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Title:

Investigating the Consumer Implications of Artificial Emotional Intelligence (AEI) in the context of Digital Banking in South Africa

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

Supervisor: Dr Cheryl Genga

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LIST OF ACRONYMS

A

Artificial Emotional Intelligence
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Artificial Intelligence
(AI) 16

H

Human-Computer Interaction
(HCI) 16, 21, 22, 23, 25

P

perceived ease of use
(PEOU) 38

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(PU) 38

T

Technology Adoption Model
(TAM2) 38, 44

DECLARATION

I Sanusha Reddy declare that this thesis, "Exploring the Consumer Implications of Artificial Emotional Intelligence (AEI) in the context of Digital Banking in South Africa," is the result of her own research. I acknowledge that this work is submitted primarily to partially fulfil the Master of Management degree in Digital Business at the University of Witwatersrand, Johannesburg.

I produced and completed this work alone for the stated objective. The University of the Witwatersrand and other institutions have not considered this for any other degree, diploma, or exam.

I realise that breaking the above declarations is academic misconduct and may result in university disciplinary action. All sources were properly cited and acknowledged according to academic and ethical standards.

I confirm that all research in this document, unless otherwise cited, is my own. I acknowledge my supervisor(s) and collaborators for their guidance and resources.





…… ……

Sanusha Reddy **Supervisor: Dr Cheryl Genga**

31 May 2024 31 May 2024

…… ……

Date **Date**

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ABSTRACT

A revolution in human-computer interaction has been brought about by the swift developments of artificial intelligence (AI), especially following the emergence of artificial emotional intelligence (AEI). The integration of AEI in the South African digital banking industry was investigated in this master's thesis, along with the potential and limitations it represented. The study used a quantitative research technique to collect data from Gauteng region residents who use digital banking. Surveys were used to evaluate user experience, ethical issues, and the effect of AEI on consumer trust and privacy.

The results showed that although AEI improved user experiences by offering emotionally intelligent and tailored interactions, it also brought up serious issues with data security, privacy, and the possibility of emotional abuse. Additionally, the study revealed a significant deficiency in the existing regulatory structures, which had difficulty keeping up with the rapid advancements in technology. By giving a thorough examination of how AEI affected user habits and banking practices, the study added to the body of knowledge in the academic community. It also made recommendations for digital banking institutions on how to create strong policies and frameworks for the moral use of AI technology. This study contributed to the wider conversations on AI ethics and legal requirements while also deepening our understanding of AEI in the context of digital banking.

KEY WORDS

Artificial Emotional Intelligence

Artificial Intelligence

Consumer

Customer Experience

Digital Bank

Ethics

Gauteng

Human-Computer Interaction

Internet Access

Personalised

Privacy

South Africa

Technology

SUMMARY OF OBJECTIVES

The primary goals of this master's research were to investigate the various complex consequences of Artificial Emotional Intelligence (AEI) in the context of Human-Computer Interaction (HCI), with a specific emphasis on the digital banking industry in South Africa. The study was designed based on a few fundamental goals:

- Evaluate the consumer experience with the use of Artificial Emotional Intelligence (AEI) in digital banking, with a specific emphasis on user contentment, perceived advantages, and possible disadvantages.
- Examine alterations in consumer behaviour associated with the implementation of AEI, specifically in relation to ethical considerations and privacy concerns.
- Analyse the obstacles to the implementation of AEI, focusing on the accessibility of the internet and devices, to comprehend the impact of these factors on the digital divide.

The objectives were formulated to facilitate a thorough comprehension of the impact of AEI on digital banking experiences, consumer trust, and ethical considerations. The objective was to provide input for the creation of frameworks and rules that guarantee responsible and user-focused AI practices in digital banking, thereby improving both customer happiness and ethical standards.

CHAPTER 1. INTRODUCTION

1.1 Background of the study

The expansion of Artificial Intelligence (AI) technology has resulted in tremendous improvements in a variety of disciplines, most notably Human-Computer Interaction (HCI) (Milczarek, 2023, p. 4). According to Dazeley et al., a significant turning point in the development of AI is the emergence of Artificial Emotional Intelligence (AEI), (2021). The way people interact with computers has changed by AEI, which gives AI systems the unmatched capacity to recognise, understand, and respond to human emotions. With the help of this ground-breaking innovation, we can expect highly customised and sensitive digital experiences (Dazeley et al., 2021, p. 12). The arguments linked to Artificial intelligence were developed based on considerable research and intense arguments on its ethical implications and societal ramifications.

Digital firms, according to Nyagadza, particularly the South African Banking Industry, are leading the way in integrating AI and AEI into their goods and services, as stated by, motivated by improving user experiences and achieving competitive advantages (Nyagadza et al., 2022, p. 5). However, adopting AEI systems for emotion analysis and the response has raised real issues. These considerations include bias risks, the possibility of emotional manipulation, user privacy, and permission (Pflanzer et al., 2023, p. 10). Notably, the continual monitoring and surveillance of emotions in HCI raises concerns about technology's encroachment into people's emotional realms.

In response to these serious concerns, this study analyses the consequences of AEI within HCI, with a specific focus on the South African digital banking sector. The key objectives are to investigate the various issues and opportunities arising from incorporating AEI into digital interactions.

The study gathered feedback from digital banking users leveraging quantitative surveys as a significant research tool. The study provides valuable insights into

the ethical dimensions of AEI in HCI, such as the impact on user experience, privacy, barriers to access, and general well-being. The primary objective is to further support digital banking organisations in creating solid frameworks and standards for designing, implementing, and regulating AEI technologies while building a deeper understanding of the requirements for improving the digital banking user experience using AEI.

This study fills a research void by investigating how AEI technologies can be tailored and integrated into South African digital banking to meet the unique requirements and circumstances of local users (Gertze & Petersen, 2024, p. 4). This approach seeks to offer comprehensive insights into the uses of AEI in a market that has received relatively little attention, so making a beneficial contribution to the wider field of AEI in digital banking.

Recognising the need to address the consequences and effects of AEI within the framework of digital banking practises, this research has taken a unique position in the South African digital banking market. It investigated how AEI affects user experiences, with particular attention paid to the South African digital banking landscape. Doing so advances the awareness of this crucial area while clarifying wider societal ramifications or related issues with digital banking.

1.2 Research Problem

In the current digital banking ecosystem, AEI, the transformative technology that enables AI systems to recognise, analyse, and respond to human emotions, can potentially revolutionise user experiences in digital banking (Ahmed, 2022, p. 57). Nonetheless, this technological advancement raises many complex ethical issues, including user privacy, emotional manipulation, bias, emotional monitoring, and the impact on general well-being (Pflanzer et al., 2023, pp. 926-930). While these studies contribute to the body of knowledge, the findings have no immediate link to the ethical implications and ramifications of using AEI in HCI in the South African digital banking sector.

The body of knowledge on AEI in digital banking is limited because minimal relevant global studies exist on the topic, specifically within an African context. These markets are digitally banked and are familiar with AI technology, specifically how AEI affects user engagement within the digital banking sector (Ahmed, 2022, p. 60).

