real-time result analysis (Leocádio et al., 2024). AI implementation makes for a leaner audit process and improved auditor productivity, enabling firms to decrease workforces and transfer some of the cost savings to their clients in form of reduced audit fees (Fedyk et al., 2022). Other key benefits of AI are its ability to predict trends and impacts, real-time insights into risks, better data-enabled decisions, and increased data accuracy (KPMG, 2024). Some key AI Applications in auditing are discussed below.

Data Analytics:

(AI) can analyse extensive datasets, identify patterns and enable real-time monitoring, enhancing the robustness and proactivity of the audit process (Odeyemi et al., 2024). The strategic implementation of AI technologies enables real-time data processing and pattern recognition, introducing a predictive aspect to auditing (Leocádio et al., 2024)

Automated Tasks

AI redefines auditing by automating repetitive tasks such as interpreting complex financial data, identifying trends and assessing risk factors. It liberates auditors for higher value analyses and enhances the overall quality, accuracy and timeliness of audit processes (Odeyemi et al., 2024). Furthermore, strong point of AI is its ability to scale rapidly, as machines can adjust to changing workloads at digital speeds (Tiron-Tudor & Deliu, 2022).

Fraud Detection

AI algorithms are trained to monitor fraud in financial statements through analysis of patterns in past transaction data to flag suspect transactions. Albahsh and Al-Anaswah's (2024) study found Machine learning (ML) offers a novel approach to credit card fraud detection. AI applications are effective at identifying patterns associated with fraudulent activities, suspicious transactions and irregularities

that deviate from typical financial behaviour. By doing so, they play a crucial role in early fraud detection and prevention (El-Mousawi et al., 2023).

Risk Assessment

Albahsh and Al-Anaswah's (2024) study found that banking auditors can comprehensively leverage AI's capabilities for credit risk assessments, i.e., AI techniques, such as neural networks and decision trees, improve credit scoring accuracy; while combining machine learning algorithms with explainable AI (XAI) enhances transparency and understandability of AI-driven credit risk predictions; and deep learning models outperform standard approaches for credit delinquency prediction.

Continuous Monitoring and Proactive Risk Management

Unlike traditional periodic audits, AI-enabled auditing tools facilitate continuous monitoring of financial processes, facilitating real-time flagging of potential issues by audit and proactive risk mitigation by management, thus fostering more robust risk management (Stockle, 2024). Furthermore, continuous monitoring minimizes the need for time-consuming audits and enhances transparency (El-Mousawi et al., 2023).

2.3.3 *Other Emerging Technologies applications and benefits in audit*

Blockchain is a game-changer to the world of digital auditing with its added security and efficiency benefits. Its transactions are tamper-proof and create an auditable trail. It streamlines the audit process, making audits faster and thus enabling auditors to focus more on deeper analysis. Cai's (2021) study found that blockchain 's triple-entry accounting capability creates real-time transparency and enhances trust. It's overall improved risk management safeguards financial health. Data sharing is secure and standardized recordkeeping simplifies the process. Elommal et al., (2022) further say that ***Blockchain*** is creating a move

towards audits centred on testing internal controls of the Blockchain rather than testing transactions (e.g., block chain's data integrity and security, change, management and governance). The disruptive blockchain technology innovation is still in its early development stages and is being adapted rapidly as it's being adopted and will continue to change (Yang et al., 2022). Scalability, regulations and integration need to be addressed. Nevertheless, the potential for a more secure, efficient and transparent future of auditing is undeniable.

2.3.4 *Challenges and barriers to adoption and application*

Ragubeer (2022) found that barriers to adoption in South African audit firms' context are financial challenges, people and culture, process and tools and environmental maturity. Similarly, Dahiyat (2022) also concluded that Jordanian firms were inhibited in adopting RPA due to its high initiating and infrastructure costs and lack of technical competencies by auditors. This inadvertently means that big audit firms (and internal audit functions within big organisations) leverage their greater investment capacity to give them further competitive advantage over their smaller counterparts (Lugli & Bertacchini, 2023). To add, AI is still a relatively new field and there is still much to comprehend about its workings and there is a lack of proactive training and education by academic institutions and professional bodies in helping accountants and auditors to upskill in understanding and use of emerging technologies (Fedyk et al., 2022; El-Mousawi et al., 2023; and Tiron-Tudor et al., 2024).

2.3.5 *Proposition 1*

This study explores the adoption, applications and perceived benefits of RPA and AI digital auditing tools in financial services sector in Johannesburg.

2.4 Ethical challenges of digital audit tools

Auditors' adoption of RPA and AI in auditing practices has great benefits, but these must be implemented with due consideration of the ethical challenges they present. The challenge lies in technologies' capacity to revolutionize auditing processes efficiently, while simultaneously posing risks such as bias introduction, privacy infringement and reduced transparency (Adelakun, 2022).

2.4.1 *Ethical concerns critical within the auditing profession*

Privacy and Security

RPA & AI systems in auditing practice process large datasets of clients' sensitive personal information, as well as organisational operational and financial information, raising concerns about data privacy and security. This is exemplified in Zhang et al.'s (2023) study confirming risk that management accountants' AI-automated report generation or multi-dimensional analysis for decision-making, involves handling substantial financial and operational data risking exposure of critical performance indicators and propriety information. Furthermore, Murikah et al. (2024) notes that auditors' depending on AI for continuous monitoring and evaluation heightens privacy and cybersecurity risks. Auditors must therefore ensure that RPA & AI systems' data collection and transformations do not breach data privacy and protection policies and regulations (e.g. POPIA), risking reputational and financial risk for the audit function, financial institution and its clients. Auditors' innovations should encompass strict data governance practices of access controls, data encryption and regular audits of digital auditing tools mitigate risks of unauthorised access and use of audit data (Adelakun, 2022).

Transparency and Explainability

AI decisions (particularly those with deep learning models), can be overly complex, making them hard to explain, creating 'black box' issue. Zhang et al.

(2023) study participants were found to be skeptical about AI's effectiveness in managerial accounting due to its "blackbox" nature, which makes its operations less transparent and potentially problematic when dealing with real data and complex scenarios. This can impede auditors' ethical decision-making. Adelakun (2022) recommends that to enhance transparency, auditors can employ strategies such as using interpretable machine learning models (e.g., decision trees or linear models) and techniques like model explanations that highlight influential factors in AI decisions. However, Lehner et al. (2022) position that even if AI traceability is technically feasible, its limited usefulness persists if it lacks easy-to-understand explanations for professionals, including auditors. They say that understanding the underlying concepts, use cases and limitations of AI algorithms is crucial for ensuring transparency, however, even software developers grapple with complex code accumulated over time and across different teams. Murikah et al. (2024) recommend that AI assurance tools' vendors should prioritize AI transparency by means of improved interfaces, comprehensive testing reports and collaborating with diverse domain experts.

RPA systems too can also lack transparency; thus, adequate and clear documentation of RPA scripts and audit trails are critical for evidencing and explaining audit decision-making.

Bias and Fairness

AI systems can inherit biases from training data, resulting in discriminatory or unfair outcomes. This is confirmed by Zhang et al.'s (2023) observation that AI aids accountants and auditors by applying rules and models derived from expert knowledge, however, expert models may introduce bias or prejudice due to their limitations. Other sources of biases in AI-enabled auditing systems identified by Murikah et al. (2024) encompass data deficiencies, demographic homogeneity, spurious correlations and improper comparators. Costanza-Chock et al.'s (2022) observation amplifies risk that while most auditors report assessing fairness across both legally protected and other demographic categories, they primarily focus only on 'Age,' 'Race/Ethnicity,' and 'Sex", thus leaving out already

unprotected sub-populations. Such biases can create audit risk and unfair findings or overall assurance opinions. Lehner et al. (2022) also noted that biased information or algorithms can compromise auditors' decision-making and that addressing this requires clear guidelines and awareness-building for developers and auditors.

To ensure ethical AI use in auditing, rigorous testing and validation are essential for detecting and rectifying biases.

RPA rules too may have inherent biases that lead to unfair audit outcomes. Ongoing reviews and updates of RPA audit tools' rules can remediate biases ensuring fair and objective audit outcomes.

Trustworthiness/Accuracy and Reliability

Lehner et al. (2022) raise that trust plays a crucial role in the adoption and execution of AI decisions in auditing and the lack of institutional trust can hinder acceptance, while distrust based on rational or irrational factors may compromise execution. The Murikah et al. (2024) study further adds that to ensure trustworthy and socially aligned auditing innovation with AI, guardrails include preventive and detective controls. Data and ethical guardrails proactively enhance input diversity and incorporate fairness.

RPA performs predefined tasks accurately but lacks intelligence to detect unexpected changes or errors in data. Auditors must ensure reliability and prevent perpetuating errors. Continuous monitoring and updates are crucial for maintaining accuracy

Accountability and Liability:

Assigning responsibility for AI decisions, especially when errors or biases occur, can be complex. This is further compounded by AI systems' ability to make decisions autonomously, reducing auditors' engagement supervision and

potentially resulting in unethical audit outcomes. AI ethical challenges arise due to ambiguity in accountability, making it crucial to establish clear frameworks and roles for AI systems. Lehner et al. (2022) emphasize that ethical algorithmic accountability should recognize algorithms as outcomes of human design and interaction, considering moral intent and institutional factors. Moreover, human agency, including power dynamics, influences the interpretation of algorithmic outputs in significant decision-making contexts (Lehner et al., 2022). To uphold auditors' ethical standards, it's essential to establish explicit protocols for human intervention and oversight in AI decision-making. Zhang et al. (2023) offer that to ensure AI achieves positive long-term outcomes and mitigates ethical risks, AI companies, client organizations, managerial accountants and regulators must collaboratively assume responsibility and establish effective accountability mechanisms for AI usage

Others:

RPA and AI automate complex auditing tasks, raising potential job losses. Audit AI policies must focus on audit workforce reskilling to mitigate risk.

Both RPA and AI offer significant benefits in digital auditing, require due consideration of ethical challenges to ensure their responsible and ethical use in audit practice.

Overall, a comparative analysis of the assessed literature reveals a strong consensus among authors on the critical ethical risks posed by AI in auditing, particularly regarding privacy, bias, and accountability. Zhang et al. (2023), Murikah et al. (2024), and Adelakun (2022) converge on the view that privacy and security risks are inherent in AI-enabled auditing due to extensive handling of sensitive financial and operational data, advocating robust data governance measures. Similarly, all authors addressing bias and fairness agree that algorithmic systems inherit biases from training data and expert models, potentially leading to discriminatory audit outcomes; however, their emphasis

differs—Costanza-Chock et al. (2022) critique auditors' narrow fairness checks, while Murikah et al. (2024) and Lehner et al. (2022) focus on technical and institutional remedies respectively. Transparency emerges as another area of shared concern, though disagreement persists on solutions: Adelakun (2022) promotes interpretable models and technical explanations, whereas Lehner et al. (2022) argues that conceptual understanding and institutional factors remain indispensable. Divergence is also evident in approaches to trust and accountability; Murikah et al. (2024) frames trustworthiness as a technical issue requiring preventive controls, while Lehner et al. (2022) situates trust within social and institutional contexts. Zhang et al. (2023) adopts a pragmatic stance on accountability, advocating collaborative responsibility among stakeholders, contrasting with Lehner et al.'s philosophical focus on moral intent and human agency. Overall, while consensus exists on the ethical imperatives of privacy, fairness, and accountability, the authors differ in prioritizing technical, institutional, or socio-ethical strategies, underscoring the multidimensional nature of ethical AI governance in auditing.

2.4.2 *Proposition 2*

This study will explore auditors' perceptions on the ethical implications of using RPA and AI for auditing in terms of risks of data privacy, lack of transparency, bias, trustworthiness and accountability.

2.5 Impact of digital auditing tools on auditors' ethical decision-making processes

Ethical decision-making is critical for auditors to ensure integrity and credibility of assurance provided. Several types of existing frameworks and models can be beneficial in guiding audit professional in tackling ethical dilemmas, whilst upholding their professional standards.

2.5.1 *Classical Ethical Decision-Making Models*

Classical decision-making models by Rest, Kohlberg and Jones may be considered by auditors in the current digital auditing age.

Rest's Four-Component Model of Morality (Rest, 1986; Rest & Narvaez, 1994) identified four integrated abilities for determining professional's moral behaviour encompassing *Moral Sensitivity* entailing the identification of an of an ethical challenge/dilemma ; *Moral Judgment* entailing the application of moral reasoning to in deciding the right/ethical course of action; *Moral Motivation* entailing engagement in ethical decision-making through process of considering and prioritising ethical values over other values; and *Moral Character/Implementation* entailing having the perseverance or moral intent to carry out the ethical decision. The model can assist auditors to identify and manage traditional ethical dilemmas like conflicts of interest, while in the digital auditing environment it can help auditors manage technological ethical issues of data privacy, AI algorithms, etc.

Kohlberg's Stages of Moral Development (Kohlberg, 1981) is a theory of how people's moral reasoning adapts as they grow. It constitutes six stages occurring through the three phases of *Pre-conventional guided* by a self-interest drive; *Conventional* guided by adherence to social norms and rules; and *Post-conventional* guided by universal ethical principles (Mcleod, 2024; Cherry, 2024). Auditors can apply the framework for reflecting on their own personal moral development and understanding how both their personal and auditing experiences influence their ethical decision-making pertaining to the adoption of digital auditing tools.

Jones' Issue-Contingent Model (Jones, 1991) for understanding individual's ethical decision making in an organisational context. At its heart is the concept of Moral Intensity defined as the extent to which an ethical issue demands ethical consideration. Moral Intensity is made up of six factors which will require an auditor in a digital practice environment to consider the magnitude/level of severity of potential consequences their actions (e.g., a data breach or); whether

there is a social consensus that their potential actions are unethical, probability of harmful effect, temporal immediacy (i.e., how soon effect of potential unethical act will be felt), auditors proximity to the potential harmful consequence and concentration of effect on either an induvial/group or both. These factors all interact with each other and an increase/decrease of one or more of the factors result in increase/decrease of the overall moral intensity issue. Auditors are likely to perceive issues with a higher moral intensity as ethical dilemmas and respond accordingly and uphold their professional scrutiny.

Auditors may require training to understand and apply these models in digital auditing context. However, it may not be practical to implement due the nuanced and increasingly complex ethical challenges. Combining the frameworks can better equip auditors' working in digital auditing environment to understand, identify and make decisions pertaining to ethical challenges of digital auditing tools.

2.5.2 *Professional and best practice ethical frameworks and guidance*

This section explores recent issued frameworks and guidance by respected professional and regulatory bodies in relation to ethical challenges of technology. It's important for auditors to keep abreast of such publications for insights that can be applied when auditing their financial services clients and in their own digital auditing transformation journey.

Auditing Professional Bodies

The Institute of Internal Auditors (IIA) issued its "Updated AI Auditing Framework: The IIA" (IIA, 2023). It is a refresher of the previously issued 3-part work from 2017 on "Artificial Intelligence – Considerations for the Profession of Internal Auditing" (IIA, 2017). The updated guidance emphasises 6 key elements for auditors to cover in their assurance on AI systems, i.e., AI governance, data architecture and infrastructure, measuring performance of AI, the human factor

and the black box factor (IIA, 2023). In terms of AI ethical considerations, the professional body's guidance is that auditors should be vigilant in giving assurance on AI innovations' adherence to ethical, legal and regulatory guidelines (IIA, 2023). Although the guidance doesn't explicitly talk about auditing function on AI infused digital auditing tools, it can be inferred that the same level of vigilance should apply when audit functions are innovating their digital auditing practices.

In 2023, the Public Company Accounting Oversight Board (PCAOB) issued the "Proposed Amendments Related to Aspects of Designing and Performing Audit Procedures that Involve Technology-Assisted Analysis of Information in Electronic Form" (PCAOB, 2023) was a key milestone in finally acknowledging that its auditors are using powerful technology-based analysis (AI) tools to assess massive data sets and its professional standards needing to change to close the gap in application to digital auditing practices. The amendments are meant to support innovation in the audit process (Stein,2023; Ho, 2023). They stressed that digital auditing tools cannot replace, professional scepticism and professional judgment (Stein, 2023). Amendments have since be adopted on12th June 2024 and are effective December 2025.

South Africa's regulatory landscape significantly shapes ethical considerations in digital auditing, with POPIA robust legal frameworks aimed at protecting confidential information and upholding individuals' right to anonymity (Mbonye et al., 2022). POPIA compliance affects organisations at the people, process, and technological levels (Chimboza & Smith, 2024), thus elevating privacy from a compliance requirement to an ethical imperative by mandating lawful processing, data minimization, and robust security measures, thereby compelling auditors to safeguard sensitive financial and personal information rigorously. Sector-specific guidance from the FSCA and IRBA further reinforces these obligations, emphasising professional scepticism, governance controls, and alignment with both POPIA and emerging AI standards and guidelines. Collectively, these frameworks mandate that auditors integrate privacy, fairness, and accountability

into every stage of digital audit processes to ensure integrity in South Africa's rapidly evolving financial services environment.

Overall, the analysis indicates broad agreement on the importance of ethical decision-making in digital auditing, yet auditors' readiness remains contested. Classical models such as Rest's Four-Component Model, Kohlberg's stages of moral development, and Jones' Issue-Contingent Model provide conceptual guidance for navigating ethical dilemmas, including those introduced by AI and data-driven tools. However, their practical application in complex digital environments is acknowledged as challenging, suggesting that auditors may lack sufficient training to operationalize these frameworks effectively. In contrast, professional bodies such as the IIA and PCAOB adopt a more optimistic stance, emphasizing that adherence to updated standards and vigilance can sustain ethical integrity despite technological disruption. This divergence reflects a nuanced tension: while theoretical and regulatory frameworks affirm auditors' capacity for ethical judgment, their readiness appears conditional on continuous education, integration of ethical models, and alignment with evolving professional guidance.

The South African financial services require frameworks that blend global best practices with local regulatory mandates. Lehner's model is most contextually relevant for ethical decision-making in digital audits, while IIA standards and PCAOB principles ensure professional rigor. POPIA complements these by embedding legal compliance and societal values.

2.5.3 *Proposition 3*

This study explores the impact of digital auditing tools on auditors' ethical decision-making processes and the mitigation strategies employed.

2.6 ANALYTICAL FRAMEWORK

2.6.1 *Theoretical Framework*

Theories are the blueprint for the construction of the researcher's "house" of research, problem statement, objectives, research questions and contribution are based (Grant & Osanloo, 2014). The Theory of Reasoned Action, Theory of Planned Behaviour, Capability Approach and Lehner et al.'s (2022) Decision-Making Framework were considered.

Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB)

TRA is focused on individuals' decisions on certain behaviours are influenced by their attitudes, beliefs and social influences (Fishbein & Ajzen, 1977). It considers subjective norms wherein individuals' perceptions of what others expect of them will influence individuals' behaviours. In terms of this study's objectives, it may be useful for understanding how auditors' perceptions of digital auditing tools' benefits of audit efficiency and accuracy and client/peers' views on ethical use (i.e., client/ professional pressures) might influence their ethical decision making. It would however be limited by its inherent disregard for individuals' personal control over their actions (thus overlooking key contextual factors/complexities of the audit profession/individual auditors' capabilities).

TPB builds on TRA by adding perceived behavioural control (Ajzen, 1991). It could therefore provide a more relevant and nuanced view for auditors' influences and behaviour plus their perceived ease or difficulty of using digital auditing tools or manage ethical dilemmas. It can provide more comprehensive analysis, but it's focus on individuals' behaviour renders it inadequate for assessing broader capabilities and/or systematic challenges pertaining to adoption of 4IR technologies and their ethical considerations or challenges of advanced 4IR technologies.

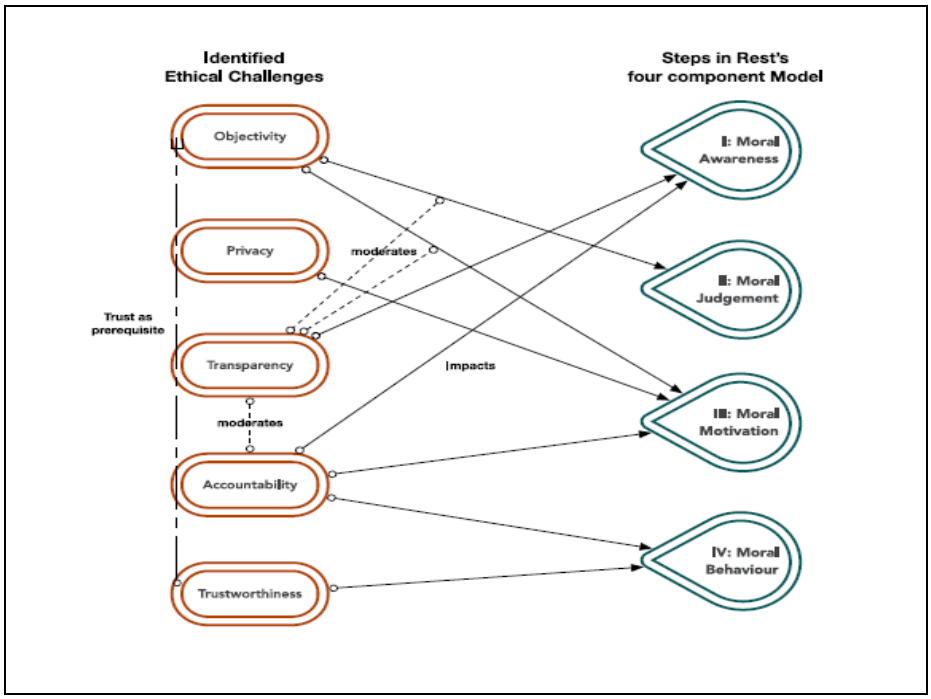
Capability Approach (CA)

The CA's emphasis is on what an individual can do and value becoming (Robeyns, 2005). It's focused on capabilities and opportunities that facilitate achievement of well-being. It could serve the study through enabling assessment of broader aspects of whether auditors are enabled to use digital auditing tools ethically through (e.g., specific technology or ethics training and guidelines) and whether the audit practice environment and culture they work in supports ethical decision-making. It's weaknesses however is that it's not adequately focused on key role of individuals' behavioural intentions like the TRA and TPB above. Furthermore, CA may overlook important nuances in culture, beliefs and social structures that affect how the digital auditing tools are used within an audit function. This study intends to provide in-depth insights into ethical decision-making using digital auditing tools.

Lehner et al. (2022) ethical decision-making framework

Lehner et al. (2022) framework was developed specifically for AI use in accounting and auditing practices. It identifies five major ethical challenges related to AI-based decision-making being
objectivity, privacy, transparency, accountability and trustworthiness (Lehner et al., 2022). It uses Rest's (1986) four-component model as a stable framework for discussing these AI (auditing technology) ethical challenges, i.e., moral sensitivity, moral judgment, moral motivation and moral character (Lehner et al., 2022). The framework emphasised that AI auditing tools alone cannot make ethical auditing decisions due to its lack of necessary preconditions. True agency and accountability are shared between the auditor and the AI (digital auditing tool).

Figure 2.1: Lehner et al. (2022) ethical decision-making framework



Source: Lehner et al. (2022)

2.7 Conceptual Framework

Following the review of ethics theories of Deontology, Consequentialism, Virtue Ethics; the classical decision-making models by Rest, Kohlberg, Jones and Lehner et al.; and due consideration of the available digital auditing tools ethical dilemmas; the researcher decided that the Lehner et al. (2022) decision-making framework best supports the objectives of this study as it specifically considers ethical challenges of digital auditing tools and ethical decision-making process.

The selection of Lehner et al.'s (2022) ethical decision-making framework is grounded in its unique alignment with the study's objectives and context. Unlike TRA and TPB, which primarily focus on individual behavioral intentions and social norms, Lehner's framework explicitly integrates the technological dimension of ethical dilemmas arising from AI and digital auditing tools. This makes it

particularly relevant for examining auditors' responses to challenges such as algorithmic bias, data privacy, and accountability in a 4IR-driven audit environment. Similarly, while the Capability Approach offers a broader perspective on enabling conditions and well-being, it lacks the granular focus on moral reasoning processes essential for understanding auditors' ethical judgments under technological pressures. Lehner et al.'s framework bridges these gaps by combining Rest's four-component model with AI-specific ethical principles—objectivity, transparency, trustworthiness, and accountability—providing a dynamic and iterative lens for analyzing auditors' lived experiences. Its emphasis on shared agency between auditors and technology further strengthens its applicability in contexts where human oversight and professional judgment remain critical despite automation. This comparative advantage underscores why Lehner et al.'s framework is superior for capturing the complexity of ethical decision-making in South Africa's digitally transforming financial services sector.

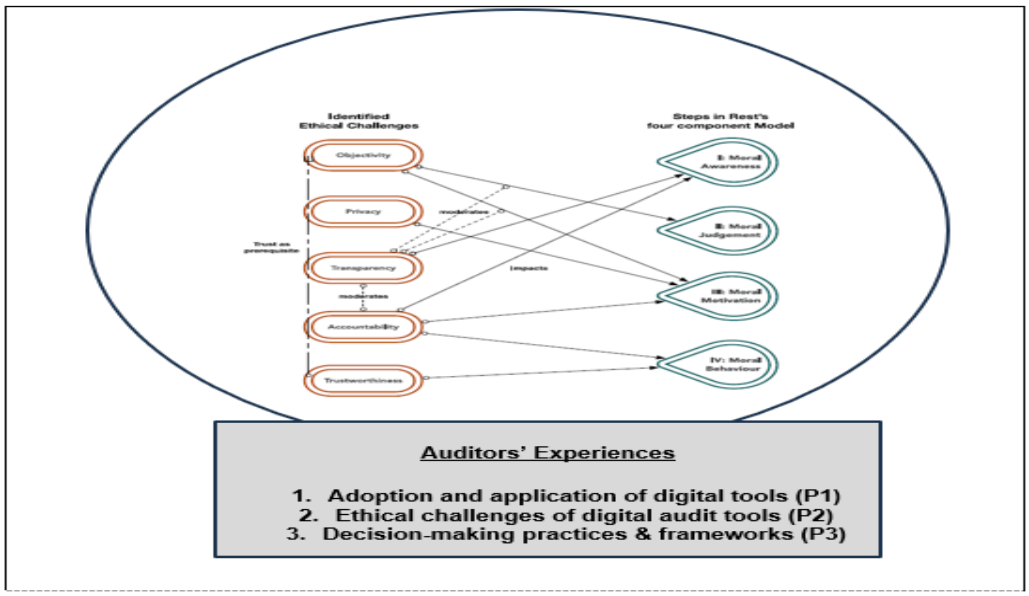
The Researcher intends to use the IPA research design outcomes, to show how the Johannesburg financial services sector auditors' lived experiences using digital auditing technology, shapes and affects their understanding of ethical challenges of the technology and their ethical decision-making responses thereto.

Building on the above theoretical justification, the conceptual framework operationalizes Lehner et al.'s (2022) model within the context of South Africa's financial services sector. By adapting its core components—moral sensitivity, judgment, motivation, and character—to auditors' lived experiences with digital auditing tools, the framework provides a practical lens for exploring how technological pressures intersect with ethical reasoning. This transition ensures continuity between theory and application: the comparative advantage of Lehner's framework in addressing AI-specific ethical challenges directly informs the design of interview questions and the interpretation of findings. Consequently, the conceptual framework serves as a bridge between abstract ethical principles

and real-world auditing practices, enabling a nuanced analysis of how auditors recognize, evaluate, and act upon ethical dilemmas in a digitally transformed environment.

Figure 2 below depicts the conceptual framework to frame and guide the interview questions and presentation of research findings. Auditors' Experiences Influencing Lehner et al. (2022) Ethical Decision-Making Framework

Figure 2.2: Conceptual Framework



Source: Mamabolo, 2024 (Adaptation of Lehner et al.'s 2022)

The Framework can demonstrate the dynamic and iterative nature of ethical decision-making. The experiences of the auditors digital tools enhance their ability to recognize ethical issues such as potential biases in AI outputs or risks to data privacy; judgement the ethical dimensions of their choices, weighing factors like fairness, transparency and potential conflicts of interest; commitment to ethical principles and their determination to act ethically, particularly in the face

of technological pressures and organisational expectations; and application of ethical decisions in real-world scenarios, ensuring that their actions align with ethical standards and professional guidelines.

2.8 Conclusion of Literature Review

This chapter explored the applications of 4IR technology-enabled audit tools, the ethical challenges they present, and their impact on auditors' ethical decision-making processes. A conceptual framework was developed using Lehner et al.'s (2022) ethical decision-making framework.

The adoption of 4IR technologies like RPA, AI, and blockchain is transforming auditing by enhancing efficiency, accuracy, and transparency. These tools automate repetitive tasks, enable real-time data analysis, and improve fraud detection and risk assessment. However, challenges such as financial barriers, technical competencies, and the need for proactive training persist, particularly in regions like South Africa and Jordan. Despite these hurdles, the potential for a more secure and effective auditing future is significant.

The adoption of RPA and AI in auditing offers significant benefits but also presents ethical challenges. Key concerns include data privacy and security, transparency and explainability, bias and fairness, trustworthiness, and accountability. Ensuring ethical use requires rigorous testing, clear documentation, and proactive training. Additionally, establishing accountability frameworks and reskilling the audit workforce are essential to mitigate risks and maintain the integrity of the auditing profession.

The literature review highlights the impact of digital auditing tools on auditors' ethical decision-making processes. Classical ethical decision-making models by Rest, Kohlberg, and Jones provide frameworks for addressing ethical dilemmas in the digital age. Professional bodies like the IIA and PCAOB have issued updated frameworks and guidance to address ethical challenges posed by AI and RPA in auditing. These frameworks emphasize the importance of governance,

transparency, and adherence to ethical standards. Training and combining these models can better equip auditors to navigate the complex ethical landscape of digital auditing tools. Lehner et al.'s framework, which addresses ethical challenges like objectivity, privacy, transparency, accountability, and trustworthiness, is deemed most suitable for this study. The conceptual framework, adapted from Lehner et al., will guide the research by examining how auditors' experiences with digital tools influence their ethical decision-making processes.

2.8.1 *Proposition 1*

This study explores the adoption, applications and perceived benefits of RPA and AI digital auditing tools in financial services sector.

2.8.2 *Proposition 2*

This study explores auditors' perceptions on the ethical implications of using RPA and AI for auditing in terms of risks to objectivity, data privacy, lack of transparency, trustworthiness and accountability.

2.8.3 *Proposition 3*

This study explores the impact of digital auditing tools on auditors' ethical decision-making processes and the mitigation strategies employed.

2.9 Summary of the Chapter

In this chapter, the three dimensions (use of 4IR technology enabled audit tools, the perceived ethical challenges posed by the technologies used and their impact on auditors' ethical decision-making processes) were explored before the conceptual framework was discussed. The chapter synthesises prior research and perspectives from various researchers on the topic, providing a summary of each author's main arguments and discussing the importance of the findings in the context of the reviewed literature. Further, conceptual framework focuses on overlaying the IPA research design outcomes, to show how the auditors' lived

experiences using digital auditing technology, shapes and affects their understanding of ethical challenges of the technology and their ethical decision-making responses thereto.

The next chapter outlines the research methodology.

CHAPTER 3. RESEARCH METHODOLOGY

This chapter presents the research methodology of this study. It identifies and explains the research paradigm and the approach selected. The research design, data collection methods, research population and sampling techniques are detailed in this chapter. The chapter also includes the research instrument, ethical considerations, study limitations, reliability and validity and the statistical techniques to be used to analyse data.

For this phenomenological study, the research methodology chosen falls within the Interpretivism paradigm, emphasizing subjective understanding and qualitative exploration (Guba & Lincoln,1994). The participants' experiences were examined with a clear focus of investigating their influence on the use of digital auditing technologies and impact of ethical decision making.

3.1 Research Paradigm

A paradigm is a set of beliefs(philosophies) that guide a researcher’s approach to what is a research problem, how to collect data and considerations of what is real knowledge (Kivunja & Kuyini, 2017). Guba and Lincoln (1994) further posited a paradigm as a basic set of beliefs or worldviews guiding a research investigation and defined its four composite elements: epistemology, ontology, methodology and axiology).

In this research’s qualitative interpretive paradigm, reality is socially constructed, with knowledge coming from the perspectives of the participants. Reality is relative and is shaped by the social context (ontology), while knowledge is built on the researcher’s interactions and their interpretation of the experiences (epistemology), and researchers acknowledge their personal biases and values influence on the research (axiology).

For this study, the Researcher's audit familiarity with auditing practices, personal viewpoints, values and goals plays a significant part in constructing the social

reality enabling extraction of new knowledge on the perspectives of the ethical implications of digital auditing tools.

Adoption of the interpretivism paradigm enables the researcher to make meaning of the constructed reality as guided by the selected Lehner et al.'s (2022) framework for ethical decision making. The researcher thus employs a deductive reasoning approach guided by the framework to explore matter of ethical implications of digital auditing tools on auditors' decision making.

3.2 Research approach

A qualitative research methodology located in the Interpretivism paradigm is selected for this phenomenological study. Following semi-structured interviews for data collection, the researcher explored meanings and insights through engagement with identified subjects (Haradhan, 2018). In-depth interviews enabled the researcher to capture a wide range of rich contextual data digital auditing tools in financial services. This qualitative data oftentimes embodies fundamental depth with great potential for revealing insights (Leech & Onwuegbuzie, 2007). Furthermore, engagement of multiple participants aids deeper understanding of the investigated experience (Polkinghorne, 2005). The qualitative research strategy selected enabled the researcher to conduct the research in a systematic manner through a detailed plan of action aimed at producing high-quality results.

3.3 Research design

The overall design of the study is Interpretive Phenomenological Analysis (IPA), acknowledging the researcher's role in interpreting the participants experiences. The researcher in this study explores auditors' perspectives on their ethical responsibilities in the digital age (in their context of sense of their context financial services audits in Johannesburg). The researcher further integrates the IPA

analysis outcomes with Lehner et al.'s framework for decision making to illuminate (or challenge) the composite elements.

Unlike quantitative approaches that seek to generalise results, phenomenology goes beyond superficial descriptions, acknowledges individual participants perspectives based on the lived experiences; hence sample sizes are significantly smaller to focus on in-depth data collection via interviews and thematic analysis for rich insights and understanding (Wagstaff et al., 2014, Alase, 2017). Lehner et al.'s (2022) framework for decision making then provides a structured process for further analysing the ethical challenges identified.

The IPA research design's integration with the ethical decision-making framework can be advantageous to this study through potentially identifying unconsidered aspects of the phenomenon and/or challenging pre-existing assumptions regarding ethical implications of digital auditing tools in financial services. Moreover, it may better highlight how individuals tackle ethical challenges based on their unique experiences.

3.4 Data collection methods

Primary data was collected using semi-structured interviews held in-person and/or virtually, with the purpose of evidencing participants' accounts of their experiences (Polkinghorne, 2005). The personal interviews enabled the researcher to engage the participants and probe deeper (or adapt the questions) when additional information was required (Alshenqeeti, 2014), especially regarding ethical-decision processes, enabling further analysis against the Lehner et al.'s framework. The researcher proactively sent the participants the interview questions ahead of the interview to allow them time to think about the responses.

Furthermore, IPA is flexible and allowed the researcher to adapt approach based on insights gained during data collection and it also allowed check and challenge of findings through (i.e., member checking).

These data collection approach enabled gathering of the right amount and depth data needed on audit professionals' perspectives on ethical implication of digital auditing tools in financial services environments.

3.5 Population and sample

3.5.1 *Population*

The population of the study are internal audit professionals working in financial services in Johannesburg. The auditing disciplines working in financial services include internal auditors, charted accountants, information technology auditors, compliance auditors, forensic auditors, etc. They all have common objective of being independent assurance providers and all use types of digital auditing tools.

3.5.2 *Sample and sampling method*

The participants for this study were selected purposively based on their seniority (i.e., Audit Manager, Senior Audit Manager, Head of Audit, Associate Director, and Executive levels) and their ability to offer rich insights pertaining to adoption and applications of digital auditing tools in financial services.

The sample size of the study was capped at 8 auditors working across different financial services institutions (as either an employee or a co-source). The spread of the sample gave sufficient diverse views and opinions on the research topic. One participant was targeted from leading financial institutions in banking, wealth and audit firm sectors. The research, considering data saturation (which was achieved when no new themes were emerging after the 8th interview), ensured the sample size was small enough for detailed analysis but large enough to apply the findings to other auditors facing similar situations.

3.6 The research instrument

The research instrument used for this study is semi-structured virtual interviews, to accommodate personal preferences and schedules. The interview guide has been provided in Appendix A. It comprises of open-ended, exploratory type questions, which are aligned with the research objectives, to facilitate probing and engaging interviews for participants to share their lived experiences for gaining of rich insights on the specific research topic. To ensure relevance and clarity, the interview guide was informally reviewed with internal peers.

3.7 Procedure for data collection

The researcher leveraged existing work, industry and personal networks to recruit participants for the study. The researcher explained the purpose of the study, benefits and participation requirements to solicit participants informed consent. The meetings were scheduled in participants diaries, per their confirmed availability, for virtual interviews of 60 minutes long each.

The process encompassed the following:

Sent the interview guide to participant(s) well in advance to enable them to prepare through thinking deeply about the questions and the interview/study objective.

i. Requested participant(s) to sign consent form prior/at commencement of the in-person and/or virtual meeting.

ii. Recorded and transcribed the meeting using MS Teams meeting application (at participant's consent) and wrote notes in a notebook to capture salient points, non-verbal cues and contextual factors from the interview discussion

iii. Continued with the data collection up to saturation point/discontinued further interviews at point where no new insights were likely to emerge from further interviews

iv. Stored all data securely.

v. Prepared and organised the validated data for analysis.

3.8 Data analysis strategies and interpretation

For this study, the data analysis was qualitative, following the Braun and Clarke (2006) thematic analysis principles depicted in Figure 3 below. Braun and Clarke (2006) have guided a process of analysis and theming of data, emphasising that the phases are non-linear and iterative through to completion.

Figure 3.1: Phases of developing thematic analysis

Phase	Description of the process
1. Familiarizing yourself with your data:	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes:	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
6. Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Source: Braun & Clarke, 2006

Following the above Braun and Clarke (2006) methodology, the researcher carefully listened to the interview recordings and review meeting notes and applicable artefacts. All the data was transcribed verbatim onto MS Word. The Researcher then spent time reading and reflecting on the interview data multiple times, synthesising the salient meanings. The data was explored, extracted and organised systematically per identified emerging themes and sub-themes of participants perceptions of the phenomenon. Initial coding was assigned. The themes and coding were refined reiteratively, considering how they relate to each other (axial coding) and their relative significance in capturing the core perceptions (selective coding).

Participants were actively involved in validating the accuracy and credibility of the findings. After initial themes were developed, participants were engaged on MS

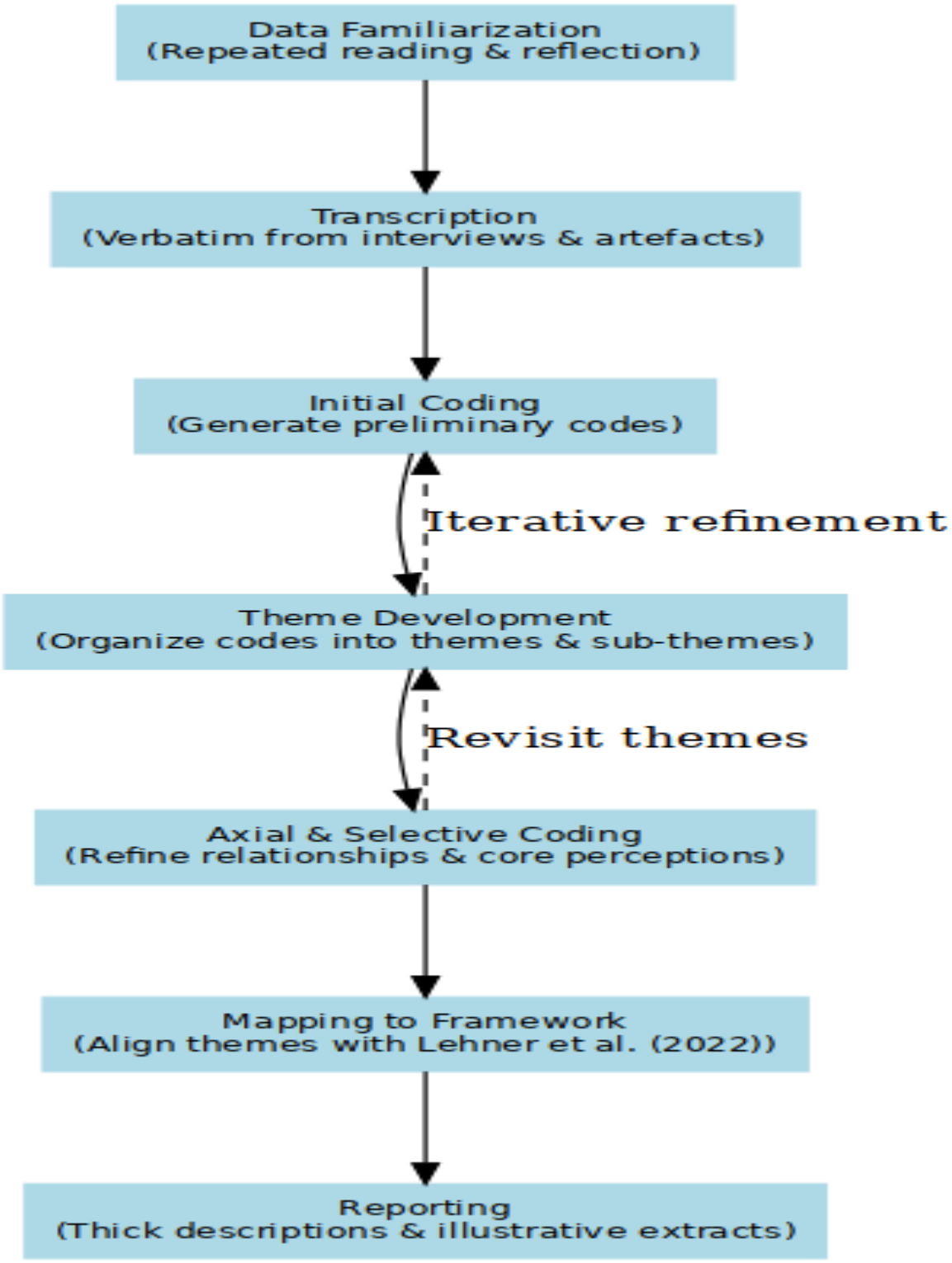
Teams call to confirm whether the themes accurately reflected their experiences and to provide feedback or clarifications. This iterative feedback loop ensured that the final analysis remained grounded in participants' perspectives. Furthermore, informal validation with internal peers was performed for further refinement.

The researcher then proceeded to map the validated core themes to the elements of Lehner et al.'s (2022) framework for ethical decision-making for interpretation of findings and to make conclusions regarding the study's objectives. Finally, in Chapter 4 of the dissertation, the researcher then discusses and reports relevant data extracts and analysis in thick descriptions to give deep and nuanced meanings of participants experiences supported by key contextual factors.

The above is reflective of IPA research design aim of delving deep into themes to thoroughly interpret their meanings and synthesise implications thereof.

Data Saturation was determined when no new codes or themes emerged during successive interviews and document reviews (around the 8th interview). Indicators included redundancy in responses, stability of themes across participants, and confirmation during peer debriefing that additional data would not alter the thematic structure. These signals indicated that the dataset was sufficiently rich to address the research objectives.

Figure 3.2: Illustration of researcher's thematic analysis process


Data Familiarization
(Repeated reading & reflection)
Transcription
(Verbatim from interviews & artefacts)
Initial Coding
(Generate preliminary codes)
Iterative refinement
Theme Development
(Organize codes into themes & sub-themes)
Revisit themes
Axial & Selective Coding
(Refine relationships & core perceptions)
Mapping to Framework
(Align themes with Lehner et al. (2022))
Reporting
(Thick descriptions & illustrative extracts)

3.9 Possible limitations and challenges of the study

This study is limited by the qualitative method's limited sample size and the researcher's potential bias in data interpretation. The lack of quantitative data from extended base of participants limits the generalisation of this study.

3.10 Quality Assurance

3.10.1 *Transferability*

To ensure transferability, the researcher gives rich descriptions of participants' profiles (Tracy, 2010), years of experience and where they work to enable readers to assess any shared similarities/differences to themselves. Thick descriptions (Tracy, 2010) of participants nuanced perspectives also help readers to relate to the study to their own experience. Further detailing of contextual factors such as auditors' gender and roles assist readers in consideration of applicability of the study's findings in different contexts.

3.10.2 *Credibility*

Study employed purposive sampling of participants that are subject matter experts, across different organisations, to derive diverse perspectives that add credibility to the findings. The researchers use of the semi-structured interview guide combined with probing follow up questioning provided in-depth insights and nuances. Furthermore, triangulation techniques such as validation of interview scripts against literature sources; and thick descriptions enable readers to assess the rigor and validity of the research study.

3.10.3 *Dependability*

Through journaling, retention of detailed records of the study's interview transcripts, data analysis, and decision logs ensure transparency and auditability

of interpretations made. The transparency in the researcher's acknowledgement of own biases that may influence the study's data collection and analysis also adds to the study's dependability and enables possible replication of the study in other contexts in future.

To further manage the researcher's, several strategies were implemented encompassing consultations with academic supervisor to challenge emerging themes and ensure diverse perspectives were considered; independent peer review assessed coding decisions and thematic structures to validate consistency and minimise subjectivity; and themes were revisited multiple times to confirm alignment with participants' narratives rather than preconceived notions. These measures were designed to enhance transparency and trustworthiness, ensuring that findings authentically represent participants' experiences rather than being shaped by the researcher's predispositions.

3.11 Ethical considerations

The researcher conformed with the ethics compliance procedure determined by the University of Witwatersrand, resume research upon clearance by the ethics committee and balance the quest for academic knowledge with the rights and interest of the participants of the study.

i. The research purpose was explained to all participants before obtaining their signed the consent form.

ii. Where applicable, research permission letters prescribed by the university was completed.

iii. The participants' anonymity was protected by the researcher using suitable coding.

iv. The Identified participants were allowed to withdraw from participating in the if they so wish.

v. The names of the audit firms and financial institutions the auditors work for are omitted from the final research paper using suitable coding designed.

vi. The researcher signed the plagiarism declaration form and submitted the paper on Turnitin to validate they have not plagiarised others work.

3.12 Summary of the Chapter

This chapter presented the research plan, encompassing the approach, design, and data collection methods, along with the analysis process. Given the exploratory nature of the study, which aims to examine the ethical implications of digital auditing tools in financial services, a qualitative approach was adopted. The chapter also elaborates on the researcher's methodology to ensure the results are transferable, credible, and reliable, and discusses the ethical considerations taken to protect the participants.

The next chapter presents the research findings as guided by the research methodology.

CHAPTER 4. PRESENTATION OF FINDINGS

4.1 Introduction

This chapter presents the phenomenological analysis of data collected from interviews with auditors working in financial services in Johannesburg. The analysis adopts an interpretivist paradigm, enabling the researcher to make meaning of the socially constructed reality, guided by Lehner et al.'s (2022) framework for ethical decision-making. Using a deductive reasoning approach anchored in this framework, the study explores the ethical implications of digital auditing tools on auditors' decision-making processes. The chapter focuses on the interpretative - descriptive analysis using Braun and Clarke's (2006) thematic analysis (TA) approach, key themes addressing the research prepositions were identified, see tables 1,2 and 3 below. The analysis focused on understanding auditors' adoption and applications of 4IR technologies, ethical challenges posed by these tools and their impact on ethical decision-making processes.

Adhering to Braun and Clarke's (2006) six-phase framework for thematic analysis, the researcher engaged in a rigorous and iterative process to ensure depth and credibility of interpretation. Initially, all interview recordings, review meeting notes, and relevant artefacts were transcribed verbatim into MS Word to preserve the authenticity of participants' narratives. The researcher then immersed in the data through repeated readings and reflective engagement, allowing for a holistic understanding and identification of salient meanings. This phase involved systematic exploration and extraction of significant insights, which were organized according to emergent themes and sub-themes reflecting participants' perceptions of the phenomenon under study. Preliminary codes were generated and subsequently refined through iterative cycles, incorporating axial coding to examine interrelationships among themes and selective coding to prioritize those most representative of core perceptions. To strengthen interpretive validity, the finalised themes were mapped against Lehner et al.'s

(2022) ethical decision-making framework, providing a structured lens for analysing findings and drawing conclusions aligned with the study's objectives. Finally, this chapter presents these themes through thick, contextually grounded descriptions, supported by illustrative data extracts, to convey nuanced interpretations of participants' lived experiences and the contextual factors shaping them.

Furthermore, insights will be drawn from this analysis to inform recommended strategies for implementation of ethical digital auditing.

To maintain confidentiality and uphold ethical standards, all participant identifiers were anonymised. Pseudonyms were assigned to each participant and used consistently throughout the presentation of data extracts. No real names or personally identifiable information (including employer firm names) appear in the report. This approach aligns with ethical research practices and ensures participant privacy while preserving the integrity and authenticity of their narratives.

4.2 Findings pertaining to exploration of adoption, applications and perceived benefits of digital auditing tools in financial services

The first research preposition aims to understand how and to what extent advanced digital auditing technologies are being integrated into various financial institutions, as well as the benefits they provide, across various financial institutions, based on the insights from the sampled auditors. The analysis of themes and subthemes derived from the participant's perceptions revealed that auditors are adopting various RPA, workflow automation, GenAI, advanced data analytics, visualization, integration & machine learning tools in their audit execution. There is noted audit value created through tangible benefits realised encompassing efficiency gains/ time savings, better insights, improved quality, improved risk assessment, real-time reporting, resource optimisation, audit

credibility, stakeholder satisfaction. Table 1 below presents the themes and related codes for this research preposition.

Table 4.1: Adoption, applications and perceived benefits of digital auditing tools in financial services

Theme	Description	Example Key Quote	Related Codes
Data-Powered Audit Transformation	Technology is enabler of fundamental shift from traditional sampling audit practices to data-intensive methodologies for comprehensive testing, continuous monitoring and enhanced risk assessment.	*"I think the biggest game changer is transforming audit to stop the sample base approach... technology is a game changer to auditing, enabling us to test full population data sets from multiple sources and give better assurance."* (Sandile) *"The biggest advantage which I've seen is that you can test more, as in 100% of population. So, for example, there's a bot for testing access management, you just run the access data through the bot, and your testing is done efficiently, then you just validate the exceptions."* (Hannah)	• Python • SAS • Microsoft SQL • Power BI • Power Automate • Copilot • Azure • Denodo • Blue Prism • Full population testing • RPA • Advanced Analytics • Artificial Intelligence • Machine Learning • Continuous monitoring • Real-time insights • Predictive analytics • Leveraging of "wider organisational systems"

Audit Value Creation with Technological Integration	Tangible benefits realised through incorporating advanced technologies, encompassing efficiency gains, enhanced quality and more timely and in-depth insights.	*"You can shift the focus away from the mundane repetitive tasks and focus the efforts on high value like stuff like the risk analysis and things that actually require judgement and expertise and actually you more insight to the client."* (Jason)	• Efficiency gains • Time savings • Better insights • Improved quality • Improved risk assessment • Real-time reporting • Resource optimisation • Audit credibility • Stakeholder satisfaction

Theme 1: Data-Powered digital transformation of audit methodologies

The study uncovered a widespread integration of 4IR technologies in financial services audits. Specifically, some of the key technologies encompassing the digital auditing toolkit are depicted below in figure 4.

Figure .1: Combined stack of technologies adopted and use cases

Robotic Process Automation (RPA) and Workflow Automation	**Generative AI**	**Advanced Data Analytics, Visualization, Integration & Machine Learning**

 		     
Use cases: extracting data, automating workflows, and ensuring timely notifications and updates.	**Use cases:** coding, data analysis, and generating insights.	**Use cases:** scripting, cleaning data, developing algorithmic models, analysing large datasets, visualising data and creating comprehensive reports.

The analysis revealed that financial services auditors are implementing the above range of 4IR technologies, moving from traditional sampling approaches to more comprehensive methodologies. The main technologies include:

i. **Robotic process automation (RPA)**: Primarily used to automate repetitive, rule-based tasks such as access management testing, reporting, functional KPIs monitoring and regulatory compliance monitoring.

"*For things like RPA, we've used it for planning and administrative purposes... we've implemented a robot takes our internal audit reports and populates new audit issues raised onto the system*." (Lerato)

"We put together some RPA automation in our internal work to automate repetitive tasks, like our recons and Work in Progress (WIP) from a project management perspective." (Jason)

"So, in every audit for vehicle and asset management finance, we used a bot for auditing the fees, interest rates, and in-duplum." (Hannah)

ii. **Advanced analytics**: Python, SAS, SQL and Power BI are being deployed for data extraction, transformation and visualisation to enable full population testing and continuous monitoring.

"*In a prior organisation, they'd spent about 12 years building up a data warehouse... we had transactional data for the last 12 years and by utilising that data, there was various anomalies that one could then test for*." (Nivhetha)

"We've even helped a bank with a continuous monitoring project, developing more advanced analytics models to do trend analysis to benchmarking and to enable real time monitoring of key risk indicators. In terms of the platform used to do that, we used Python." (Janson)

"For AML Compliance Continuous Auditing, they gave me the rule data files, and they wanted me to basically, redo the calculations on those files in my own way, and to compare it with the client results based on the client method and software they are using. So basically, that audit was to check/compare if the end values the same." (Nicole)

iii. **Machine learning and AI**: Still in early proof-of-concept stages for most auditors' functions with applications focused on pattern recognition, predictive analytics and anomaly detection.

"We've also used optical character recognition (OCR), that's like web scraping of web documents and taking unstructured data and making it structured. That incorporated an element of machine learning because obviously you must train up the model to do it more accurately." (Jason)

"*With machine learning, it is algorithmic models that we build for applicable audit types, example an insurance claims audit. We come up with predictive models and forecasts, dependent on the history of information that we have*." (Lerato)

"What I'm finding as a benefit of using data and all these tools that we have, is the ability to question multiple scenarios as we become more familiar with the data and develop a deeper understanding, including what are the limitations of the data? And then we start testing other things. That is something you could never achieve with traditional auditing approach of sample testing." (Sandile)

iv. **Leveraging of "wider organisational systems":** Auditors' functions are strategically aligning tech adoption strategy with business is helping to accelerate digital auditing

"The bank had already made significant investment on technology, so when I joined, I told my team, all these bots are there, so we just need to use them." (Hannah)

"*We also have full access to the bank's stack in terms of technologies that are available*." (Sandile)

v. **Varying levels of digital maturity:** maturity of technology adoption varied significantly among organisations/ auditors. Financial services institutions

appear to be leading other sectors but even within this industry, there are substantial differences:

"*I think South Africa, compared to other countries, we are quite a bit more advanced in the adoption of technology, utilising and leveraging it."* (SB)

"*In terms of AI and robotics and all of that I'd say again, this is now the infancy stages. This is where data analytics was seven years ago*." (Akilah)

" We are building a proof of concept with a risk consultancy company to address pain points in our audit process. The goal is to create reusable automations and challenge machine learning models to adapt to changes in production. This will help us quantify the impact of audit findings more accurately." (Hannah)

Theme 2: Value creation through technological integration

Participants identified several ways 4IR technologies create value in audit processes:

i. **Efficiency and resource optimisation**: Technologies enable faster completion of routine tasks, allowing reallocation of resources to higher-value activities.