The study has added substantively to the academic and practical understanding of AI ethics, notably by providing light on the ethical elements connected with AEI in HCI within digital banking (Obuchettiar & Megargel, 2023, p. 333). However, Obuchettiar & Megargel identified a significant gap globally, which is the gap in standards and frameworks, which are critical for the ethical integration of AEI in HCI, particularly within the complex digital banking ecosystem (2023).

The need for knowledge on AEI in the South African digital banking sector makes it difficult for the sector to scale the rapid adoption of AEI like its global counterparts while remaining competitive by offering bespoke customer experiences. Regrettably, organisations tend to depend on empirical knowledge that fails to adequately address the unique obstacles faced by South Africa, particularly in terms of accessing modern digital banking technologies. Therefore, the primary goal of this research is to provide diverse insights into the elements of AI technology, with a specific emphasis on exploring how AEI impacts various aspects of consumer user involvement in the South African digital banking sector.

1.3 Statement Of Purpose

This study analysed the function and influence of Artificial Emotional Intelligence (AEI) in the field of Human-Computer Interaction (HCI), particularly in the digital banking industry in South Africa. The motivation behind this study was the significant impact that AEI (Artificial Emotional Intelligence) can have on improving user experiences in digital banking platforms. AEI has the potential to revolutionise interactions by allowing for more personalised and emotionally responsive interactions between users and the platform.

As AEI technology advanced, they created new possibilities for expanding digital banking services, which could result in enhanced client satisfaction and loyalty. Nevertheless, these progressions also brought about noteworthy ethical, privacy, and socio-economic dilemmas that required attention to guarantee responsible and comprehensive implementation of technology. This study examined these difficulties, with a specific emphasis on the consequences of AEI on customer behaviour, privacy, trust, and accessibility in the digital banking setting.

1.4 Research Objectives

i. Assessment of Consumer Experience and Knowledge:
   - Assessed the complete interaction of AEI digital banking audience members, evaluating their degree of knowledge, merits gained, along with challenges encountered.
     - Hypothesis 1: A greater confidence in the potential of AEI to improve the online banking experience correlated with a higher level of understanding of AI.
     - Hypothesis 2: Users' comprehension of AEI and favourable experiences with it positively correlate with the belief in its benefits for enhancing South African online banking services.

ii. Analysis of Consumer Decisions in conjunction to Ethics and Privacy:
   - Explored the ethical dilemmas associated with Artificial Emotional Intelligence (AEI) in the realm of digital banking, with a specific emphasis on issues related to privacy, consent, and emotional manipulation. Evaluated the consequences of these challenges on customer trust and their willingness to share personal data.
     - Hypothesis 3: There is a direct correlation between the significance of control over AEI applications in digital banking and user concerns about privacy.

iii. Analysis of Internet and Device Access:
   - Examined and assessed obstacles to the adoption of AEI (Artificial Emotional Intelligence) in digital banking, including limitations in

internet and device accessibility, as well as variations in digital literacy among different demographic groups.

- Hypothesis 4: Obstacles related to Internet connectivity and device accessibility significantly impede the effective implementation and consumer adoption of Artificial Emotional Intelligence (AEI) innovations in the digital banking sector in South Africa.

1.5 Rationale

Investigating the implications and consumer effect of Artificial Emotional Intelligence (AEI) in Digital Banking from a South African viewpoint is critical for numerous compelling reasons:

i. The Importance of AI and AEI in Digital Banking: The rapid growth of AI technology and the incorporation of AEI can change the landscape of digital banking by providing highly personalised and emotionally responsive services (Kanaparthi, 2024, pp. 4–5). Understanding the ethical implications of AEI is crucial for guaranteeing responsible and user-centric AI development, given the expanding significance of digital banking in South Africa and its reliance on AI technologies (Foffano et al., 2023, p. 480).
ii. Focus on User Experience and Well-being: This study investigates how AEI affects many areas of user involvement, such as user experience, privacy, emotional manipulation, bias, emotional surveillance, and general well-being in the context of digital banking (Latif et al., 2022, pp. 10–11). Understanding these characteristics is critical for digital banking organisations wishing to make informed decisions and prioritise consumer trust and satisfaction in South Africa's unique banking environment.
iii. Frameworks: As South African digital banking firms progressively utilise AEI technology, formulating rules becomes critical. This research project intends to provide practical recommendations for developing principles and frameworks that will guide the design, deployment, and regulation of

AEI technologies while protecting user interests and privacy (Renda, 2019, pp. 57–71).

iv. Access: To ensure inclusive digital financial services, internet and device access must be studied in relation to Internet banking and AEI. The study aims to gain a broader understanding of these aspects needed to improve AEI efficacy and digital banking user engagement in South Africa if access discrepancies exist (Msweli, 2020, p. 18).

v. Contribution to Academic and Practical Knowledge: This research contributes to the academic discourse on AI concerning AEI, particularly in the context of Human-Computer Interaction (HCI) in digital banking. It expands on the existing knowledge and guides ethical conversations and decisions in the area by providing empirical insights into the ethical components of AEI.

This research provides significant insights into the implications and consequences of Artificial Emotional Intelligence (AEI) in Human-Computer Interaction (HCI), specifically within the digital banking domain in South Africa. The findings of this study will be of great significance to digital banking organisations as they navigate the ethical dilemmas presented by AI systems. Its goal is to encourage the responsible implementation of user-centred AI development practices within the digital banking context (Pflanzer et al., 2023, p. 923).

1.6 Delimitations of the study

The boundaries of the study " Investigating the Consumer Implications of Artificial Emotional Intelligence (AEI) in the context of Digital Banking in South Africa" can be defined as follows:

The study aimed to:

i. Focus on the implications and repercussions of AEI in the setting of digital banking organisations.

ii. The research focused on the implications of AEI on Human-Computer Interaction (HCI) and its impact on user experience, privacy, emotional manipulation, and bias.
iii. The investigation was limited to the effects of AEI on Human-Computer Interaction (HCI) and its impact on user experience, privacy, emotional manipulation, bias, emotional surveillance, and general well-being.

Conceptual Restrictions:

i. The study focused on the components of AEI in HCI rather than the more complex social implications of AEI or ethical concerns unrelated to HCI.
ii. The investigation was on the impact of AEI on overall HCI and does not extend to exploring individual AI performance and the impact of AEI on overall HCI.

Geographical Boundaries:

iii. The study was limited to digital banking users executed in the Gauteng Region.

Methodology:

iv. The study collected data using quantitative research approaches such as questionnaires to examine user opinions, attitudes, and experiences.
v. The study collected data from digital banking users via questionnaires, limiting the scope of data collection methods.

Organisational Structure:

vi. The study focused on digital banking organisations. The focus was on the entities' digital traits, including using mobile phones and the internet to access the platform.

Timeframe:

vii. The timeframe for the investigation was 2 Months post the approval of the proposal.

Legal and Regulatory Frameworks:

viii. The report does not mention the legal and regulatory frameworks governing AI or AEI in the jurisdiction of the selected digital banking organisations.