"*It saves you a lot of time, reducing our audit time, our timelines for execution by taking things that would take someone if they were to do it manually hours, you do it in the space of minutes*." (Jason)

ii. **Enhanced scope and coverage**: Moving from sample-based to full population testing increases assurance quality.

"*The biggest advantage which I've seen is that you can test more, as in 100% of population*." (Hannah)

iii. **More timely and impactful insights**: Real-time or near-real-time monitoring enables quicker identification of issues.

"*For me, there's a couple of other things by doing this level of work, you're able to give relevant information quicker. You're not waiting for three months, four months, maybe even longer to clear an issue."* (Akilah)

iv. **Enhanced credibility**: Data-driven insights improve the quality and defensibility of audit findings.

"*When you do that depth of work management cannot argue... we raised 11 very significant issues, and we clear the audit report within a week*." (Nivhetha)

4.3 Findings pertaining to Ethical Challenges of Digital Auditing Tools

Next, the study addressed research preposition 2 focusing on auditors' perceptions of the ethical implications, including risks to objectivity, data privacy, lack of transparency, trustworthiness, and accountability. Understanding these perceptions is crucial for addressing potential ethical challenges and ensuring that the use of digital tools aligns with professional standards and ethical guidelines. Further, effective data governance emerged as the foundation for ethical digital auditing underscoring need for robust protocols for data quality issues, data governance frameworks, data privacy and confidentiality, data security, transparency and traceability, POPIA/ GDPR compliance, data masking/ anonymisation, access controls, data minimisation and encryption. Table 2 below presents the themes and related codes for this research preposition.

Table 4.2: Ethical Challenges of Digital Auditing Tools

Theme	Description	Example Key Quote	Related Codes
Navigating Ethical Complexities in Automated Audit Processes	Challenges in ensuring fairness, transparency and appropriate human oversight when implementing automated tools and algorithms.	*"There is a misconception that AI is coming to take everyone's job, but it's not the case. AI helps the audit process, but you will still need someone to validate whatever AI has given you as a result. Audit duration will be shortened but you will still need your expertise that human touch to unpack the results, so client understand it."* (Lerato)	• Bias • Privacy and security • Transparency • Over-reliance on technology • Professional judgment • Model validity • Lack of human oversight • Validation of results

Data Governance as a Foundation for Ethical Digital Auditing	The establishment of robust frameworks and practices for managing data quality, privacy, security and compliance in digital audit environments.	*"Our approach is encrypting data when we store it on the Cloud. We need to make sure it's POPIA and GDPR compliant, i.e., make sure the data is saved on local servers, and we do not have South African data is sitting in another country that we're unaware of."* (Jason) *"Framework further guides about when I now start working with that information, what do I do to sensitive information (i.e., decrypt or de-identify the information); how do I present information for exception flags; how to preserve and reindex my data..."* (Lerato)	• Data quality issues • Data governance frameworks • Data privacy and confidentiality • Data security • Transparency and traceability • POPIA/GDPR compliance • Data masking/ anonymisation • Access controls • Data minimisation • Encryption

Theme 3: Navigating ethical complexities in automated audit processes

Participants identified several ethical complexities specific to automated audit processes:

i. **Bias and Fairness**: Concerns about biased algorithms and ensuring fair treatment across business units.

"*Us deciding from the onset that we are going to be doing maximum assurance and full population testing instead of sampling mitigates risk of biases, because in sampling there can be bias to select specific portion of the data*." (Sandile)

"Whatever *solution you have, whatever script you have, you cannot apply it unilaterally across any environment. You need to understand the specifics of that situation and also the risk appetite*." (Nivhetha)

"*To train these models you need a varied base set of data. However, the reported cases are composed of base sets of data that they use only white people for facial recognition and then can't pick up people of colour... it doesn't pick up that accurately as there are biases in the AI model training data set.*" (Jason)

ii. **Privacy**: Concerns about data security and protection of sensitive and personally identifiable information.

"*The data I had was very confidential. So, you must just ensure that your things are secure. You can't just go use that information and run a query in ChatGPT or Copilot. It's sensitive, I mean you can 100% identify a person based on that information*" (Nicole)

"*The bank has all the necessary stops as well. If I were to do prohibited activity, there's a team that monitors the work that we are doing as data scientists. So, it's not like we just have full access to that data, I cannot just do whatever I want as I am being monitored."* (Sandile)

" *From a POPIA perspective, one of the key aspects is limiting the collection and the processing of data to what is necessary*." (Jason)

iii. **Transparency and Explainability**: The challenge of understanding and explaining how automated tools arrive at conclusions.

"*If I use an automation tool, I need to be transparent with my client to say this is what I'm going to do, and this is the tool that I'm going to use, and this is the rationale of what I'm trying to do. So that they are comfortable when they give us access to that information*." (Nicole)

"*As part of the auditing process, make sure that you document what you've done in detail, to enable reperformance and so that the next person can fully understand what you've done. Be clear on where you got the data from, the limitations you've considered, and how you've tested it. Lastly, confirm the results with the auditee*." (Jan)

iv. **Accountability**

- *Risk of over-reliance on technology:* The danger of accepting automated outputs without appropriate scrutiny.

"*Over reliance in the sense that people are going to stop thinking for themselves and just going to rely on the outputs... the more prevalent stuff like that's going to become the less critical thinking people are going to do."* (Jason)

"*I think the biggest issue is results bias, where you take the output from your analytics at face value, assuming that because it is the result, it must be true*." (Jan)

- *Human oversight:* The continued importance of human judgment in validating and interpreting automated results.

"*AI helps the audit process, but you will still need someone to validate whatever AI has given you as a result. Audit duration will be shortened but you will still need your expertise that human touch to unpack the results, so client understand it."* (Lerato)

"*It's very easy to fall into the trap of saying, OK, we run it, the machine knows better, it's going to be accurate, so let's just take the output as fact, which is not the case. The more prevalent these AI models become, the more there is a need for human oversight."* (Jason)

- *Responsibility and monitoring:* The accountability for continuous monitoring of tools and validation of results

"*As a digital assurance team, our accountability includes building, running, scheduling, and visualizing results. We ensure the team and business are updated and responsible for understanding and validating the insights shared*." (Sandile)

"There have been instances where during the year, the codes are running, and we see spikes in trends. Auditors may not pay attention to these, so we go back to the details and say, hey, we are seeing this trend, have you engaged with the business to understand what is going on?" (Sandile)

v. **Trustworthiness:** The accuracy and reliability of tools outcomes play a crucial role in the adoption and execution of AI decisions in auditing

- *Transparency*

"*It's about that transparency being open and following the due process from a governance perspective*." (Nivetha)

- *Accuracy and Data Integrity*

"*The accuracy and the trustworthiness of the data, in terms of where the data comes from, how complete is it, what limitations do you need to factor into the results*." (Jan)

"*You also must be very conscious of the fact that the tools could just be wrong. When you look up certain information, it could really be a misrepresentation which in return can be a big ethical issue at the whole end*." (Nicole)

- *Governance and Compliance*

"Being open and following the due process from a governance perspective, following the process that you audit everybody else against and displaying and demonstrating that you will go through that same process." (Nivhetha)

- *Quality Assurance*

"*And then again within our world, same as we do for our clients, we perform regular audits of our tools and models to ensure that they are doing what they should*." (Jason)

- *Stakeholder Engagement*

"Regularly having discussions with the key stakeholders involved from beginning of the project development life cycle all the way through to the end." (Jason)

Theme 4: Data governance as a foundation for ethical digital auditing

Participants highlighted data governance as the fundamental requirement for ethical digital auditing practices:

i. **Data governance frameworks**: Developing policies and structures to secure and manage audit data.

"*Our internal audit is starting a data management working group so all of those disciplines under data management, quality, retention, etc. we will be running that ourselves."* (Hannah).

"*We will also be forming a data council or a data governance working group who will assessing how GIA is making use of the data mart, are all these user groups I've defined, and are that the right people are accessing the right files*." (Sandile)

"*I had to come up with a with a data governance framework including data management principles and explain there what this is what I'm going to do from an audit perspective. Obviously, there's data governance for the group and I also need to align to those*." (Lerato)

ii. **Data privacy and security**: Managing sensitive information in compliance with regulations (POPIA/GDPR) was a primary concern.

"*We de-identify data and when our Quality Assurance team select a file, they check whether there any customer information which was left on file and if applicable, they raise a critical finding against responsible audit team*." (Hannah)

"Privacy is always a big thing in my mind. Protecting the personal information of data subjects is important. Information is appropriately secured and used in line with GDPR regulations."

iii. **Access controls**: Ensuring appropriate, time-limited access to sensitive data.

"*The first thing is to use secure and access-controlled environments so limiting the ability to access data to specific individuals who have the mandate to do so*." (Jason)

iv. **Data minimisation and targeted extraction**: Collecting only necessary data rather than full data dumps.

"*I think it's only lazy auditors who say give me a download of your database... one needs to sit with that architect or database administrator and say I'm doing this audit, let's see what fields are here and based on the test procedures and your objective, therefore you need to say this is the only data I need*." (Nivheta)

v. **Data Masking and Encryption:**

"*If you have to put confidential personal information, we also mask it out*." (Akilah)

"*When you process the data, it needs to be encrypted. When you transmit the data between systems or environments, it needs to be encrypted*." (Jason)

4.4 Findings pertaining to the impact of digital auditing tools on ethical decision-making processes and mitigation strategies employed

The third research preposition examines the impact of these tools on ethical decision-making and the strategies auditors employ to mitigate any negative effects. By analysing participant narratives, this study elucidated that decision-making framework for auditors evolving, necessitating Integration of traditional ethics with digital considerations of data ethics, human oversight and validation, documenting for transparency and accountability, transparency and accountability. Further, there is need for increased scepticism, continuous learning and adaptation, increase in regulations, professional courage and escalation, responsibility and accountability processes. The study also identifies enablers and barriers to ethical technology adoption encompassing digital maturity, skills gap, professional body guidance, governance structures, data quality and accessibility, technical and resource challenges and change management. These are assessed with the aim of deriving strategies/best practices and guidelines for using digital tools in a way that supports ethical auditing practices. The strategies can offer a comprehensive framework for financial services auditors' implementation of ethical digital auditing. Table 3 below presents the themes and related codes for this research preposition.

Table 4.3: Impact of digital auditing tools on ethical decision-making processes and mitigation strategies employed

Theme	Description	Example Key Quote	Related Codes
Evolving Frameworks for	The adaptation of traditional ethical principles and development of new	*"I think the game changer, is transforming audit to stop the sample base approach... from*	• Integration of traditional ethics with digital considerations

Ethical Decision-Making	approaches to guide responsible technology use in audit practices.	*an ethical perspective we'll be confident to say when we looked at the business, there's no stone that was left unturned."* (Sandile)	• Data ethics • Human oversight and validation • Documenting for transparency and accountability • transparency and accountability • Increased scepticism • Continuous learning and adaptation • Increase in regulations • Professional courage • Escalation, responsibility and accountability processes
Organisational Enablers and Barriers to Ethical Technology Adoption	Organisational factors influencing effective and ethical implementation of digital audit tools, including maturity levels, skills development and governance structures.	*"I think sometimes a lot of companies are so eager to adopt that they inadvertently put the cart before the horse by not putting measures in place to ensure success in terms of the strategy, policies and governance. They do it and then it fails, and then they wonder why."* (Jason)	• Digital maturity • Skills gap • Professional body guidance • Governance structures • Data Quality and Accessibility • Technical and Resource Challenges • Change management

Theme 5: Evolving frameworks for ethical decision-making

The analysis indicates that auditors are adapting their ethical decision-making approaches to accommodate digital audit tools:

i. **Integration of traditional ethics with digital considerations**: Participants applied established ethical principles to new technological contexts (**emphasising data ethics**).

"*I think for me, as auditors, we've always had, for me, that's not new. We've always had those and so the principles and the codes that guide us dictate how we will deal with that*." (Nivetha)

"*Be more conscious of your data and the whole automation process, ensuring security while you're using the tools.*" (Nicole)

"*When we open ourselves up to get more data than is actually necessary, that is when you have data breaches coming from the auditors and then no one can defend themselves*" (Nicole)

ii. **Human oversight and validation:** Auditors' heightened need for trust and validation of decisions made by digital auditing tools**.**

"For now, I would still need that human eye to look at the decision that it has made. For now, I don't think I'm at the point where I will use a tool to make a decision for me." (Lerato)

"You also have to be very conscious of the fact that the tools could actually just be wrong. When you look up certain information, it could really be a misrepresentation which in return can be a really big ethical issue." (Nicole)

iii. **Documenting for transparency and accountability**: Increased focus on documenting methodologies, assumptions, and limitations.

"*The key thing first and foremost is the documentation around the use of that model or that application or platform... So, for example, in respect of the B-listed tool, we had to put together a detailed methodology on how the tool works, where it's getting data from, how it's processing data, what the outputs are, where it's stored, and that creates like a sense of transparency and trust*." (Jason)

"I think to validate, confirm, explain, and agree, those are the human things that a machine can't do." (Jan)

iv. **Increased scepticism:** Auditors hesitation and cautious approach towards current capabilities of digital auditing tools

"*I would be very hesitant if there was a tool that uses AI to do auditing. I think there's still a lot of improvement needed in that space*." (Jan)

"*It's a lazy person who's going to ask for everything because they don't know what they actually want.”* (Nivetha)

v. **Continuous learning and adaptation:** Staying abreast of emerging technologies to be able to tackle new digital auditing ethical dilemmas

“*So that, and another thing that we've seen that makes it difficult, right, is the skill gap. So, to train an upskill our juniors to use kind of these kind of advanced tools, it's quite time intensive*.” (Jason)

“*Where my experience comes in, I'm good at data analysis, so they brought me in basically to use my skills in data analysis and programs like SAS and things to basically implement those skills on audits*.” (Nicole)

vi. **Increase in regulations:** There is need for compliance with new compliance requirement.

“*I think from a POPIA perspective, one of the key aspects is limiting the collection and the processing of data to what is necessary. And I mean you can, you can adopt that that requirement in POPIA to just your day-to-day business as usual activities because you should only be using data that you need, not just data for the sake of data*.” (Jason)

“*I think another aspect, even though POPIA has been enacted, I just think there isn't a great awareness, and I also think you know our regulators have been lenient on organizations, and we haven’t really seen somebody getting a good sanction of a vast amount of money to wake people up*.” (Jan)

vii. **Professional courage:** The perseverance to carry out ethical decisions, as pertaining to digital auditing ethical dilemmas.

“*Ethics are personal. It is you doing the right thing when no one is watching. That is very personal, right? So now you are trusting that the people you've hired, they will always be thinking in an ethical manner, whether is legal or not, whether it is allowed or not*.” (Hannah)

“I think probably a common ethical dilemma that a lot of people have is to disclosing presence of an issue with a tool, i.e., do we report the issue, or do we just fix it and pretend nothing happened... So key thing to resolving it is always to communicate with the involved party.” (Jason)

viii. **Escalation, responsibility and accountability processes:** Establishing clear paths for addressing ethical concerns and accountable decision-makers.

“Our methodology practice is that such matters should be reported to seniors for assessment of what the implications are and how it gets taken forward. I think the main thing is for your auditors feel safe enough to be able to report these things and have a culture in the in the company that they feel that they will be safe and supported.” (Akilah)

"To be 100% honest, first thing I'm thinking of is I have my manager, I believe my line manager is very trustworthy, so I would immediately go to him and just explain the problem I'm facing and ask for their opinion and confirmation." (Nicole)

"*So, if I, example, if I have access, if I see something I shouldn't see, I will disclose that to my direct report or whatever the process is. I will bring it to the attention and what happened and the circumstances, and so that's the way I personally would deal with it."* (Nivetha)

Theme 6: Organisational enablers and barriers to ethical technology adoption

Several organisational factors were identified that influence ethical technology adoption:

i. **Organisational maturity and readiness**: Varying levels of preparedness for ethical technology implementation.

"B*ank X been one of our clients where we have been able to excel in that department, but that's because the bank themselves in their operations is excelling in Big data and automation and all of that*." (Akilah)

"*CAE has challenged the audit firm to come up with a digital strategy. It has been three years, and I still have not seen it*." (Lerato)

ii. **Skills development and training**: Building both technical and ethical competencies.

"*All the students and up-and-coming employees are very computer literate. But they're not necessarily risk literate. That just needs training to bring the two together to say, yeah, you can do all these great things with emerging technology, but you need to consider the ethical implications, the cyber risk implications, and all of that*." (Jason)

" *There can be no auditor who does not understand technology and there can be no technology auditor who doesn't have a sense of financial control and financial literacy*." (Nivetha)

iii. **Professional body guidance**: Mixed views on the adequacy of guidance from professional bodies.

"*I think ISACA is doing more. I think they're getting better at it and I'm closer to ISACA than I am to the IIA. I see White papers and I see journals coming out*." (SP)

"*They do have guidance, and they do have journal articles and stuff around there. But what I'm saying is it probably is not consumed by the intended audience as much as it could be*." (Jan)

"*So, I think the challenge is that the use of AI and emergent tech is moving at like such a rapid pace, but it's difficult for its regulation keep track. So, there's always an element of catch up that regulation has to do*." - Jason

iv. **Governance structures**: Establishing committees, working groups and approval processes.

"*There is a governing team where you go present use cases for approval, as such I've got two use cases approved for next year for home loans audits, I had to motivate this is what we want, formally. We also must capture benefits realisation, based on effective use of various bots deployed in audits*." (Hannah)

"*Since being a member of the AI Champion Committee, I make sure that as someone who handles data, I adhere to all learning and constantly I share them with my team, i.e., what can you or not do; what tools can you use or not use*." (Lerato)

v. **Data Quality and Accessibility:** Inaccurate or incomplete data can result in erroneous audit conclusions and damage the trustworthiness of the audit process.

" *Everyone wants to do the best analytics and the best RPA, but often, the foundation of what's required for that, being data, is not up to what it should be. You often have poor quality data, incomplete data or data that takes ages to acquire and that impedes the effectiveness of these RPA or AI automations that you want to do*." (Jason)

"*So, data quality is, the first step, because basically if you your data quality is bad then your output will be bad. So, the most important step I would say is that you are able to source the data, the correct data, and useful data to get useful results*." (Nicole)

vi. **Technical and Resource Challenges:** Co-sourcing challenges, financial constraint, etc. can impede the adoption of digital audit tools.

"*We keep talking about money. The audit firm has the digital resources and skills in their Advisory Services division but are constrained by the approved budget*." (Lerato)

"In terms of costs, it's not cheap having the correct technology and security in place so the data and whole process doesn't get jeopardized. And in terms of the time, it takes sometimes to build tools, the resourcing is also costly." (Nicole)

vii. **Change management:** All key stakeholders must be brough along on digital auditing journey.