Various constraints have been identified. However, these constraints aid in establishing the scope and boundaries of the study.

1.7 Assumptions

Assumptions that influenced the findings of the study on the implications of Artificial Emotional Intelligence (AEI) in Human-Computer Interaction (HCI) in the context of digital banking in South Africa:

- Assumption: Users needed to be made aware of the presence and scope of AEI in their interactions with digital financial systems.
  i. Reasonability: It was acceptable to anticipate that customers were only occasionally fully aware of the presence and scope of AEI in digital banking interactions, as these technologies could easily integrate into system capabilities and user interfaces.
  ii. Sensitivity: Lack of user understanding of AEI impacted the correctness of their responses and viewpoints in the research, thereby influencing data reliability and overall research conclusions.
- Assumption: Perceptions of the implications of AEI in HCI may differ depending on cultural, societal, and individual factors.
  i. Reasonability: While some ethical principles are universally accepted, there may be differences in opinions on what constitutes proper usage of AEI in digital banking due to cultural, societal, and individual beliefs. Sensitivity to cross-cultural and individual variances in ethical concerns is crucial to ensure the universal applicability of study findings. This concern necessitates the development of personalised recommendations that are particular to different situations.

ii. Sensitivity: If ethical issues differ significantly among cultures or individuals, the research findings may not be universally relevant, necessitating adapted suggestions for specific circumstances.

- Assumption: Survey responses correctly reflect users' accurate opinions and experiences with AEI in digital banking HCI.
  i. Reasonability: This presumption assumes that survey participants will give truthful and precise answers. Participants could, however, give socially acceptable answers or may need to fully comprehend the ethical implications, which could jeopardise the accuracy of the data.
  ii. Sensitivity: Inaccurate or biased responses could skew research findings and lead to erroneous conclusions about how users view AEI in digital banking HCI.
- Assumption: User preferences for privacy and emotional engagement correspond with ethical considerations.
  i. Reasonableness: Users' priorities can differ; some may place more importance on convenience and personalised experiences than on privacy issues, or they may be willing to put up with some emotional manipulation in exchange for improved interactions.
  ii. Sensitivity: If user preferences do not coincide with established ethical considerations, the research may entail an evaluation of potential conflicts between user desires and ethical imperatives in the context of AEI in digital banking HCI.

These assumptions identify potential areas of sensitivity and emphasise the significance of careful attention in the design and execution of the research. Addressing these assumptions and their potential impact on research findings is critical for ensuring the study's integrity and comprehensiveness.

1.8 Definition of Terms

This section defines essential terms and concepts related to the research issue within the study context.

Artificial Emotional Intelligence (AEI): Artificial Emotional Intelligence refers to the development and application of artificial intelligence systems capable of recognising, comprehending, and responding to human emotions. The systems are designed to imitate emotional awareness and responsiveness in interactions with human users, hence improving the emotional component of human-computer interaction (Milczarek, 2023, p. 4).

Bias: Bias refers to the presence of systematic and unfair favouritism or prejudice in the design, development, or operation of AI systems, resulting in unequal or discriminatory treatment of individuals or groups based on various traits such as gender, race, or socioeconomic position (Hurtado et al., 2021, p. 2).

Digital Banking: Digital banking, often known as online banking or electronic banking, is a modern banking method that uses digital technology and the internet to provide customers with a wide range of financial services and transactions (FANG & Quintos, 2023, p. 52). FANG & Quintos go to on elaborate that it enables consumers and organisations to manage their banking and financial activities through digital channels like websites, mobile applications, and other electronic platforms, eliminating the need for actual visits to a bank office (2023).

Emotional Manipulation: Cohen has identified the deliberate and strategic use of emotional cues and reactions by AI systems to influence users' emotions, behaviours, or decisions as emotional manipulation. This system application could include approaches intended to generate specific emotional responses to achieve certain goals, thereby creating ethical problems about user autonomy and consent (Cohen, 2023, pp. 211–218).

Human-Computer Interaction (HCI): HCI is an interdisciplinary field that explores humans' design, evaluation, and interaction with digital computing systems. It

includes the numerous methods in which humans communicate, interact, and engage with computer technology (Kanade, 2022).

Personal information, data, and emotions must be protected against unauthorised access, use, or exposure to be considered private. In the context of AEI in HCI, privacy problems related to the collecting, storage, and use of emotional data created during interactions with AI systems (Pflanzer et al., 2023, p. 920)

User Behaviour: User behaviour describes how people interact with and use a product, service, website, application, or system. This interaction usually occurs in a digital or online context (Verganti et al., 2020, p. 216). User behaviour encompasses a range of observable actions, including but not limited to clicking on links, making selections, inputting data, scrolling through content, making purchases, leaving reviews, sharing information, and engaging in other activities that demonstrate how individuals interact with and respond to the digital interface or environment they are utilising (Verganti et al., 2020, p. 217).

User Experience (UX): User Experience comprises the overall perception, satisfaction, and emotional responses of people when dealing with digital systems or products (Yang et al., 2019, p. 2). It encompasses features such as usability, accessibility, and emotional engagement, all of which can be influenced by introducing AEI into HCI and subsequently digital banking (R et al., 2023, p. 2).

Well-being refers to an individual's mental, emotional, and physical health and contentment (Rosen et al., 2022, p. 7). Well-being concerns in the context of AEI

focus on how the technology's influence on emotions and interactions may impact users' overall well-being (Rosen et al., 2022, p. 30).

The research proposal provideed these definitions to establish a standard grasp of essential terms and topics, promoting clear communication and explanation of the scope and objectives of the study.

1.9 Chapter Outline

The research dissertation thoroughly analysed several aspects of Artificial Emotional Intelligence (AEI) in Human-Computer Interaction (HCI) in chapters two through six. Chapter 2 provided an in-depth examination of the literature on the ethics and impacts of Artificial Emotional Intelligence (AEI) in Human-Computer Interaction (HCI). It discussed various ethical considerations, user experience, privacy issues, emotional manipulation, and bias. Additionally, it emphasised the existing challenges and frameworks in this area of study. In Chapter 3, the research technique was explained, providing reasons for utilising quantitative methods and surveys to gather data. Additionally, the study design was described to correspond with the research objectives. Chapter 4 established the theoretical framework by connecting ethical ideas and concepts to the aims of the study and influencing the technique of the investigation. Chapter 5 presented the findings of the data analysis, which involved the use of descriptive and predictive statistics to investigate the impact of AEI on HCI ethics. It also discussed user perspectives on important ethical factors. Chapter 6 consolidated the research findings, examined their implications for both theory and practice, and offered recommendations for digital enterprises on the responsible implementation of AEI technology. The investigation was ended by providing a thorough description of the findings and their significance in the area. The assessment of the study was based on its original goals and theoretical framework. The references section provided a comprehensive list of all the sources that were cited, so substantiating the views presented in the chapters.

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter presents a comprehensive study of the available literature on the ethical implications and consequences of Artificial Emotional Intelligence (AEI) in the context of digital banking in South Africa. This literature review aims to investigate and critically evaluate the present knowledge, identify essential concepts, controversies, theories, and research gaps, and lay the groundwork for the study's hypotheses and propositions.

2.2 What is Artificial Emotional Intelligence (AEI)?

Marr indicates that Artificial Emotional Intelligence (AEI) is a cutting-edge field within artificial intelligence (AI) and human-computer interaction (HCI) that focuses on enabling AI systems to recognise, interpret, and respond to human emotions. AEI seeks to instil emotional awareness in computers and software, allowing them to comprehend and engage with humans on an emotional level (Marr, 2021).

Below is an overview of critical aspects of Artificial Emotional Intelligence in digital banking:

Emotion Recognition: According to Yan et al., AEI entails the creation of technologies and algorithms that can identify and comprehend human emotions. AEI output can be achieved by analysing multiple data sources, such as facial expressions, voice tone, text sentiment and physiological signals (Yan et al., 2021).

Applications: AEI can be applied across a wide variety of industries. It can be used in marketing and advertising to assess consumer reactions to items and advertisements. In customer service, Maar indicated that AEI can be utilised to

make chatbots and virtual assistants more emotionally responsive to users' needs (Marr, 2021).

Challenges: The richness and subjectivity of human emotions make developing AEI systems difficult. Variability in emotional expressions between cultures, context-dependent meanings, and the requirement to understand emotions across many modalities (e.g., text, voice, and facial expressions) all provide substantial obstacles (Latif et al., 2022, p. 5).

User Experience Enhancement: Improving user experiences through the emotional intelligence and responsiveness of AI systems is one of the main objectives of AEI. The multi-use application can result in more personalised and empathic interactions, enhancing overall customer happiness (Wewege et al., 2020, p. 16).

Privacy and security: AEI must protect user data and emotional information. To protect emotional data from breaches or misuse, AI developers and organisations must employ strong security measures (Latif et al., 2022, pp. 6–7).

2.3 Current South African Digital Banking Landscape:

The South African digital banking sector refers to the ecosystem of financial institutions, fintech startups, and digital or mobile-based platforms that provide access to numerous banking and financial services via digital channels (Mothibi & Rahulani, 2021). It includes traditional banks that have adopted digital transformation and pure-play digital banks (Van den Berg et al., 2023). Outline the South African digital banking landscape as follows:

2.3.1 *Participants:*

i. Traditional Banks: Established banks like Standard Bank, ABSA, Nedbank, and First National Bank (FNB) have all embraced digital transformation, offering online and mobile banking services (Van den Berg et al., 2023).

ii. New digital-only banks like TymeBank and African Bank offer a variety of banking services online only (Kshetri, 2021)
iii. Fintech Startups: Numerous startups provide specialised digital financial services like peer-to-peer borrowing and mobile payment solutions (Van den Berg et al., 2023).
iv. Mobile Network Operators: Mobile network operators like MTN and Vodacom have launched mobile money services, expanding the digital banking landscape (Mavhuru, 2022).
v. Regulatory Bodies: Regulatory authorities like the South African Reserve Bank (SARB) oversee the sector (Lessambo, 2023).

2.3.2 *South African Digital Banking Users:*

The users of the South African digital banking sector encompass a wide range of individuals and entities:

i. According to Windasari et al., many digital banking users are ordinary consumers and individuals. They use digital banking for daily transactions, payments, savings, and investments (2022, p. 2).
ii. Businesses: Tay et al., have identified that small, medium, and large businesses utilise digital banking services for payroll, payments, collections, and other financial operations (2022, pp. 8–9).
iii. Companies: Fintech startups and technology companies often partner with banks or offer services through digital banking platforms (Slazus & Bick, 2022, pp. 47–48).
iv. Digital banking can be used for government disbursements, tax collection, and financial administration (Mhlanga & Denhere, 2020, p. 49)

2.4 The relationship between AEI and Digital Banking in South Africa

Based on global best practices, Ahmed states that incorporating Artificial Emotional Intelligence (AEI) into the South African digital banking ecosystem can transform how financial institutions interact with consumers, offer services, and respond to emotional demands (Ahmed, 2022, pp. 60–61). This section examines the high-level impact of AEI on the South African digital banking sector based on the data provided:

2.4.1 *Improving User Experience*

According to Pflanzer, the entry of AEI into digital banking aims to fundamentally improve the user experience for South African clients. Digital banks can generate more personalised and compassionate connections with their consumers by enabling AI systems to recognise, interpret, and respond to human emotions (R et al., 2023, p. 5). For example, when a consumer finds a glitch during an online transaction, an AEI-powered digital banking platform can identify displeasure or bewilderment and respond with targeted help, enhancing overall customer happiness. This enhanced emotional intelligence can distinguish digital banks in a crowded market, generating stronger client loyalty (Wewege et al., 2020, p. 34).

2.4.2 *Privacy Awareness*

Lappeman et al., have indicated in their findings that introducing Artificial Emotional Intelligence (AEI) into South Africa's digital banking industry raises essential ethical and privacy concerns. As digital banking platforms include AEI to improve customer service and personalisation, the ethical handling of sensitive personal and financial data becomes crucial (Lappeman et al., 2023, p. 340). Privacy concerns are significant given that AEI systems can access and interpret individual users' emotions and attitudes. Banking institutions and AEI developers must collaborate to verify that these innovations adhere to user permission, data protection laws, and ethical norms (Lappeman et al., 2023, p. 354). The

permission includes openly informing clients about their data usage, establishing strong cybersecurity safeguards, and following South Africa's regulatory provisions on data privacy, like the Protection of Personal Information Act (POPIA) (*Protection of Personal Information Act*, 2013). Balancing technological progress with ethical considerations and privacy protection is essential to build consumer trust and acceptance. The guidelines will help sustain the growth of digital banking improved by artificial emotional intelligence (AEI) in South Africa.

2.4.3 *Cultural and ethical diversity*

The great cultural diversity of South Africa adds another degree of complication to the influence of AEI in digital banking. Macamo has indicated that emotional expressions and interpretations can differ significantly among cultures, making it critical for digital banks to adjust their AEI systems to be adaptable and culturally sensitive. The persistent misinterpretation of emotions due to cultural variations may result in user unhappiness and ethical quandaries, emphasising the importance of rigorous cross-cultural study and customisation of AEI systems (Macamo, 2020, p. 50).

Slazus & Bick, have identified that the influence of Artificial Emotional Intelligence (AEI) on digital banking in South Africa is multidimensional, promising more extraordinary user experiences but necessitating careful consideration of ethical, cultural, and security issues (Slazus & Bick, 2022, p. 47). Ahmed further elaborates that for digital banks to fully utilise AEI technology's potential to profit clients and financial institutions in the particular context of South Africa's digital banking sector, it is essential to comprehend and manage this impact (Ahmed, 2022, p. 60).