"*In the early days we could see the resistance from businesses when it came to changing from traditional sampling approach to want full on access to data. Change management with business was initially not an easy exercise, but business is now seeing the value of work being done*." (Sandile)

"*That's the level transformation we want, because we are very good at auditing and finding exceptions, but the "so what" is the most difficult. My team this year, we've had to spend so*

much time with business quantifying what is the actual impact of this issue, to the extent of quantifying it to the basis points." (Hannah)

"*I'll say in the beginning, in the early days, I don't think we were fully transparent with businesses as we were still going through our own internal journey of understanding the continuous auditing work in terms of methodology and requirements for conformance to the IIA standards*." (Sandile)

4.5 Summary of the findings

This chapter presented the findings related to the application of 4IR technologies in financial services audits, the associated ethical challenges, and their impact on auditors' ethical decision-making. Thematic analysis reveals a profession navigating significant transformation while attempting to maintain ethical standards. The data indicates widespread adoption of these technologies, coupled with significant ethical concerns and the implementation of various mitigation strategies. Furthermore, ethical decision-making frameworks are evolving and adapting in response to complex digital auditing ethical challenges, amidst several identified enablers and barriers to ethical adoption of digital auditing tools. Several key implications emerge for discussion in the next chapter pertaining to varying levels of digital maturity, persistent gap in ethical guidance, Dual upskilling requirement, enduring importance of human judgment and transition from tool-focused to strategic approach.

4.6 Summary of the Chapter

Chapter Four presents the qualitative research results, summarizing and interpreting the data collected from participants through thematic analysis approach and reporting the findings. Additionally, the chapter emphasizes the necessity of a strategic approach to facilitate the ethical adoption of digital auditing tools.

The next chapter analyses the findings as guided by the analytical framework and literature review covered in Chapter 2.

CHAPTER 5. DISCUSSION OF THE FINDINGS

5.1 Introduction

This section is a discussion of the research findings above. The findings of the research have been presented in 3 phases congruent with descriptive and interpretive phenomenology as well as responding to the 3 research preposition RP1: explores the adoption, applications and perceived benefits of RPA and AI digital auditing tools in financial services sector; RP2: explores auditors' perceptions on the ethical implications of using RPA and AI for auditing in terms of risks to objectivity, data privacy, lack of transparency, trustworthiness and accountability; and RP3: explores the impact of digital auditing tools on auditors' ethical decision-making processes and the mitigation strategies employed.

The findings described focus on the summative phenomenology on the descriptions of individual experiences of 8 internal audit professionals who were engaged. The discussion is set up according to the Six core themes emerged which are Data-Powered Audit Transformation, Audit Value Creation with Technological Integration, Navigating Ethical Complexities in Automated Audit Processes, Data Governance as a Foundation for Ethical Digital Auditing, Evolving Frameworks for Ethical Decision-Making and Organisational Enablers and Barriers to Ethical Technology Adoption.

The overall discussion is framed in alignment with Lehner et al.'s (2022) ethical decision-making framework for AI-based decision-making in accounting and auditing, which is based on Rest's four-component model of ethical decision-making. This model includes:

- Moral Sensitivity: Recognizing the ethical implications of decisions.
- Moral Judgment: Determining the right course of action.
- Moral Motivation: Prioritizing ethical values over other values.

- Moral Character: Having the strength to act on ethical decisions.

Lehner et al. identified five major ethical challenges in AI-based decision-making: objectivity, privacy, transparency, accountability, and trustworthiness. They argue that AI alone cannot make ethical decisions due to its lack of true agency and reliance on human-set goals. Therefore, accountability must be shared between humans and AI, and governance processes need to be adapted to ensure ethical AI-based decision-making.

The earlier literature review aimed to synthesise insights from numerous empirical studies, identify knowledge gaps and to help illustrate connections to the current study covering ethical challenges of digital audit tools. Recognition that ethical adoption of digital auditing practices safeguards the profession's reputation and integrity is imperative.

5.1.1 *Demographic profile of participants*

Eight (8) internal audit professionals working in financial institutions were interviewed for the study as detailed in table 4 below.

5.1 Demographic profile of participants

Table 5.1: Demographic profile of participants

	Lerato	Nicole	Jan	Akilah	Sandile	Hannah	Nivhetha	Jason
Gender	Female	Female	Male	Female	Male	Female	Female	Male
Position	Senior Audit Manager: Data Science and Analytics	Management Consultant/Contracting Audit Manager	Senior Audit Manager: Information Technology and Cyber Security	Senior Audit Manager: Quality Assurance	Senior Audit Manager: Data Science and Analytics	Head of Audit: Credit	Head of Audit: Information Technology and Cyber Security, Non-Executive Director and Audit	Associate Director

							Committee Member	
Finance Sector	Wealth: Investments and Insurance	Financial Management Consulting	Banking	Audit Firm	Banking	Banking	Banking	Audit Firm
Experience	15 - 20 years	1 - 5 years	20 - 25 years	15 - 20 years	15 - 20 years	20 - 25 years	20 – 25 years	5 – 10 years
Highest Qualification	Master of Commerce	Bachelor of Science: Financial and Actuarial Mathematics	Matric	Bachelor of Commerce with Honors in Internal Auditing	Bachelor of Commerce: Management Information Systems	Higher National Diploma in Management Practice	Master's Degree in Computer Auditing	Honours degree in economics and information systems.
Professional Accreditations	CISA and DAMA	None	CISA and CISM	CIA, CRMA and CCSA	None	CISA	CISA, CGEIT and CDPSE	COBIT and CISA

The demographics of the interviewed auditors reveal a diverse group in terms of gender, experience, qualifications, and sectors. This diversity provides a comprehensive perspective on the use of intelligent tools in financial services auditing. The group includes both male and female auditors, offering a balanced view of experiences and insights from different gender perspectives.

The auditors hold senior positions in various sectors, including wealth management, financial consulting, banking, and audit firms. This variety ensures that the findings are relevant across different areas of financial services.

The range of experience varies significantly, from 1-5 years to over 25 years. This mix of seasoned professionals and relatively newer auditors provides a blend of traditional and contemporary auditing practices and insights into the adoption of new technologies. Furthermore, the auditors possess diverse educational backgrounds and professional accreditations. While some have advanced

degrees and multiple, others have more practical experience without formal accreditations. This diversity highlights the different pathways to expertise in auditing and the varying emphasis on formal education versus practical experience.

Overall, the demographic diversity of the interviewed auditors enriches the thematic analysis by incorporating a wide range of perspectives and experiences. This diversity is crucial for understanding the ethical challenges and practical applications of intelligent tools in financial services auditing, ensuring that the findings are robust and applicable across different contexts.

5.2 Discussion pertaining to exploration of adoption, applications and perceived benefits of RPA and AI digital auditing tools in financial services

The study's starting point of understanding AI use cases is important for revealing digital auditing context-specific ethical risks and impacted audit stakeholders. This in turn can inform recommendations for tailored ethical frameworks and guidelines that meet auditor standards and support of ethical digital auditing.

The are significant milestones made in adoption of advanced 4IR technologies in auditing practices. The study revealed an evolving auditing landscape compelled by data-powered audit transformation and audit value creation with technological integration, consistent with the broader research on digital transformation in auditing. Auditors highlighted how adoption of advanced 4IR technologies are shifting audit practices from traditional sampling to comprehensive and data-intensive methodologies. This transition leads to increased audit efficiency, higher quality audit outcomes, and timely insights, thus ensuring effective audits that deliver greater value to stakeholders.

Data-Powered Audit Transformation

The financial services auditors' adoption of technologies such as Python, SAS, SQL, Power BI, Power Automate, and Azure enables the transformation their auditing processes. Their tools enable analysis of full population data sets, providing auditors with a more complete and accurate picture of the financial service risk landscape, for credible and reliable audit assurance. These findings align with Kapur and Singh's (2022) and Tiron-Tudor et al.'s (2024) observations that audits can examine entire risk populations to validate internal controls and confirm management's claims of operational effectiveness. Similarly, Leocádio et al. (2024) noted the increasing transition from point-in-time audits to continuous monitoring approaches, which was echoed by multiple participants in this study.

The identified RPA tool use cases are for access management testing, reporting, functional KPIs monitoring and regulatory compliance monitoring align Balamurugan et al.'s (2022) assertion that leveraging RPA enhances workflow by simplifying repetitive, high-volume tasks, proving it versatility to create efficiencies across various business processes (Plattfaut et al., 2022). Deployment of its capabilities for extracting data, automating workflows, and ensuring timely notifications and updates, all align with Tiron-Tudor et al.'s (2024) 25 uses cases for RPA in accounting and auditing, allowing audit testing to be done efficiently so auditors can focus on validating exceptions and other complex and value-adding tasks (Griffiths & Pretorius, 2021).

Auditors agreed that continuous auditing and real-time risk insights are essential elements of the new data-powered audits, shifting the focus from reactive to proactive assessments, enabling auditors to detect and address issues early, unlike traditional periodic reviews. El-Mousawi et al. (2023) corroborate this through finding that AI detects patterns and analyses large data sets, providing deeper insights through proactive identification of correlations and variances. This is echoed in Odeyemi et al.'s (2024) observation that by using advanced algorithms, AI helps auditors uncover complex relationships within data that traditional methods might miss, leading to a deeper understanding of financial transactions, business operations and potential risks.

Enhanced risk assessment is enabled through the advanced technologies' ability for real-time analysis of large volumes of data, ensuring a higher level of assurance. Albahsh and Al-Anaswah (2024) highlighted transformative impact of AI on bank auditing, emphasising enhanced risk assessment, operational efficiency, fraud detection, cybersecurity and bankruptcy prediction. Furthermore, the ongoing exploratory builds for integration of machine learning will enable next-level predictive risk assessment analytics for identifying potential issues before they can materialise.

Audit Value Creation with Technological Integration

Auditors highlighted tangible efficiency gains and time savings are realised automating repetitive and mundane tasks like data cleaning, analysis, and visualization. This frees auditors to focus on complex and high-value tasks needing expert judgement. Auditors are also able to perform deep-dive audits real-time reporting and proactive issue identification, enhancing the overall audit quality and enabling clients' decision making. The deployment of robotic process automation, advanced analytics and machine learning allows for more efficient and effective testing processes with reduced errors and risk of oversight. This value creation aligns with Fedyk et al.'s (2022) findings that AI implementation leads to leaner audit processes and improved auditor productivity. Similarly, Ayinla et al. (2022) elucidated how RPA significantly enhances operational efficiency, accuracy, and compliance in accounting processes by automating routine tasks.

AI's ability to analyse large datasets from multiple sources allows for more comprehensive and detailed assessments and comprehensive assurance. KPMG (2024) study corroborates benefits of improved data-enabled decisions and increased data accuracy, which were consistently mentioned by auditors in the study. Optimisation of audit resources through automation and advanced analytics, not only enables teams to operate more efficiently and effectively, but it also improves credibility of audit work, providing more reliable and timely insights and reporting which increases stakeholder satisfaction. This is captured

by Kapur and Singh (2022) exploration of the transformation brought by RPA in internal audits, noting improvements in audit resource utilisation, output, business value, as well higher efficiency and lowered costs. Bose et al. (2022) also gave insight of how big data, data analytics, and AI are enhancing audit processes by offering better insights and improved quality, helping auditors to stay ahead of the competition.

Overall, the significant investment and adoption of these process automation and intelligent digital auditing tools in the financial services sector represents significant advancement that underscores the importance of embracing technology to stay ahead in an increasingly complex and data-driven world. The tangible benefits realized through technological integration highlight the potential for continued innovation and improvement in audit practices.

Financial services auditors are at different stages of technology adoption with some organisations demonstrating sophisticated implementation while others are still in early phases. The auditors' perspectives indicate that analytics is the most widely used technology throughout the audit lifecycle. They noted that their audit functions are still in the early stages of exploring AI, with most AI use cases currently at the proof-of-concept stage. Several auditors confirmed that they are leveraging their client financial institutions' broader organizational systems to facilitate and speed up their own internal audit technology adoption. Aligning audit functions' digital auditing efforts with their organization's overall digital transformation strategy is accelerating and maturing digital auditing practices, allowing audits to benefit from established infrastructure and expertise within the organization.

Overall, key implication and area of improvement that emerges is that there are varying levels of digital maturity as financial services auditors are at different stages of technology adoption with some organisations demonstrating sophisticated implementation while others are still in early phases.

5.3 Discussion of ethical implications of technologies pertaining to data privacy, lack of transparency, bias, trustworthiness and accountability.

The integration of automated tools and algorithms in auditing presents several ethical complexities that need to be navigated carefully. This section explores the auditors' perspectives on ethical challenges experienced. The findings are contextualized per the challenges of ethical decision-making identified in Lehner et al. (2022) Ethical Decision-Making Framework.

Navigating Ethical Complexities in Automated Audit Processes

Objectivity

One of the primary concerns with automated audit processes is the potential for bias in the algorithms. Auditors discussed objectivity risks pertaining to potential biases from insufficient model training, flawed algorithm rules, indistinction between ethical vs. legal standards, and context-specific script application. This is supported by Adelakun's (2022) summation that bias in AI algorithms can arise from biased training data, flawed algorithms, or improper implementation.

The auditors noted that using inadequate training data or sampling specific portions of the training data can introduce bias and thus significantly skewing audit outcomes, which may affect the fairness of the audit. This concern is echoed in literature underscoring that the biases embedded in algorithm data risk objectivity and fairness of model outcomes and emphasising the need for diverse training datasets to improve the accuracy and fairness of AI models (Murikah et al., 2024; Adelakun, 2022; and Lehner et al. 2022).

The auditors also expressed awareness of the topical and notable ethical risk use cases of AI models using facial recognition based on limited and discriminatory training data. Aligned with this, the distinction between legal compliance and ethical standards is another critical consideration raised, emphasising that even if a practice is legal, it may not be ethical. This perspective is aligned with

Costanza-Chock et al. (2022) finding that many vulnerable sub-populations are not adequately protected by current laws, and that intersectional fairness assessments are difficult for auditors to implement and verify due to such legal complexities hindering efforts to de-bias algorithms based on intersectionality. Regular ethics training for auditors can help them recognize potential biases and ethical issues, that go beyond traditional legal and compliance requirements, enabling them to address these concerns proactively, and ensure digital auditing tools are developed and used in a manner that upholds ethical principles.

Furthermore, the auditors also highlighted risk of potential bias in the algorithm rules and/or criteria used for audits, thus perpetuating unfair auditing outcomes. This perspective is supported by Zhang et al. (2023), who found that algorithms rules may be contaminated by human expert's bias in decision-making. Auditors agree that continuous review and improvement of audit algorithm rules are necessary to address this risk and ensure that the rules used are fair and objective.

The understanding and adjusting modelling of specific business and client contexts and risk appetites of different environments was emphasised as crucial for avoiding erroneous models and false positives. This is corroborated by Zhang et al. (2023) finding that AI does not automatically adapt to changes in accounting policies or the environment, making its results unreliable and invalid for decision-making in new situations. Auditors understanding for need to adapt their approaches based on the unique characteristics of different environments helps in accounting for unique processes and risks of each unit and avoids false positives and ensures that the audit results are reliable and relevant.

Overall, the integration of insights from the interviewed auditors revealed that by implementing controls such as full and diverse population training data, tailored scripts, ethics training, understanding specific contexts, auditors can ensure that digital auditing tools are used ethically and effectively.

Privacy

The auditors emphasised risks of confidentiality of data, data sharing restrictions, lawful data collection and processing, access management, data anonymization and masking.

Confidentiality of sensitive data, including personally identifiable information is paramount to the financial services auditors, affirmed by Adelakun (2022), who stresses the need for robust data protection measures to prevent unauthorized access. Zhang et al. (2023) summed up that risks of data security, privacy, and potential misuse and breach of data are top ethical concerns. This concern is supported by Murikah et al.'s (2022) study that revealed that personal data exploitation without consent, in the form of confidentially breach, is a key ethical risk in auditing.

Auditors also emphasised concerns of lack of strict access management in protecting audit evidence, as well as sharing of sensitive information without proper controls leading to privacy breaches. Zhang et al. (2023) found ethical concern of data sharing and integration across internal and external systems and entities, underscoring the need for strict data sharing constraints and rules when using AI and data. Auditors raised that they must ensure data is collected and processed lawfully by verifying consents and compliance with regulations like GDPR and POPIA, highlighted as essential to protect privacy of data by Adelakun (2022). While anonymization and masking protect personally identifiable information, the risk of re-identification remains, Murikah et al. (2024) also note techniques like data perturbation techniques to preserve privacy.

To address these ethical risks, several controls were discussed by the auditors, encompassing the use of secure audit management tools to store audit information securely; data encryption during processing and transmission; regular ethics training; continuous monitoring and auditing of data access and usage to ensure compliance with security policies.

Transparency

The interviewed auditors highlighted transparency risks associated with digital auditing tools, albeit there was notable vagueness regarding actual AI technological and ethical intricacies as pertains to transparency risk. This is attributable to fact that AI adoption by the auditors is in its infant phase with use cases shared by the auditors still being in the proof-of-concept stage and thus would not have the detailed understanding of AI algorithms, their use cases, and limitations essential for ensuring explainability and transparency (Lehner et al.,2022). Furthermore, the lack of specificity could be due to the “blackbox” nature of AI like that described by Zhang et al. (2023) wherein managerial accountants were unsure about AI’s internal workings.

One transparency related risk identified is the lack of communication. Auditors emphasized the importance of clear communication with clients about the audit tools and methodologies used in audits, aligned with Zhang et al. (2023) observation that communication is essential for a comprehensive understanding of business and for managers to appreciate the capabilities and accountability of managerial accountants. Without transparency, clients may not fully understand or trust the digital auditing process.

Insufficient documentation is another significant risk discussed, highlight that failing to document audit processes in detail can lead to misunderstandings and hinder the ability to reproduce and verify results. This concern is supported by Adelakun (2022), who stresses the need for auditors to clarify the AI's decision-making process by explaining data inputs, analysed features, and the rationale behind final decisions. Zhang et al. (2023) also noted the ethical impact of insufficient documentation in managerial accounting, highlighting the need for detailed records to ensure transparency and accountability.

Opaque methodologies also pose a transparency risk. Using business rules and scripts without independent verification can create transparency issues. Auditors need to re-script and test these rules to ensure they arrive at the same conclusions as the business. Murikah et al. (2024) emphasize the importance of

transparency in AI systems applied in auditing, noting that independent verification is crucial for maintaining trust.

Through implementing above controls, such as clear communication, detailed documentation, independent verification, and regular audits, auditors can enhance transparency in the audit process. This correlates with Murikah et al.'s (2024) recommendation that vendors of AI assurance tools should enhance AI transparency through better interfaces, detailed testing reports, and collaboration with diverse domain experts.

Accountability

Regarding accountability, auditors discussed concerns pertaining to over-reliance; results bias; human oversight and judgment; and responsibility and monitoring*.*

Regarding over-reliance on digital tools, auditors noted that when these tools are used without sufficient human judgment, important details can be overlooked, leading to incorrect audit findings. Similarly, when auditors are biased towards a certain outcome or result, they may take the output from digital tools at face value without questioning its accuracy, thus leading to incorrect conclusions if the data or the tool's processing is flawed. This concern is supported by Murikah et al.'s (2022) study that revealed that overreliance on algorithms sans human judgment, is a key ethical risk in auditing manifesting in the form of deskilling effects or conscience gaps. The auditors elucidated that over-reliance on automated tools can result in auditors missing critical nuances that only human judgment can catch.

The absence of appropriate human oversight was also emphasised, highlighting the necessity of human intervention to validate the outputs of digital tools. Without human judgment, there is a risk that automated tools may produce misleading results. This concern is supported by Adelakun's (2022) observation that ensuring that auditors can review AI decisions is essential for maintaining accountability and integrity in auditing and that AI systems' auditability allows

auditors to identify biases, errors, or inconsistencies, thereby preserving the integrity of the audit process

Lack of accountability for regular monitoring and review processes could result in anomalies or spikes in data trends going unmonitored. Auditors mentioned the importance of these processes to ensure that they remain aware of and can investigate unusual patterns, aligning with Lehner et al. (2022) stressing that ethical accountability should view algorithms as products of human design and interaction. Regular reviews by auditors help ensure that digital tools are functioning as intended and that any deviations are addressed promptly. Zhang et al. (2023) also concurs that AI for managerial accounting should be shared amongst all involved stakeholders who must work together to mitigate ethical risks and prevent unethical behaviour.

Trustworthiness

The auditors emphasised transparency, accuracy and data integrity, governance and compliance, quality assurance and stakeholder engagement as prerequisites for building trustworthiness of digital auditing tools. These align with Murikah et al.'s (2024) identified emergent guardrails for trustworthy AI-based auditing, encompassing data, algorithmic, evaluation, ethical and human guardrails.

Transparency as a concern, emphasises the need for clear and open communication throughout the auditing process. Auditors highlighted the importance of being transparent from the start to the end of the audit, ensuring that all steps, tools, and results are clearly communicated to clients and stakeholders. This openness helps build trust and ensures that the audit process is understood and accepted by all parties involved. Lehner et al. (2022) further stress that AI's lack of transparency complicates the detection of biases, which can stem from the algorithmic code or the training data, and thus for auditors to identify the source of these biases, continuous monitoring and traceability are essential.

The accuracy and integrity of data as pertains to verifying the source, completeness, and limitations of the data used in digital auditing systems, was stressed as crucial for producing reliable audit results. Regular reviews and checks are necessary to maintain the accuracy of the data and the outputs generated by AI tools. Adelakun (2022) concurs that auditors must clearly communicate data sources and usage in AI algorithms to maintain trust, stressing that transparency in data collection and processing is essential for trustworthiness of audit outcomes.

Adhering to governance processes and compliance standards is essential for maintaining the integrity of the audit process. Auditors discussed the importance of following established governance frameworks and demonstrating that the same rigorous standards applied to auditees are also applied to audit function's processes. This adherence to governance helps mitigate risks and ensures that AI systems are used responsibly and ethically. Adelakun (2022) confirms that auditors must follow regulatory standards and ethical guidelines to ensure legal compliance and maintain the integrity of audit processes, thus allowing them to benefit from AI while managing its risks and ethical challenges.

Quality assurance processes are vital for ensuring that audit results are accurate and reliable. Auditors highlighted the need for thorough review processes, where digital auditing results are checked by multiple levels of management before being presented to clients. This multi-layered review helps catch any errors or inconsistencies and ensures that the final audit outcomes and insights are of high quality. Furthermore, auditors added that engaging with stakeholders throughout the audit process is crucial for building trust and ensuring that the audit meets the needs and expectations of all parties involved. Regular discussions with key stakeholders help clarify the objectives, methodologies, and limitations of the AI tools used in the audit. Murikah et al (2024) extends this to mean that even the technology vendors should ensure transparency and collaborate with diverse experts to identify blind spots in AI tools, thus global collaboration is essential for AI safety, fairness, and scaling trustworthy auditing practices.

Data Governance as a Foundation for Ethical Digital Auditing

The study found that data governance is a prerequisite for auditors being able to manage ethical risks of digital auditing.

The perspectives of the interviewed auditors highlight the importance of robust data governance strategies in ensuring ethical digital auditing practices. Auditors emphasizing the importance of developing and aligning frameworks and working groups with organizational policies and regulatory requirements. Auditors highlighted the need to align data governance with group policies and constantly reference data privacy and confidentiality frameworks. Establishing comprehensive data governance frameworks is crucial for managing data throughout its lifecycle. Adequate frameworks are designed to provide guidelines on data handling, storage, and processing, ensuring consistency and compliance with regulatory requirements. This aligns with Lehner et al.'s (2022) finding that organisation should create an intra-firm governance committee to both oversee and provide ethical guidance pertaining to AI and Big Data processes, review algorithms and decisions, AI learning, user training and identify risks for regulation.

Ensuring high data quality was flagged as being fundamental to effective auditing. Auditors shared how their frameworks encompass ensuring data quality through checks and transformations and managing data usage according to ownership and governance rules. Murikah et al. (2024) highlight the importance of resolving data quality issues and the necessity for guardrails to enhance data quality. Poor quality or inaccurate data can produce misleading results (Zhang et al., 2023) and undermines the credibility of the audit process.

Transparency and traceability in data handling are critical for ethical auditing (Adelakun, 2022). Auditors highlighted need to ensure that data processing activities are transparent, and that data can be traced back to its source. This helps in maintaining accountability and addressing any discrepancies that may

arise during the audit process. Lehner et al. (2022) supports this view, highlighting the role of transparency in building trust and ensuring ethical data practices.

Auditors elucidated that data privacy and ensuring data security are critical for ethical digital auditing. Auditors discussed various measures to protect data privacy and security, including data masking, minimisation, encryption (both in transit and at rest), to safeguard sensitive information. This is consistent with the literature, which underscores the need for robust data security measures to protect against breaches and ensure compliance with privacy laws (Adelakun, 2022; Lehner et al., 2022, Zhang et al., 2023, and Murikah et al., 2024). Compliance with data protection regulations such as POPIA and GDPR is essential to avoid legal issues, maintain ethical standards and maintain stakeholder trust. By following these regulations, auditors can reduce the risk of facing regulatory penalties and legal liabilities (Adelakun, 2022).

Blockchain seems to not be adopted, its tamper-proof, encrypted data storage with traceability of data entries and changes (Lehner et al., 2022) is not yet realised, perhaps because it is still in early development stages discussed by Yang et al., 2022.

Overall, the study identifies key concerns in digital auditing, including bias in AI algorithms, privacy breaches, lack of transparency, and accountability issues. It emphasizes the need for diverse training data, robust data protection, clear communication, and human oversight. Compliance with regulations like GDPR and POPIA is crucial. Despite technological advancement, participants consistently and overwhelmingly emphasised that human judgment remains essential for ethical decision-making and interpretation of results.

Furthermore, robust data governance frameworks are essential for ethical digital auditing. By following these frameworks, auditors can maintain high data quality, safeguard data privacy, and comply with regulatory requirements. Auditors are starting with development of own formal data governance policies and structures

to secure and manage audit data and mostly aligning these to wider client organisations frameworks.

Overall, key implications and areas of improvement that emerge are that firstly, there is an enduring importance of human judgment because despite technological advancement, participants consistently emphasised that human judgment remains essential for ethical decision-making and interpretation of results. Secondly, the study established that data governance is foundation for ethical digital auding as auditors are starting with development of own formal data governance policies and structures to secure and manage audit data and mostly aligning these to wider client organisations frameworks.

5.4 Discussion pertaining impact of digital auditing tools on ethical decision-making processes and mitigation strategies employed

The adoption of digital auditing practices is significantly reshaping auditors' ethical decision-making and necessitating evolution of necessary frameworks, particularly as Murikah et al. (2024) emphasise that AI in auditing focuses on real-world testing, interdisciplinary collaboration, human involvement, standardizing audit methods, resolving data quality issues, and broadly considering external factors.

This discussion explores the impact of digital auditing tools on ethical decision-making in financial services auditing practice, using the thematic analysis conducted on responses from eight participants. The analysis was framed using Rest's (1986) Four Components of Ethical Decision-Making: moral sensitivity, moral judgment, moral motivation, and moral character. The findings reveal a nuanced understanding of how these tools influence ethical practices, highlighting both benefits and challenges

Evolving Frameworks for Ethical Decision-Making

Moral Sensitivity

Moral sensitivity involves recognizing the presence of an ethical issue and understanding how different actions affect the stakeholders involved. Auditors elucidated that digital auditing introduces new and complex ethical dilemmas related to data privacy, algorithm bias, cybersecurity, and the use of AI. Traditional ethical frameworks may not fully address these complexities and auditors must now integrate traditional ethics with digital considerations as they grapple with the ethical implications of automated decision-making and the potential for unintended consequences. Adelakun (2022) highlights the balance between innovation and integrity in AI for auditing, emphasizing the need to address new ethical challenges such as algorithm opacity and data security concerns. Zhang et al. (2023) also find that AI managerial accounting systems' integration diverse data sources and customisation heightens and raises issues and doubts about data security, privacy and misuse; transparency and reliability, bias and over-reliance by less experienced accountants.

The vast volumes of data involved in digital audits necessitates a stronger focus on data ethics. Frameworks are evolving to incorporate principles of data privacy, security, and responsible data usage. Auditors must consider the ethical implications of data collection, storage, and analysis, particularly when dealing with sensitive information. Lehner et al. (2022) emphasize the importance of data ethics, elucidating that the major ethical challenge of Privacy in AI-based decision-making audit systems encompass concerns regarding data protection, regulation compliance, sensitivity of data, data loss, data awareness, cybercrime and fraud, explainability of data and intellectual property rights. Adelakun (2022) stresses the privacy and data protection are crucial in AI auditing as auditors must comply with regulations, use data responsibly in AI algorithms, and be transparent about data collection and usage.

Auditors also emphasised a heightened need for trust and validation of decisions made by digital auditing tools, evidencing high level of moral sensitivity and underscoring the necessity for human oversight in the use of digital auditing tools. Auditors are aware of the limitations and risks associated with digital tools and recognise that human intervention ensures accuracy and ethical compliance for maintaining trust in the auditing process. Murikah et al. (2024) emphasise auditors crucial oversight role in ensuring the integrity of training data, questioning model assumptions, and proactively assessing risks of unfairness towards minorities, further elucidating Leocadio's (2024) assertion that relationship between humans and AI is pivotal in the digital era.

5.5.1.1 ***Moral Judgment***

Moral judgment involves determining the right course of action by evaluating the ethical principles and guidelines relevant to the situation. The use of AI and machine learning in auditing raises concerns about algorithm transparency and accountability. Ethical frameworks are being adapted to require auditors to assess the fairness and reliability of algorithms used in audit processes. Auditors emphasised their increased focus on documenting digital audits' methodologies, assumptions, and limitations to be able to explain how algorithms arrive at their conclusions and ensure that they are not biased or discriminatory. Adelakun (2021) highlights the need for algorithm transparency stating auditors' strategies for making AI algorithms more transparent should encompass decision trees, model explanations, audits of AI decisions and logging and tracking the decisions made by AI algorithms. Zhang et al. (2023) underscore that impacts of AI decision making can be immediate or long-term, necessitating evaluation of both ethical issues in AI use and long-term effects on managerial accountants (and auditors) and organisations.

While digital tools can enhance audit efficiency, auditors recognise they also pose the risk of over-reliance on automated processes. Their scepticism and hesitation to fully embrace these technologies without robust validation and specification processes highlights professional judgement. Ethical frameworks are reinforcing

the importance of professional scepticism and the need for auditors to exercise independent judgment. Auditors must be able to critically evaluate the outputs of digital systems and identify potential errors or biases. The scepticism about the reliability of some of these tools and emphasis the need for further improvement, is rooted in moral judgment, as auditors critically evaluate the ethical implications of relying on AI and machine learning. Murikah et al. (2024) study highlighted ethical issues such as reduced diligence, overdependence on efficiency, and impartiality risks driven by market incentives, emphasising the need for governance, for maintaining professional scepticism. Zhang et al. (2023) further discuss that managerial accountants (and auditors) must learn to uphold professional scepticism when utilizing AI.

5.5.1.2 ***Moral Motivation***

Moral motivation refers to the prioritisation of ethical values over other personal or professional interests when making decisions. Auditors emphasised a need to understand how to leverage these tools to their advantage, but at the same time understand and assess the ethical implications of these. The rapid pace of technological change requires auditors to engage in continuous learning and adaptation, as such ethical frameworks are emphasizing the importance of ongoing professional development and staying abreast of emerging technologies. Auditors must be prepared to address new ethical challenges as they arise. Leocadio et al. (2024) highlight that continuous development, adaptability, and competency growth are essential for preparing auditors to tackle the complexities of modern auditing. Zhang et al. (2023) further highlight that organisations should offer diverse opportunities and customize training programs to accommodate accountants' varying learning paces.

Auditors emphasised that with the rise of AI and other digital auditing practices, there is an increase in regulations, such as POPIA and GDPR. These regulations are forcing auditing ethical decision-making frameworks to include compliance with these new regulations. Adelakun (2022), Lehner et al. (2022) and Murikah

et al. (2024) highlight the increasing regulatory landscape and the need for auditors to comply with new regulations.

5.5.1.3 *Moral Character*

Moral character involves having the courage and perseverance to carry out ethical decisions, even in the face of challenges, and whether is legal or not, whether it is allowed or not as one auditor said. Auditors must have the moral character to exercise professional scepticism and independent judgement, even when digital tools provide seemingly reliable outputs. According to Murikah et al. (2024), the core principles of independence and professional scepticism, which are essential for audit quality, risk being compromised by an improper balance between automation and human judgment. This requires the courage to question and verify the results and communicating openly with stakeholders. Adelakun (2022) emphasises that professional ethics guide auditors' behaviour and conduct and are crucial for preserving the integrity and independence of audit processes.

Auditors must demonstrate a strong commitment to ethical standards by continuously learning, adapting to new technologies, and ensuring compliance with regulations. Auditors described escalation and responsibility processes and frameworks for establishing clear accountability for technology-assisted audit work. Such Accountability and Responsibility frameworks are essential to uphold the integrity of the auditing process. Adelakun (2022) discusses that implementing oversight and accountability mechanisms can help prevent and address bias and unfairness in AI auditing.

Organisational Enablers and Barriers to Ethical Technology Adoption

Interview discussions with the auditors engaged in the study revealed several organisational enablers and barriers to ethical technology adoption. Auditors shared some insights of factors that influence the effective and ethical implementation of digital audit tools, encompassing organisational maturity levels, skills development, and governance structures.

One of the primary organisational enablers is the readiness and maturity level of the organisation. Organisations with higher digital maturity are ready and better positioned to adopt and integrate digital audit tools effectively. Auditors emphasised that these organisations typically have established processes, robust IT infrastructure, and a culture that supports innovation and continuous improvement. Conversely, organisations with lower digital maturity may struggle with the adoption of new technologies due to outdated systems, resistance to change, and a lack of strategic vision. These findings align with Ragubeer's (2022) identification of barriers to technology adoption in South African audit firms, including financial challenges, people and culture and environmental maturity. Similarly, Dahiyat (2022) noted that implementation is hindered by high infrastructure costs and technical competency gaps.

Skills development and training is another crucial enabler highlighted. The successful implementation of digital audit tools requires auditors to possess the necessary technical skills and knowledge. This includes understanding how to use advanced data analytics, AI, and machine learning tools. However, there is often a skills gap within audit functions, where auditors lack the expertise needed to leverage these technologies effectively, and/or IT resources lack business skills and vice-versa. This aligns with Fedyk et al. (2022), El-Mousawi et al. (2023) and Tiron-Tudor et al. (2024) finding that AI is still new, and there's much to learn while academic institutions and professional bodies lack proactive training to help accountants and auditors upskill in emerging technologies. Addressing this gap through targeted training and professional development programs is essential for fostering an environment where digital audit tools can be used ethically and efficiently.

Professional body guidance can help ensure that auditors can leverage new technologies while maintaining the core principles of the profession, thus fostering ethical technology adoption. This is supported by Sten (2023) and Ho (2023) findings that guidance supports innovation in the audit process, however digital auditing tools cannot replace, professional scepticism and professional

judgment (Stein, 2023). Auditors highlighted potential barrier is the underuse of available resources, meaning that although valuable may materials exist, they are not effectively reaching the intended audience, hindering the adoption of ethical practices. Furthermore, the rapid advancement of technologies, especially AI, often surpasses the ability of regulatory bodies (and professional bodies likewise) to keep pace and formulate required guidance.

Governance structures set up to support digital auditing practices play a significant role in ensuring the ethical adoption of digital audit tools. Effective governance involves establishing clear policies, procedures, and accountability mechanisms to guide the use of technology. This aligns with Lehner et al.'s (2022) finding that organisation should create an intra-firm governance committee to both oversee and provide ethical guidance pertaining to AI and Big Data processes, review algorithms and decisions, AI learning, user training and identify risks for regulation. Auditors shared how establishing committees, working groups and approval processes has helped digital auditing efforts. Committees mandate includes setting standards for data quality and accessibility, ensuring compliance with relevant regulations, and implementing robust cybersecurity measures. Organisations that lack strong governance structures may face challenges such as data breaches, algorithm bias, and ethical dilemmas related to data privacy and security.

Ragubeer's (2022) and Dahiyat (2022) further corroborate that technical and resource challenges also impact the adoption of digital audit tools. Organisations must invest in the necessary technology infrastructure and resources to support the implementation of these tools. Without these investments, organisations may encounter technical difficulties that hinder the effective use of digital audit tools. Furthermore, change management is another critical factor. The transition to digital auditing requires a shift in organisational culture and mindset. Employees must be willing to embrace new technologies and adapt to new ways of working. Effective change management strategies, such as clear communication, stakeholder engagement, and continuous

support, are essential for overcoming resistance and ensuring a smooth transition.