2.4.4 *Barriers to Access*

According to Msweli, the application of AEI and digital banking, along with the uptake and efficacy in South Africa, has been constrained due to internet and device access limitations. Despite the country's technical advances, the digital gap persists, with Internet connectivity and smart device availability varying by demographic and geography (Msweli, 2020, p. 56). These constraints prevent a substantial segment of the public from enjoying the full benefits of digital banking and AEI, such as personalised financial advice and better customer service (Gujral, 2022). Rural and low-income areas need help with Internet connectivity, data costs, and smart device affordability. Msweli goes on to elaborate that these issues limit the accessibility and potential of AEI-driven banking innovations and worsen financial inclusion gaps (Msweli, 2020, p. 105). These barriers to access must be further understood to ensure that all South Africans can enjoy the benefits of AEI in digital banking without the limitations of barriers.

2.5 Background of the Research

According to Dazeley et al., the rapid progress of Artificial Intelligence (AI) technology, has caused significant disruptions in several industries, significantly impacting digital banking. Artificial Emotional Intelligence (AEI) advancement allows AI systems to identify, understand, and react to human emotions, representing a notable milestone in AI technology (Dazeley et al., 2021, pp. 10–12). AEI can potentially revolutionise human-computer interaction in digital banking by offering personalised and emotionally intelligent experiences. Integrating emotional detection and reaction features in digital banking transactions raises ethical and privacy issues (Bankins & Formosa, 2023, p. 732).

Pflanzer et al., indicate that integrating AEI in digital banking introduces a new level of complexity because of its close interaction with human emotions and behaviours. AI systems are improving in their ability to comprehend and impact emotions, leading to ethical challenges that require a detailed analysis of potential

consequences, particularly in the digital banking industry (Pflanzer et al., 2023, pp. 930–931).

Digital financial institutions are leading the way in combining AI and AEI technology to improve user experiences and gain a competitive advantage. Mothibi and Rahulani go on to elaborate that AEI systems' capacity to analyse and react to human emotions raises significant problems about user privacy, permission, emotional manipulation, potential biases, and the ethical implications of continuous emotion surveillance. A robust ethical framework is needed to prioritise user welfare, privacy, and autonomy to promote responsible AI development specific to the South African environment (Mothibi & Rahulani, 2021, p. 17)

This research contributes to the knowledge of the ethical and privacy considerations related to AEI in digital banking. The project analyses the effects of AEI on user experience, privacy, emotional manipulation, access, and emotional surveillance to guide the creation of ethical standards for integrating, utilising, and regulating AEI technologies in digital banking institutions. The main objective is to promote trust, openness, and ethical decision-making in the changing digital banking environment, focusing on privacy as a fundamental aspect of this advancement.

2.6 First research question/objective: Consumer Knowledge Effects:

To quantify the overall consumer experience in digital banking with adopting AEI, including identifying knowledge, awareness, statistically significant benefits, and drawbacks of AEI from the perspective of South African consumers (Alnaser et al., 2023, p. 2).

The null and alternative hypotheses according to Turney are two conflicting assertions that researchers evaluate evidence for and against using a statistical test (Turney, 2022):

- The null hypothesis states that there is no discernible impact or influence within the entire population.
- The alternative hypothesis speculates the existence of an effect within the population.

The effect often refers to the impact or influence that the independent variable has on the dependent variable (Turney, 2022).

2.6.1 *Hypothesis 1: Null Hypothesis*

There is greater confidence in the potential of AEI to improve the online banking experience when there is a higher level of understanding of AI.

2.6.2 *Hypothesis 1: Alternative Hypothesis*

Consumers' level of AI knowledge is irrelevant to their optimism about AEI's ability to enhance online banking. Instead, trust in technology, perceived security, and personal experiences with digital banking platforms influence their views.

2.7 Second research question/objective: Consumer Experience Effects:

To investigate the function of AEI in improving or detracting from the overall user experience in digital banking.

2.7.1 *Hypothesis 2: Null Hypothesis*

Users' comprehension of AEI and favourable experiences with it positively correlate with the belief in its benefits for enhancing South African online banking services.

2.7.2 *Hypothesis 2: Alternative Hypothesis*

Understanding AEI and positive interactions with it are not the only things that influence customers' opinions of its benefits for improving South African online banking user experience. Product importance, AEI implementation efficiency and dependability, and customer service quality affect digital banking users' evaluations of AEI efficacy.

2.8 Third research question/objective: Ethics and Privacy Effects

To quantitatively analyse how the introduction of AEI affects consumer behaviour, such as their trust in digital banking systems, satisfaction with services, and willingness to share and control their data with AEI-powered interfaces.

2.8.1 *Hypothesis 3: Null Hypothesis*

There is a direct correlation between the significance of control over AEI applications in digital banking and user concerns about privacy.

2.8.2 *Hypothesis 3: Alternative Hypothesis*

Privacy problems, trust, and satisfaction with digital financial services are not solely affected by AEI application control. These perceptions are nuanced and impacted by AEI transparency, authorisation clarity, and digital banking institutions' privacy protection efficiency.

2.9 Fourth research question/objective: Internet & Device Access

Evaluate and identify the primary obstacles hindering the implementation of AEI innovations in financial services, specifically focusing on obstacles with Internet connectivity and device accessibility.

2.9.1 *Hypothesis 4: Null Hypothesis*

Internet connectivity and device accessibility do not pose a significant obstacle to the successful implementation and customer acceptance of Artificial Emotional Intelligence (AEI) advancements in the digital banking sector in South Africa.

2.9.2 *Hypothesis 4: Alternative Hypothesis*

Obstacles related to Internet connectivity and device accessibility significantly impede the effective implementation and consumer adoption of Artificial Emotional Intelligence (AEI) innovations in the digital banking sector in South Africa.

2.10 ANALYTICAL FRAMEWORK

A theoretical framework for the quantitative study evaluating the consumer implications of Artificial Emotional Intelligence (AEI) in the context of Digital Banking in South Africa was critical for organising and leading the investigation (Mehrad et al., 2019). The following theoretical framework covers essential theories and concepts for the study:

2.10.1 *Theoretical Framework*

A quantitative study evaluating the consumer implications of Artificial Emotional Intelligence (AEI) in the context of Digital Banking in South Africa might use a digital theory as the theoretical foundation (Park et al., 2022). The Technology Adoption Model (TAM2), which expands the Technology Acceptance Model (TAM) to consider external factors and user characteristics that influence technology adoption, is one applicable digital theory. This theoretical framework uses TAM2 (Park et al., 2022):

Key Theory:

Technology Adoption Model 2 (TAM2): Developed by Venkatesh and Davis in 2000, TAM2 expands the TAM by incorporating external variables that can influence technology adoption. Perceived external elements, such as social influence and facilitating conditions, together with perceived ease of use (PEOU) and perceived usefulness (PU), influence consumers' intentions to adopt technology (Park et al., 2022, p. 3). The TAM2 was selected for the following reasons:

- TAM2 expands the original TAM, widely utilised and validated in several technology adoption studies. Its well-established theoretical base makes it suitable for researching consumer behaviour in adopting AEI technology in digital banking (Wu et al., 2011, p. 8).
- TAM2's focus on perceived ease of use (PEOU) and perceived usefulness (PU) aligns well with the primary factors that motivate consumers'

decisions to adopt new digital banking features, including AEI, as digital banking continues to evolve with the integration of AI and emotional intelligence (Park et al., 2022, p. 5).