Overall, study found that evolving frameworks for ethical decision-making in digital auditing require auditors to integrate traditional ethics with digital considerations, focus on data ethics, and ensure human oversight. Continuous learning, adapting to new regulations, and establishing accountability frameworks are essential for maintaining ethical standards in digital auditing.

Furthermore, the study identified key enablers and barriers to ethical technology adoption in auditing. Enablers include organizational maturity, skills development, and governance structures. High digital maturity and robust IT infrastructure support adoption, while low maturity and resistance to change hinder it. Skills development and governance ensure ethical use. Barriers include outdated systems, lack of strategic vision, and insufficient training. Effective change management and investment in technology infrastructure are crucial for success. The salient outcomes are that while professional bodies are providing some guidance, there remains a significant gap between technological advancement and ethical frameworks. Organisations are largely developing their own approaches to fill this void. The research highlights a need for dual upskilling - technical experts need to understand audit and ethics while traditional auditors need technological literacy. Furthermore, more mature organisations are moving beyond viewing technology as isolated tools and instead developing comprehensive digital audit strategies with integrated ethical considerations.

Overall, key implications and area of improvement that emerge are that firstly, there is a persistent gap in ethical guidance because while professional bodies are providing some guidance, there remains a significant gap between technological advancement and ethical frameworks. Organisations are largely developing their own approaches to fill this void. Secondly, the study highlights a need for dual upskilling - technical experts need to understand audit and ethics while traditional auditors need technological literacy. Lastly there is a

transition from tool-focused to strategic approach as more mature organisations are moving beyond viewing technology as isolated tools and instead developing comprehensive digital audit strategies with integrated ethical considerations.

5.5 Conclusions

Overall, the study reveals a profession navigating significant transformation while attempting to maintain ethical standards, with several key implications emerging.

The adoption of digital auditing tools in financial services is driving a profound transformation in audit methodologies. By embracing these technologies, auditors can achieve greater efficiency, enhanced scope, timely insights, and improved credibility in their audit processes. However, the varying levels of digital maturity among organizations highlight the need for continuous investment in technology and skills development to fully realize the benefits of digital auditing.

The ethical challenges of digital auditing tools require auditors to balance technological advancements with ethical considerations. By addressing issues of bias, privacy, transparency, accountability, and trustworthiness, and by establishing strong data governance frameworks, auditors can ensure the responsible and ethical use of digital auditing tools. Continuous professional development and adherence to evolving regulations are essential for maintaining trust and integrity in the auditing process. Furthermore, human judgment remains crucial for ethical decision-making and interpreting results, whilst establishing formal data governance policies and structures is essential for ethical digital auditing.

In conclusion, the study highlights that ethical decision-making in digital auditing requires integrating traditional ethics with digital considerations, focusing on data ethics, and ensuring human oversight. Continuous learning, adapting to new regulations, and establishing accountability are essential. Key enablers include organizational maturity, skills development, and governance structures. High digital maturity and robust IT infrastructure support adoption, while low maturity

and resistance to change hinder it. Effective change management and investment in technology infrastructure are crucial for success The study elucidates gap in ethical guidance, requiring organizations to develop their own approaches; the need for dual upskilling, with technical experts learning audit and ethics, and auditors gaining technological literacy; and a shift in mature organizations from viewing technology as isolated tools to developing integrated digital audit strategies with ethical considerations.

Key implications and potential areas of improvement are recapped as follows:

i. **Varying levels of digital maturity**: Financial services auditors are at different stages of technology adoption with some organisations demonstrating sophisticated implementation while others are still in early phases.

ii. **Persistent gap in ethical guidance**: While professional bodies are providing some guidance, there remains a significant gap between technological advancement and ethical frameworks. Organisations are largely developing their own approaches to fill this void.

iii. **Dual upskilling requirement**: The research highlights a need for dual upskilling - technical experts need to understand audit and ethics while traditional auditors need technological literacy.

iv. **Enduring importance of human judgment**: Despite technological advancement, participants consistently emphasised that human judgment remains essential for ethical decision-making and interpretation of results.

v. **Transition from tool-focused to strategic approach**: More mature organisations are moving beyond viewing technology as isolated tools and instead developing comprehensive digital audit strategies with integrated ethical considerations.

5.6 Summary of the Chapter

In summary, this study explored multiple aspects of the ethical implications of digital auditing tools in the financial services sector. By examining specific research propositions, participants' insightful narratives illuminated the diverse perspectives pertaining to factors leading to ethical challenges in the application of digital auditing tools and proposing strategies for improvement for ensuring ethical digital auditing practices in this field. The next chapter concludes the study and offers recommendations for ethical digital auditing adoption.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter weaves together the entire study, assessing what was achieved against the research objectives, elaborating on its theoretical contributions, stakeholder recommendations, and suggestions for future research.

6.2 Conclusions

Here is a comprehensive overview of the study as a whole.

The rapid adoption of 4IR technologies in auditing presents both opportunities and challenges. While digital auditing tools enhance efficiency and effectiveness, they also raise ethical concerns that impact auditors' roles, create audit risks, and compromise stakeholder trust. This study explores auditors' experiences with 4IR tools, the ethical challenges these technologies pose, and their impact on ethical decision-making. The knowledge gap lies in understanding the intersection of digital audit tools and auditors' ethics. The study focuses on auditors in Johannesburg's financial services sector to investigate factors leading to ethical challenges in the application of digital auditing tools and proposing strategies for improvement. Delimitations encompass focusing on financial services auditors, with a specific emphasis on ethical implications of digital auditing tools on auditors' decision-making. The findings and recommendations may have wider implications for addressing the ethical challenges posed by digital tools across various organisations and industries. Ultimately, appreciating and enhancing the ethical adoption of digital auditing practices is essential for safeguarding the profession's reputation and integrity.

The literature review's objective is to synthesise insights from numerous empirical studies covering ethical challenges of digital audit tools and to propose a conceptual framework for framing and guiding the current study more comprehensively. The review examined the use of 4IR technology-enabled audit tools, their ethical challenges, and their impact on auditors' ethical decision-making. The adoption of technologies like RPA, AI, and blockchain is transforming auditing by enhancing efficiency, accuracy, and transparency, despite challenges such as financial barriers, technical competencies, and the need for proactive training. Key ethical concerns include data privacy, transparency, bias, trustworthiness, and accountability. Ensuring ethical use requires rigorous testing, clear documentation, and proactive training. Classical ethical decision-making models and updated frameworks from professional bodies provide guidance for navigating these ethical challenges. A conceptual framework was developed using Lehner et al.'s (2022) ethical decision-making framework. Lehner et al.'s framework is deemed most suitable for this study and will guide the research on how auditors' experiences with digital tools influence their ethical decision-making processes.

The study covered eight senior auditors who were purposively selected from leading financial institutions to provide diverse insights on digital auditing tools. Semi-structured virtual interviews were used, featuring open-ended questions aligned with research objectives to gather rich, lived experiences from participants. Qualitative data analysis followed thematic analysis principles. Data was transcribed, coded, and organized into themes and sub-themes. These were mapped to Lehner et al.'s (2022) ethical decision-making framework for interpretation and conclusions. The process aimed to provide deep, nuanced insights into participants' experiences of ethical adoption of digital auditing tools in financial service in Johannesburg.

The studied auditors hold senior positions across wealth management, financial consulting, banking, and audit firms, making the findings relevant to different areas of financial services. Their perspectives reveal that the financial services

sector's significant investment in process automation and intelligent digital auditing tools underscores the importance of embracing technology to stay competitive in a complex, data-driven world. The integration of these technologies offers tangible benefits, driving innovation and improvement in audit practices. Currently, analytics is the most widely used technology throughout the audit lifecycle, while AI is still in early exploration stages. Auditors are leveraging client financial institutions' systems to facilitate and accelerate their own technology adoption. Aligning audit functions with the organization's digital transformation strategy further accelerates and matures digital auditing practices, benefiting from established infrastructure and expertise. The further study highlights key concerns in digital auditing, such as bias in AI algorithms, privacy breaches, lack of transparency, and accountability issues. It emphasizes the need for diverse training data, robust data protection, clear communication, and human oversight. Compliance with regulations like GDPR and POPIA is crucial. Additionally, robust data governance frameworks are essential for maintaining high data quality, safeguarding data privacy, and ensuring regulatory compliance. The study found that evolving frameworks for ethical decision-making in digital auditing require auditors to integrate traditional ethics with digital considerations, focus on data ethics, and ensure human oversight. Continuous learning, adapting to new regulations, and establishing accountability frameworks are essential for maintaining ethical standards. Key enablers for ethical technology adoption include organizational maturity, skills development, and governance structures. High digital maturity and robust IT infrastructure support adoption, while low maturity and resistance to change hinder it. Effective change management and investment in technology infrastructure are crucial for success. Overall, several key implications and areas of improvement that emerged pertaining to varying levels of digital maturity, persistent gap in ethical guidance, Dual upskilling requirement, enduring importance of human judgment and transition from tool-focused to strategic approach.

Based on the theoretical and practical insights obtained, the researcher is confident that the following set research objectives have been achieved:

i. an investigation into the factors leading to ethical challenges in the application of digital auditing tools in financial services;

ii. the presentation of the findings related to the ethical challenges of digital auditing tools;

iii. the analysis the findings related to the ethical challenges of digital auditing tools; and

iv. the recommend strategies for the ethical implementation of digital auditing tools in financial services.

6.3 Recommendations

While digital auditing tools enable audit efficiency and effectiveness, ethical considerations and challenges arise impacting auditors' roles, creating audit risk and compromising stakeholders' trust in audits. Ethical digital auditing is crucial, there is a need to balance efficiency and expertise, digital audit tools streamline processes, however auditor human judgement and scepticism is critical for accurate analysis of outcomes and ethical decision making. Below are recommendations made for enabling and enhancing ethical digital auditing practices, as derived from research participant's insights. The recommendations are made to key digital auditing stakeholders being auditors, audit functions, professional bodies, regulators and academic institutions.

i. ***Lehner et al. (2022) framework for ethical decision-making*** is recommended for all stakeholders because it provides a structured approach to addressing ethical challenges, focuses on key ethical issues, acknowledges the role of AI, and encourages adaptability in a changing technological landscape.

ii. ***Auditors*** should take advantage of training opportunities for upskilling in use and understanding of AI and other advanced technologies to develop integrated and hybrid skill set and competencies that merges financial expertise with data science and AI knowledge. They should also foster a

mindset of continuous development, learning and adaptability to help them stay effective and relevant in a rapidly evolving technological landscape. Furthermore, it's crucial that auditors continuously keep up to date with technological advancements and applications thereof in the profession.

Audit functions should create clear strategies for implementation of ethical digital auditing aligned with business goals as depicted in Table 5 below.

Table 6.1: Recommended strategies for implementation of ethical digital auditing

Strategy	Recommendation
Enhance Organisational Maturity and Readiness	Conduct a digital maturity assessment to identify current capabilities and areas for improvement. Develop a strategic roadmap to enhance IT infrastructure, establish robust processes, and foster a culture of innovation and continuous improvement.
Invest in Skills Development and Training	Implement comprehensive training programs focused on advanced data analytics, AI, and machine learning tools. Partner with academic institutions and professional bodies to offer certifications and continuous learning opportunities for auditors.
Leverage Professional Body Guidance	Engage with professional bodies to stay updated on the latest guidelines and best practices for digital auditing. Regularly review and incorporate professional guidance into organizational policies and training programs to ensure ethical technology adoption.
Strengthen Governance Structures	Establish governance committees to oversee the ethical use of digital audit tools and ensure compliance with relevant regulations. Develop clear policies and procedures for data quality, accessibility, and cybersecurity, and regularly review and update them.

Strategy	Recommendation
Invest in Technology Infrastructure and Resources	Allocate budget and resources for upgrading technology infrastructure to support digital audit tools. Prioritize investments in scalable and secure IT systems that can handle advanced auditing technologies.
Implement Effective Change Management	Develop a change management plan that includes clear communication, stakeholder engagement, and continuous support. Foster a culture of adaptability by encouraging employees to embrace new technologies and providing ongoing support during the transition to digital auditing.

iii. ***Professional bodies and regulators*** should establish comprehensive standards and clear guidelines for auditors' AI adoption. Working closely with technology developers and the audit industry, they should ensure that regulatory frameworks evolve alongside technological advancements. They also have a pivotal role to play in supporting technological innovation in the audit industry through backing up research and development initiatives, whilst upholding ethical standards in the profession and in public.

iv. ***Academic institutions*** should refresh their curricula offering to incorporate advanced digital auditing technologies. Partnerships with audit industry will help them align curricula so it gives students insights into real-world applications of AI and other advanced technologies, as they are applied in real auditing practices.

Furthermore, to implement ethical digital auditing practices, key reforms are needed across regions. In Johannesburg and South Africa, above recommendations apply, highlighting need for strengthening regulatory frameworks, investing in auditor development, adopting AI and blockchain, and ensuring data protection as crucial. For the SADC region, harmonising standards,

building local capacity, fostering cross-border collaboration, and establishing ethical guidelines are essential. Across Africa, investing in digital infrastructure, updating policies, increasing stakeholder awareness, and promoting research are vital. Globally, advocating for consistent standards, developing ethical frameworks, continuous compliance monitoring, and international collaboration are necessary to enhance transparency and trust in digital auditing.

This study contributes to the ongoing conversation in the literature about how auditing is being reshaped by digital transformation and highlights the critical importance of ethical considerations as an integral part of this evolution rather than an afterthought.

As noted by one participant, "*auditors will not disappear,*" but they must evolve to integrate technological capabilities with traditional audit values. The challenge for the profession is to develop systematic approaches to ethical technology implementation that preserve the core principles of audit while embracing the enhanced capabilities offered by 4IR technologies.

6.4 Suggestions for further research

Suggestions for further research encompass an investigation of how various types of digital auditing tools impact auditors' decision-making differently. This could involve comparing tools based on their complexity, functionality, and adoption rates. Secondly, a longitudinal study could be conducted to track how ethical concerns related to digital auditing tools evolve over time, especially as technology advances and becomes more integrated into auditing practices. Lastly a study could be conducted evaluating the effectiveness of ethical training programs for auditors who use digital auditing tools, assessing how well these programs prepare auditors to handle ethical dilemmas and ensure ethical decision-making.

These topics can help further explore the ethical implications of digital auditing tools and contribute to the development of best practices and guidelines in the financial services industry.

REFERENCES

Adelakun, B. O. (2022). Ethical Considerations in the Use of AI for Auditing: Balancing Innovation and Integrity. *European Journal of Accounting, Auditing and Finance Research,* 10(12), 91-108. https://doi.org/10.37745/ejaafr.2013

AICPA (2020). **AICPA Code of Professional Conduct.** Accessed 3 July at https://us.aicpa.org/research/standards/codeofconduct

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-T.

Alase, A. (2017). The Interpretative Phenomenological Analysis (IPA): A Guide to a Good Qualitative Research Approach. *International Journal of Education & Literacy Studies, 5(2); April 201.* http://dx.doi.org/10.7575/aiac.ijels.v.5n.2p.97

Albahsh, R., & Al-Anaswah, M. F. (2024). Artificial intelligence applications in auditing processes in the banking sector. *Corporate Ownership & Control, 21*(3), 35–46. https://doi.org/10.22495/cocv21i3art3

Al-Sharif (2023). Ethics In the Digital Age: Adapting Auditing Practices for Technological Challenges. TGS-Sarrio. *Experience the TGS Magazine, 3rd edition.* Retrieved from https://issuu.com/tgs-sarrio/docs/magazine-experience-edition3/s/34982309

Alshenqeeti, H. (2014). Interviewing as a Data Collection Method: A Critical Review. *International Journal of Education & Literacy Studies*, 3(1), 39-45. http://dx.doi.org/10.5430/elr.v3n1p39

Angeles, E. J. A. A., Mabazza, G. B. M., Pascua, A. E. G. B. P., Salta, K. E. S., Santiago, Z. J. V. S., Marquez, J. M., & Catacutan, K. J. (2023). Shift to Digital Audit: A Study Investigating the Benefits and Challenges of Digitalization on the Audit Profession. *Asian Journal of Management Analytics*, *2*(4), 415–440. https://doi.org/10.55927/ajma.v2i4.6294

Ayinla, B. S., Atadoga, A., Ike, C. U., Ndubuisi, N. L., Asuzu, O. F., & Adeleye, R. A. (2024). The Role of Robotic Process Automation (RPA) in Modern Accounting: A Review - Investigating How Automation Tools Are Transforming Traditional Accounting Practices. *Engineering Science & Technology Journal*, 5(2), https://doi.org/10.51594/estj.v5i2.804

Balamurugan, A., Krishna, M. V., Bhattacharya, R., Mohammed, S., Haralayya, B., & Kaushik, P. (2022). Robotic Process Automation (RPA) in Accounting and Auditing of Business and Financial Information. *Manager.* 58(157):127-142. Accessed 1 July 2024 at https://www.researchgate.net/publication/370418613_robotic_process_automation_rpa_in_accounting_and_auditing_of_business_and_financial_information

Bose, S., Dey, S.K., & Bhattacharjee, S. (2022). Big data, data analytics and artificial intelligence in accounting: an overview". In *Handbook of Big Data Research Methods*. Cheltenham, UK: Edward Elgar Publishing. Retrieved Jul 8, 2024, from https://doi.org/10.4337/9781800888555.00007

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101**.** https://doi.org?10.1191/1478088706qp063oa

Cai, C.W. (2021), Triple-entry accounting with blockchain: How far have we come? *Account Finance*, 61: 71-93. https://doi.org/10.1111/acfi.12556

Chartered Professional Accountants of Canada (CPA Canada) and the American Institute of CPAs (AICPA) (2020). The Data-Driven Audit: How Automation and AI are Changing the Audit and the Role of the Auditor. Retrieved April 19,2024 from https://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiAjdSD2o2HAxXMTEEAHY9mDF0QFnoECA4QAQ&url=https%3A%2F%2Fus.aicpa.org%2Fcontent%2Fdam%2Faicpa%2Finterestareas%2Ffrc%2Fassuranceadvisoryservices%2Fdownloadabledocuments%2Fthe-data-driven-audit.pdf&usg=AOvVaw04pZjhh7yRJ1ACkvtD7HI9&opi=89978449

Chimboza, T., & Smith, E. (2024). How Does Compliance with the Protection of Personal Information Act (POPI Act) Affect Organisations in South Africa. *African Conference on Information Systems and Technology. 19.* https://digitalcommons.kennesaw.edu/acist/2024/presentations/19

Costanza-Chock, S., Raji, I. D., & Buolamwini, J. (2022). Who Audits the Auditors? Recommendations from a field scan of the algorithmic auditing ecosystem. *Proceedings of the 2022 ACM Conference on Fairness, Accountability, and Transparency* (pp. 1571-1583). https://doi.org/10.1145/3531146.3533213.