- South African applicability Context: TAM2's adaptability to external factors makes it culturally and contextually adaptive. South Africa's unique technology adoption characteristics can be incorporated into TAM2 (Cele & Mlitwa, 2024).
- TAM2 has been widely tested and validated in empirical research across various technological fields. Using a well-known model improves the validity and trustworthiness of the research findings (Wu et al., 2011, p. 11).

TAM2 provides a flexible theoretical framework for studying AEI's consumer effects in South African digital banking. It relies on established theory and accounts for external variables, making it suited for analysing technology adoption in this setting.

2.10.2 *Conceptual Framework*

The research on Artificial Emotional Intelligence (AEI) in South African digital banking investigated Consumer Experience, Knowledge and Consumer Behaviour related to Ethics and Privacy, and Internet and Device Access based on the outlined objectives. The categories corresponded to the main objectives of investigating the effects of AEI on user experience, trust, and ethical issues in the digital banking industry. The framework emphasised the relationships between AEI technologies, customer interactions, ethical considerations, and access challenges.

Theoretical Structure AEI in Digital Banking: At the framework's core is incorporating AEI technologies into digital banking platforms to improve user experiences through the identification, analysis, and response to human emotions.

Consumer Experience and Knowledge Evaluation:

- Components: Developed a further understanding and consciousness of AEI and the perceived advantages and disadvantages.
- Impact Areas: User experience, satisfaction levels, and engagement within digital financial services.

Consumer behaviour associated with ethics and privacy:

- Elements: Confidence in digital financial systems, contentment with services, readiness to disclose and manage personal data.
- Ethical considerations including privacy concerns, potential emotional manipulation, bias, and emotional surveillance.

Access to the internet and devices:

- Challenges included identifying and overcoming obstacles to adopting AEI, explicitly focusing on internet connectivity and device accessibility.
- Objective: Improve the inclusivity and accessibility of digital banking services enhanced by AEI technology.

Results:

- Enhanced user engagement will be quantified by analysing the rise in usage, satisfaction levels and trust towards digital banking services.
- Developed guidelines and frameworks to ensure the ethical integration of Artificial Emotional Intelligence (AEI) while prioritising user privacy and well-being.
- Enhanced Accessibility and Inclusivity: Ensuring that AEI technologies are available to everyone, regardless of internet and device constraints.

DIAGRAM

The graphic representation in Diagram 2: Outcome Framework, represents a conceptual framework for the research on integrating Artificial Emotional Intelligence (AEI).

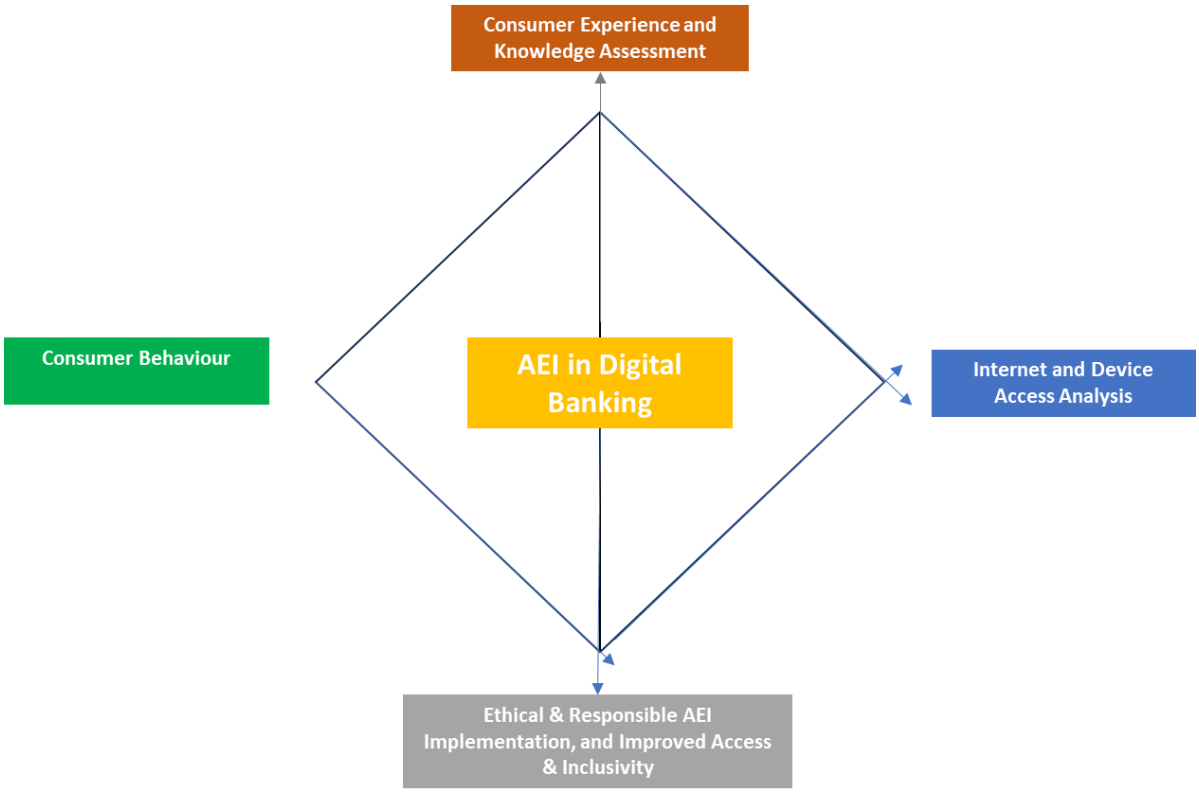


Diagram 1: Conceptual Framework for AEI in the South African Digital Banking Context

The "AEI in Digital Banking" visual diagram is positioned at the centre. Three primary areas extend from this central point:

- Consumer Experience and Knowledge Assessment is directly connected to AEI in Digital Banking, demonstrating the progression from AEI technology to enhanced user experience and knowledge. This branch is subdivided into sub-areas, including knowledge and awareness, benefits, and downsides.

- Consumer behaviour is connected to ethics and privacy inside the AEI core. This connection branches into trust, satisfaction, and data control, encompassed by ethical factors such as privacy and bias.
- Internet and Device Access: This division concentrates on recognising obstacles to access and strives to link back to the AEI core, showing initiatives to address these issues and promote widespread AEI adoption.

Each branch is linked to the outcomes, showing how they help improve user engagement, ethical implementation, and access and inclusion in digital banking.

This conceptual framework provided a detailed plan for the research, directing the exploration of how AEI may transform digital banking in South Africa, emphasising user experience, ethical concerns, and addressing access barriers. It emphasizes the significance of comprehending and dealing with the consequences of AEI from various perspectives to promote the responsible and inclusive integration of technology in the banking industry.

2.11 Conclusion of Literature Review

This chapter's extensive literature review examined Artificial Emotional Intelligence (AEI) in South Africa's digital banking sector, focusing on its ethical implications, user experience improvements, privacy concerns, and societal and cultural contexts. This assessment has illustrated the current state of AEI in digital banking, its potential benefits, and its complex challenges.

The review highlighted AEI's potential to improve digital banking user experiences through emotional reactivity and personalised interactions. It demonstrated how AEI technology might improve customer service and interaction, increasing customer happiness and loyalty. This finding supports the idea that understanding AI and AEI could improve online banking.

The discussion also raised significant ethical and privacy problems related to AEI's application. AEI systems' ability to interpret and respond to users' emotions

raises moral questions about sensitive emotional data and the necessity for strong privacy protections. For users to trust and adopt AEI technology, the evaluation stressed the significance of following legal and ethical norms such as the Protection of Personal Information Act (POPIA).

The literature analysis also found substantial gaps and problems that need further re-reviewed to maximise AEI's digital banking potential. These included the requirement for cross-cultural awareness to meet South Africa's unique culture and explicit norms and procedures for ethical emotional data use.

In conclusion, the literature study identified critical areas of interest, such as how AEI affects user experience, privacy concerns, and ethical frameworks, laying the platform for future research. The literature indicated that AEI could improve digital banking if ethical, privacy and cultural concerns are monitored and controlled. This data suggested that empirical research must examine these interactions and provide actionable insights and recommendations for ethical, privacy-respecting, and culturally aware AEI integration into digital banking. The study aimed to contribute to the discussion on responsible AI development and constructing technologically advanced, ethically grounded, and user-centric digital banking systems.

CHAPTER 3. RESEARCH METHODOLOGY

This study's primary research method is quantitative. According to Mehrad et al., quantitative research is appropriate for addressing research objectives because it allows the collection of empirical data that can be statistically analysed to uncover patterns, trends, and correlations among variables (2019)

3.1 Quantitative research

Mehrad et al., outline that quantitative research is gathering and analysing numerical data to understand and explain occurrences, correlations, or trends systematically and objectively. It uses systematic data collecting and statistical methodologies to derive inferences and generalise about a population or sample (Mehrad et al., 2019, p. 3).

Data collected can be quantified and expressed numerically, which is required for quantitative research. Surveys, experiments, observations, and structured interviews can be used to collect the data (Mehrad et al., 2019, p. 3).

3.2 Research approach

Given the study's goal of investigating user perceptions, attitudes, and experiences regarding the ethical implications of AEI in digital banking, Mehrad et al., confirm that quantitative approaches such as surveys are well-suited for gathering vast amounts of data and generating statistical insights (2019, p. 4).

This method's assumptions, combined with the Technology Adoption Model (TAM2), are consistent with gaining a deeper understanding of South African digital banking users' perspectives and experiences (Park et al., 2022, pp. 4–5). Data obtained from a representative sample of digital banking users provides insights into broader patterns of thoughts and attitudes towards AEI in HCI (R et

al., 2023, pp. 2–3). It also assumes that survey results adequately reflect participants' ethical judgements about AEI, allowing for quantitative analysis.

3.3 Research design

This study will be cross-sectional. A cross-sectional approach collects participant data at a specific time to understand a trend (Thomas, 2020). Surveys will be provided to participants to collect their ideas, attitudes, and experiences regarding the ethical implications of AEI in digital banking. This method is appropriate since it allows for efficient data gathering from various participants while providing a picture of their thoughts on the topic.

The cross-sectional survey method is easy to collect data from, captures a variety of perspectives, and allows for factor correlations. However, it has disadvantages, such as response bias and the lack of longitudinal data to show causal correlations (Thomas, 2020).

3.4 Data Collection Method and Instrument

Participants will be given online questionnaires as the primary means of data collection. The survey method was selected as this type of research gathers data from a sample. Survey research uses quantitative (numerical surveys), qualitative (open-ended questions), or mixed methods (Ball, 2019, pp. 9–10). This study aimed to quickly acquire data on a wide sample of people of interest. Survey research has become scientific, using validated methods for selecting a representative sample, survey method, and timing to avoid non-response error and ensure high-quality results, which aligned with the aim of the study and correlated in the validation of the results.

The survey included structured questions to measure participants' perceptions of ethical issues linked to AEI in digital banking (Ahmed, 2022, p. 57). These questions included privacy, emotional manipulation, bias, and user well-being.

The survey also gathered demographic data to investigate potential differences in perceptions based on participant characteristics (Latif et al., 2022, p. 5).

The survey method was explicitly selected for its ability to contact a large group of people and generate quantitative results (Ball, 2019, p. 9). While it standardises data collection and statistical analysis, a possible disadvantage highlighted by Mehrad et al., is that surveys may limit participants' ability to provide thorough explanations (Mehrad et al., 2019, p. 4).

This study's research tool was an online survey questionnaire. The survey collected participants' ideas, attitudes, and experiences about the ethical implications of AEI in digital banking. The questionnaire included closed-ended as well as 5-point and 7-point Likert-scale questions to gauge participants' agreement or disagreement with specific claims or their understanding or the terms (*Likert Scales: Definition, Benefits & How to Use Them* | *Qualtrics*, n.d.). The questions corresponded with the research objectives and theoretical framework to correlate the relevance and validity.

The instrument was pre-tested with a small group of participants to identify any ambiguities, validated question clarity, and ensured that the survey gathered the required information. A cover letter detailing the research objective, participants' rights, and data usage accompanied the survey.

3.5 Population and sample

The population for this study was consumers from the South African Banking Sector. This study includes digital banking users who may have experienced AEI. The target population for study was the Gauteng Region. Respondents were selected based on age, gender, education, and technical skills. The convenience selection approach was applied to select the survey sample (Government of Canada, 2021).

The appropriate sample size aimed for statistical significance and analysis power. A moderate sample size of 300 participants was calculated as ideal because it

achieved a compromise between acquiring enough data for analysis and managing research resources and simple regression analysis typically requires a minimum of 50 samples with a recommendation of at least 100 samples. (Memon et al., 2020, p. 2). In addition, the when using the sample size calculator, factoring in a Confidence Level of 90%, allowing for 5% Margin of Error, 44% Population proportion (Statista, 2022a), including 50% use and a population size of 16100000 (Statista, 2022b), the proposed sample size was 269 (*Sample Size Calculator*, 2024). Online platforms, forums, social media channels and professional networks were be leveraged, per the convenience approach to recruit participants.

3.6 Procedure for data collection

The data collection procedure consisted of multiple steps:

i. Design of the online survey questionnaire and its accompanying letter.
ii. Pre-Testing: Executing a pilot test of the survey with a limited number of participants to detect and correct any errors.
iii. Distributed the survey on online sites, forums, and social networks to recruit participants.
iv. Participants accessed the online survey, answered the questions, and submitted their answers.
v. Data cleaning included inspecting the acquired data for completeness and quality and addressing missing or inconsistent responses.
vi. Data Analysis: Conducted statistical analysis on the acquired data to identify insights and trends.