Dahiyat, A. (2022). Robotic process automation and audit quality. *Corporate Governance and Organizational Behavior Review, 6*(1), 160–167. https://doi.org/10.22495/cgobrv6i1p12

Dennis, A. (2024). What AI can do for auditors. *Journal of Accountancy.* Accessed 19 April 2024 https://www.journalofaccountancy.com/issues/2024/feb/what-ai-can-do-for-auditors.html

Elommal, N. & Manita, R. (2022). How Blockchain Innovation could affect the Audit Profession: Qualitative Study. *Dans Journal of Innovation Economics & Management 2022/1 (N° 37), pages 37 à 63Éditions De Boeck Supérieur.* https://doi.org/10.3917/jie.pr1.0103

El-Mousawi, H., Jaber, A., & Fakih, I. (2023). Impact of Using Artificial Intelligence Applications on the Accounting and Auditing Profession–An Exploratory Study from the LCPAs' Perspective. *Journal of Business Theory and Practice.* 11. p1. https://doi.org/10.22158/jbtp.v11n4p1

Eulerich, M., Masli, A., Pickerd, J. and Wood, D.A. (2023), The Impact of Audit Technology on Audit Task Outcomes: Evidence for Technology-Based Audit Techniques†. Contemp Account Res, 40: 981-1012. https://0-doi-org.innopac.wits.ac.za/10.1111/1911-3846.12847

Ezedike, E. U. (2020). A Contemporary Analysis of Kant's Concept of Goodwill and the Categorical Imperative. *PINISI Discretion Review*, 3(2), 185-194. Retrieved 4 July 2024 https://media.neliti.com/media/publications/314484-a-contemporary-analysis-of-kants-concept-1eecaaef.pdf

Faster Capital. (2024). Independence: Upholding Professional Ethics by Auditing Standards Board. Retrieved April 19,2024 from https://fastercapital.com/content/Independence--Upholding-Professional-Ethics-by-Auditing-Standards-Board.html

Faster Capital (2024). The Impact of Automation and Data Analytics on Auditing. Retrieved April 19,2024 fromhttps://fastercapital.com/startup-topic/Impact-of-AI-and-Automation.html#:~:text=Overreliance%20on%20Technology%3A,human%20judgment%20and%20automated%20processes

FCSA (2022). Financial Sector Outlook Study, 2022. https://www.fsca.co.za/Documents/FSCA%20Financial%20Sector%20Outlook%20Study%202022.pdf

Fedyk, A., Hodson, J., Khimich, N. & Fedyk, T. (2022). Is artificial intelligence improving the audit process? *Review of Accounting Studies,* 27(3), 938-985. https://doi.org/10.1007/s11142-022-09697-x

Fishbein, M., & Ajzen, I. (1977). Belief, attitude, intention, and behaviour: An introduction to theory and research, 27(2), 123-156.

FS-ISAC. (2024). Adversarial AI Frameworks: Taxonomy, Threat Landscape, and Control Frameworks. Accessed 2 July 2024 at https://www.fsisac.com/knowledge/ai-risk

FS-ISAC. (2024). Building AI into Cyber Defense 4Combating Threats and Reducing. Accessed 2 July 2024 at https://www.fsisac.com/knowledge/ai-risk

FS-ISAC. (2024). Combating Threats and Reducing Risks Posed by AI. Accessed 2 July 2024 at https://www.fsisac.com/knowledge/ai-risk

FS-ISAC. (2024). Framework of Acceptable Use Policy for External Generative AI. Accessed 2 July 2024 at https://www.fsisac.com/knowledge/ai-risk

FS-ISAC. (2024). Responsible AI Principles. Accessed 2 July 2024 at https://www.fsisac.com/knowledge/ai-risk

FS-ISAC. (2024). The Generative AI Vendor Evaluation and Qualitative Risk Assessment. Accessed 2 July 2024 at https://www.fsisac.com/knowledge/ai-risk

Gorichanaz, T. (2023). A Compass for What Matters: Applying Virtue Ethics to Information

Behavior. *Open Information Science*, *7*(1), 20220151. https://doi.org/10.1515/opis-2022-0151

Grant, C., & Osanloo, A. (2014). Understanding, selecting, and integrating a theoretical framework in dissertation research: Creating the blueprint for your "house." *Administrative Issues Journal: Connecting Education, Practice, and Research*, 4(2), 12-26. https://doi.org/10.5929/2014.4.2.9

Griffiths, L., & Pretorius, H. (2021). Implementing Robotic Process Automation for Auditing and Fraud Control. Society 5.0. 26-36. https://doi.org?10.1007/978-3-030-86761-4_3

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105–117). Sage Publications, Inc

Han, H., Shiwakoti, R., Jarvis, R., Mordi, C., & Botchie, D. (2023). Accounting and auditing with blockchain technology and artificial Intelligence: A literature review. *International Journal of Accounting Information Systems*, 48,2023,100598. https://doi.org/10.1016/j.accinf.2022.100598.

Haradhan, M. (2018). Qualitative research methodology in social sciences and related subjects. Accessed 24. *Journal of Economic Development, Environment and People,* 7(1), 23-48. https://mpra.ub.uni-muenchen.de/85654/

Herath, S.K. & Hamm, A. (2023). How big data analytics is used in forensic accounting and auditing. *The Business and Management Review, 14(1).* DOI:10.24052/BMR/V14NU01/ART-12

Ho, C. (2024). Statement on the Adoption of Amendments Related to Aspects of Designing and Performing Audit Procedures that Involve Technology-Assisted Analysis of Information in Electronic form – Catching up to the Technology Advancements. Accessed on 2 July 2024 at https://pcaobus.org/news-events/speeches/speech-detail/statement-on-the-adoption-of-amendments-related-to-aspects-of-designing-and-performing-audit-procedures-that-involve-technology-assisted-analysis-of-information-in-electronic-form---catching-up-to-the-technology-advancements

IIA. (2024). Code of Ethics. Introduction to the Code of Ethics. Accessed 3 July at https://www.theiia.org/en/standards/what-are-the-standards/mandatory-guidance/code-of-ethics/

Kant, I., Bennett, C., Saunders, J., & Stern, R. (2019). Groundwork for the Metaphysics of Morals. Oxford University Press, 2019. 144 pages. ISBN 978-0-19-878619-1.

Kapur, N., & Singh, A.K. (2022). Robotics process automation and Internal Audit: A transformation. *The Management Accountant*. July 2022. p58-63. https://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiT_8qxoJeHAxV2VUEAHULIAyIQFnoECBEQAQ&url=https%3A%2F%2Fnirdprojms.in%2Findex.php%2Fmaj%2Farticle%2Fview%2F170854%2F116212&usg=AOvVaw0d4Q9aE-bABimravmPsVRv&opi=89978449

Kivunja, C., & Kuyini, A. B. (2017). Understanding and Applying Research Paradigms in Educational Contexts. International Journal of Higher Education, 6, 26-41. https://doi.org/10.5430/ijhe.v6n5p26

KPMG. (2021). Robotic process automation (RPA) powering up the audit. Retrieved April 19,2024 from https://kpmg.com/za/en/home/insights/2021/11/robotic-process-automation--rpa--powering-up-the audit.html#:~:text=Robotics%20in%20the%20audit&text=process%20automation%20(RPA)-,RPA%20is%20the%20simplest%20form%20of%20digital%20labour.,team%20of%20humans%20could%20manage.&text=RPA%20is%20the%20simplest%20form%20of%20digital%20labour.,-Its%20significance%20is

KPMG. (2024). AI in financial reporting and audit: Navigating the new era. Retrieved July 8,2024 https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2024/04/ai-in-financial-reporting-and-audit-web.pdf

Leech, N. L., & Onwuegbuzie, A. J. (2007). An array of qualitative data analysis tools: a call for data analysis triangulation. *School Psychology Quarterly*, 22(4), 557-584. https://doi/org.10.1037/1045-3830.22.4.557

Lehner, O.M., Ittonen, K., Silvola, H., Str¨om, E., and Wührleitner, A. (2022). Artificial intelligence based decision-making in accounting and auditing: ethical challenges and normative thinking. *Accounting, Auditing & Accountability Journal.* 35 (9), 109–135. https://doi.org/10.1108/AAAJ-09-2020-4934

Leocádio, D., Malheiro, L., & Reis, J. C. G. d. (2024). Auditors in the digital age: a systematic literature review. *Digital Transformation and Society*, Vol.4 No.1, pp. 5-20. https://doi.org/10.1108/DTS-02-2024-0014

Lugli, E. and Bertacchini, F. (2023), "Audit quality and digitalization: some insights from the Italian context". *Meditari Accountancy Research*. 31(4), 841-860. https://doi.org/10.1108/MEDAR-08-2021-1399

Mbonye, V., Moodley, M. & Nyika, F. (2024). Examining the applicability of the Protection of Personal Information Act in AI-driven environments. *South African Journal of Information Management* 26(1), a1808. https://doi.org/10.4102/sajim.v26i1.1808

Mookerjee, J., & Rao, O. R. S. (2021). A Review of the Robotic Process Automation's Impact as a Disruptive Innovation in Accounting and Audit. *Turkish Journal of Computer and Mathematics Education*, 12(12), 3675-3682. https://doi.org/10.17762/turcomat.v12i12.8117

Murikah, W., Nthenge, J. K., & Musyoka, F. M. (2024). Bias and ethics of AI systems applied in auditing - A systematic review. *Scientific African*, 25, e02281. https://doi.org/10.1016/j.sciaf.2024.e02281

Odeyemi, O., Awonuga, K. F., Mhlongo, N. Z., Ndubuisi, N. L., Olatoye, F. O., & Daraojimba, A. I. (2024). The transformative impact of artificial intelligence on auditing practices globally1. *World Journal of Advanced Research and Reviews*, 21(02), 359–370. https://doi.org/10.30574/wjarr.2024.21.2.0460

PCAOB. (2023). Proposed Amendments Related to Aspects of Designing and Performing Audit Procedures that Involve Technology-Assisted Analysis of Information in Electronic Form. PCAOB Release No. 2023-004 June 26, 2023. PCAOB Rulemaking Docket Matter No. 052. Accessed 2 July at https://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwi6hK34l4mHAxU9W0EAHXSfDT0QFnoECCQQAQ&url=https%3A%2F%2Fassets.pcaobus.org%2Fpcaob-dev%2Fdocs%2Fdefault-source%2Frulemaking%2Fdocket-052%2Fpcaob-release-no.-2023-004-technology-assisted-analysis.pdf%3Fsfvrsn%3Db801ffd0_2&usg=AOvVaw0Z95TKPHZVW4wjv8abQydi&opi=89978449

PCAOB (2024). Project History: Amendments Related to Aspects of Designing and Performing Audit Procedures That Involve Technology-Assisted Analysis of Information in Electronic Form. Accessed on 2 July 2024 at https://pcaobus.org/oversight/standards/standard-setting-research-projects/amendments-related-to-certain-aspects-of-designing-and-performing-audit-procedures-that-involve-technology-assisted-data-analysis

Polkinghorne, D.E. (2005). Language and meaning: Data collection in qualitative research. *Journal of Counselling and Psychology*, 52(2), 137–145. https://doi.org/10.1037/0022-0167.52.2.137

Plattfaut, R., Borghoff, V., Godefroid, M., Koch, J., Trampler, M., & Coners, A. (2022). The Critical Success Factors for Robotic Process Automation. *Computers in Industry*, 138, 103646. https://doi.org/10.1016/j.compind.2022.103646

Ragubeer, S. (2022). Redesigning Internal Audit Practices in South Africa: Understanding the influence of intelligent automation technology on internal audit practices. http://hdl.handle.net/2263/90826

Rest, J.R. (1986), Moral Development: Advances in Research and Theory, Praeger, New York, p. 224.

Rest, J.R. (1994), Moral Development in the Professions: Psychology and Applied Ethics, Psychology Press, Hillsdale, NJ.

Robeyns, I. (2005). The capability approach: A theoretical survey. Journal of Human Development, 6, 93–117. https://doi.org/10.1080/146498805200034266

SADC (2024). Annual corporate plan 2024/25 (consolidated annual operational plans and

budgets). Accessed 29 June 2024 at https://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwi6r_KYm4GHAxUeWEEAHYakAioQFnoECBwQAQ&url=https%3A%2F%2Fwww.sadc.int%2Ffile%2F9191%2Fdownload%3Ftoken%3DS6GEY_cD&usg=AOvVaw2HhsuCo8eXx4npQBEjCJVV&opi=89978449

Santoso, B. (2020). The Impact of Information Technology on the Audit Process: Auditors' Perspectives. *Golden Ratio of Auditing Research*,1(1), 11-23. https://doi.org/10.52970/grar.v1i1.362

Smith, J. A., & Nizza, I. E. (2022). What is interpretative phenomenological analysis? Essentials of interpretative phenomenological analysis (pp. 3–10). American Psychological Association. https://doi.org/10.1037/0000259-001

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104,2019, 333-339. https://doi.org/10.1016/j.jbusres.2019.07.039.

SteenKamp, L., & Smidt L. (2024). Ethical Perspectives on Digital Auditing. Good Governance Academy Webinar, 15 May 2024. Accessed May 20 2024 https://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiwr9LyspeHAxVcQUEAHZilCdAQFnoECBYQAQ&url=https%3A%2F%2Fgoodgovernance.academy%2Fethical-perspectives-on-digital-auditing%2F&usg=AOvVaw2rKlzYb8Bom7byJOYVtZRk&opi=89978449

Stein, K.M. (2023). PCAOB. Algorithms, Audits, and the Auditor. Accessed 2 July 2024 at https://pcaobus.org/news-events/speeches/speech-detail/algorithms-audits-and-the-auditor

Stockle, S. (2024). All Eyes on: AI in Audit. KPMG Blog. Accessed at https://kpmg.com/xx/en/blogs/home/posts/2024/02/all-eyes-on-ai-in-audit-2024.html

Stockle, S. (2023). All Eyes on Continuous auditing. KPMG Blog. Accessed at https://kpmg.com/xx/en/blogs/home/posts/2023/02/all-eyes-on-continuous-auditing.html

Tavares, M. C., Zimba, L. N., & Azevedo, G. (2022). The Implications of Industry 4.0 for the Auditing Profession. *International Journal of Business Innovation*. 1(1), e27625. https://doi.org/10.34624/ijbi.v1i1.27625

The Independent Regulatory Board for Auditors (IRBA) (2023). Final Pronouncement: Technology-related Revisions to the IRBA Code of Professional Conduct for Registered Auditors. Retrieved from https://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwit95Ozj9KFAxVs_7sIHejSBxcQFnoECCQQAQ&url=https%3A%2F%2Fwww.irba.co.za%2Fupload%2Freport_files%2F71.-Technology-communique.pdf&usg=AOvVaw0ED_4XAX3_wxkplQOaDj4M&opi=89978449

Tiron-Tudor, A., & Deliu, D., (2022). Reflections on the human-algorithm complex duality perspectives in the auditing process. *Qualitative Research in Accounting & Management*, 19(3), 255-285. https://doi.org/10.1108/QRAM-04-2021-0059

Tiron-Tudor, A., Lacurezeanu, R., Bresfelean, V.P. and Dontu, A.N. (2024), Perspectives on How Robotic Process Automation Is Transforming Accounting and Auditing Services†. *Accounting Perspectives*, 23(1), 7-38. https://doi.org/10.1111/1911-3838.12351

Tracy, S. J. (2010). Qualitative quality: Eight “big-tent” criteria for excellent qualitative research. *Qualitative Inquiry*, 16(10), 837-851. https://doi.org/10.1177/1077800410383121

Wagstaff, C., Jeong, H., Nolan, M., Wilson, T., Tweedlie, J., Phillips, E., Senu, H., & Holland, F. (2014). The Accordion and the Deep Bowl of Spaghetti: Eight Researchers' Experiences of Using IPA as a Methodology. *The Qualitative Report*, *19*(24), 1-15. https://doi.org/10.46743/2160-3715/2014.1216

Wolters Kluwer (2023). Harnessing the Cloud: The Transformation of Audit Firms to Unlock Efficiencies. *Wolters Kluwer 2023-24 Audit Industry Report*. Retrieved from https://www.wolterskluwer.com/en-my/expert-insights/audit-industry-trends-harnessing-cloud-technology#form#gc

Yang, W., Ziyang, W., Xiaohao, Z., & Jianming, Y. (2022). The optimisation research of

Blockchain application in the financial institution-dominated supply chain finance system. *International Journal of Production Research*, 61(11), 3735–3755. https://doi.org/10.1080/00207543.2022.2087567

Zhang, C., Zhu, W., Dai, J., Wu, Y., & Chen, X. (2023). Ethical impact of artificial intelligence in managerial accounting. *International Journal of Accounting Information Systems*, 49, 100619. https://doi.org/10.1016/j.accinf.2023.100619

APPENDIX A (Research Instrument)

INTERVIEW GUIDE

Affirming Participant's Profile

i. What is your highest education qualification? Bachelor 'Degree/Honours Degree/Masters/Doctorate?
ii. What auditing certifications do you hold? CA (SA)/ CISA/ CIA/ ACCA/ CMA/ CFE?
iii. How long have you been auditing?

RO1: Adoption and applications of digital auditing tools

(1) What advanced technologies have you adopted in your financial services auditing practices (RPA, AI, ML, Advanced Analytics)?

(2) What do the various intelligent tools enable you to do in financial services auditing? How long? Which financial institutions? How?

(3) What do the various process automation tools enable you to do in auditing? How long? Which financial institutions? How?

(4) What are the biggest advantages you've experienced utilising these technologies in your financial services audit execution?

(5) What are the biggest disadvantages/challenges you've experienced utilising these technologies in your financial services audit execution?

RO2: Ethical challenges of digital audit tools

(6) What are some common ethical issues you have encountered while using digital auditing tools in financial services?

(7) Have you noticed any biases or fairness issues in the outcomes provided by digital auditing tools in financial services audits? How do you address these concerns?

(8) How do you handle data privacy and security when using digital tools in your financial services audits? What ethical considerations are involved?

(9)

RO3: Ethical decision making

(10) Can you share an instance where you faced an ethical dilemma involving digital auditing tools in financial services? How did you resolve it?

(11) What lessons have you learned about ethical decision-making from your experience with digital auditing tools in financial services?

(12) How have digital auditing tools changed the way you approach ethical decision-making in your financial services auditing practice?

(13) Are there specific ethical guidelines you follow when using digital auditing tools? How effective do you find these guidelines in addressing ethical issues?

(14) What kind of training or support have you received regarding the ethical use of digital auditing tools? How has it impacted your ethical decision-making?