3.7 Data analysis strategies and interpretation

Plan for Data Analysis:

Descriptive Statistics:

Analysis commenced by computing descriptive statistics for demographic characteristics (such as mean age, gender distribution, and educational levels) in South African digital banking (Mehrad et al., 2019, p. 2).

Computed descriptive statistics for the variables linked to the ethical implications of AEI in digital banking (e.g., privacy concerns, transparency perceptions) and customer impact (e.g., trust, contentment) (Mehrad et al., 2019, p. 2).

Regression Analysis:

Regression analysis was applied to determine how demographic factors affect trust and satisfaction. Regression was used to interpret coefficients and evaluate model predictive power (*Regression Analysis - Research-Methodology*, n.d.).

Data Visualisation:

Significant findings and patterns will be presented using data tables and bar Visualisations to make complex data more accessible to understand (Islam & Jin, 2019)

Interpretation:

Findings from the survey were then interpreted considering the study objectives. The aim was to discuss in detail how AEI affects South African digital banking consumer trust, satisfaction, and ethics, considering the results' practical implications for South African digital banks.

Recommendations:

The report provided practical recommendations based on findings to help digital banking organisations and policymakers manage concerns and maximise customer benefits of AEI integration.

Limitations and Future Research:

Acknowledged study limitations, including sample size and survey technique. Suggesting research or improvements to solve these constraints.

Conclusion:

The study's principal results and relevance to South African digital banking was summarised to highlight how it can shape or support the advances in AI ethics, digital banking and consumer behaviour.

3.8 Limitations and challenges of the study

i. Geographical Restriction:

The study was specifically done within the Gauteng Region of South Africa. Though this region holds economic importance, it may not have adequately reflected the range of digital banking experiences found in other areas of South Africa, especially in rural or less economically developed regions.

ii. The extent of AEI Technologies' operations and activities:

The study examined the implementation and impacts of AEI in the context of digital banking. The exploration of other potential applications of AEI in various sectors or its wider ramifications across different digital platforms was not undertaken. This constraint restricted the generalizability of the results to other scenarios in which AEI could be applied.

iii. Variance in Technological and Digital Literacy:

Differences in technological and digital proficiency among participants may have impacted their comprehension and engagement with AEI, thereby influencing their answers to survey questions on their experiences with AEI. This volatility may not have been sufficiently considered, thereby distorting the reported user experience and satisfaction levels.

iv. Time limitations:

The research was done within a limited time frame, which may have hindered the observation of extended-term effects and user adjustments to AEI in digital

banking. Therefore, it was not possible to evaluate alterations in user perceptions and behaviours over time.

v. Regulatory and ethical factors to be considered:

The study did not extensively examine the changing regulatory and ethical frameworks that explicitly control AEI in South Africa, which could have a substantial impact on the implementation and acceptability of AEI technology.

The study did not extensively examine the changing regulatory and ethical frameworks that explicitly control AEI in South Africa, which could have a substantial impact on the implementation and acceptability of AEI technology.

3.9 Quality Assurance

This proposal describes quality assurance procedures that were applied for the quantitative study on the consumer effects of Artificial Emotional Intelligence (AEI) in South African digital banking. This proposal emphasised validity, reliability, and external validity (generalizability) in quantitative research.

The questionnaire was pilot tested for clarity and relevance.

Construct Validity: The underlying constructs and the extent to which the questionnaire items measured these constructs were analysed using factor analysis (Dolnicar et al., 2022, p. 2).

Validity Criteria: The validity of questionnaire items were assessed, by being compared to known measures in the literature, where applicable (Rose & Johnson, 2020, p. 3).

Reliability: The quality of replies were assessed by delivering the questionnaire to a subset of respondents at two separate time points to determine test-retest reliability (Dolnicar et al., 2022, p. 2).

Objectivity: Throughout the research process, researchers involved in data collecting and analysis retained objectivity. This objectivity entailed eliminating

personal biases and maintaining objectivity in data analysis (Rose & Johnson, 2020, p. 5).

Data collection and analysis was carried out by standardised processes, limiting the possibility of subjective impact on the results (Rose & Johnson, 2020, p. 10).

Quality Control: Data collection was consistently reviewed to ensure data quality and conformity to research (Dolnicar et al., 2022, p. 2).

Ethical Considerations: All study operations followed ethical norms, such as informed permission, privacy protection, and participant anonymity.

To guarantee that the findings were robust, trustworthy, and generalisable, this quantitative research study on the consumer implications of AEI in South African digital banking significantly emphasised validity, reliability, and objectivity. This study provides significant insights into the expanding field of digital banking and AEI adoption through rigorous design, data collecting, and analysis.

3.10 Ethical considerations

Ethical issues were adhered to throughout the research procedure. Prior to participating in the survey, participants provided informed consent. The survey's cover letter included information on the research's purpose, data usage, and participant rights. Data was anonymised and managed in confidence. The research followed the ethical norms established by WITS.

3.11 Proposed schedule and timelines

The research study was completed within three months of proposal approval. The following significant milestones schedule

i. Weeks 1-2: Developed and evaluated the survey instrument.
ii. Weeks 3-6: Recruited volunteers and collected data.
iii. Weeks 6 and 7: Cleaned and analysed the data collected.
iv. Week 8 and 9: Interpreted the findings, developed the findings chapter, and explored the consequences.
v. Week 10 and 11: Prepared for submission by finalising the report, findings, and recommendations.

The planned timeline guaranteed that the research project proceeded smoothly and within the timeframe specified.

CHAPTER 4. RESEARCH FINDINGS

This section presents the research findings in two aspects: primarily the demographic characteristics of the participants, and secondly, the evaluation of the significant area of the study, which is the implementation of AEI in digital banking. This study investigated the impact of AEI on user experiences and trust and its implications for data privacy.

4.1 Survey Approach

The quantitative survey was designed to gain insights into the ethical dimensions of AEI in HCI, such as its impact on user experience, privacy, emotional manipulation, bias, and general well-being. The study targeted users of digital banking platforms residing in the Gauteng province for a more focused study. The survey issued using the Qualtrics tool consisted of 29 questions (see Annexure 2), including an Opt-In question. The Initial pilot survey was issued to 54 respondents to validate for quality assurance, then revised and issued to 204 respondents, who were friends, colleagues and family recruited via LinkedIn, WhatsApp, or Facebook.

Responses received:

204 respondents started the survey:

- Ten respondents (5%) selected not to proceed with the survey, abandoned completion (possibly due to the length of the survey or connectivity challenges)
- One hundred twenty-four completed 100% of the survey, used digital banking, and are in Gauteng. The responses received from these respondents will be used for the research study.

The survey comprised the following five key focus areas:

- Section 1: Q1 to Q4 – Demographic and Validation questions

- Section 2: Q5 to Q6 - Knowledge and understanding of AEI
- Section 3: Q7 to Q15 – Digital Banking and AEI
- Section 4: Q16 to Q22 –Ethical and Behavioural Implications
- Section 5: Q23 to Q28 – User Privacy and Accessibility Key survey findings

4.2 Demographic Profile of the Respondents

4.2.1 *Age*

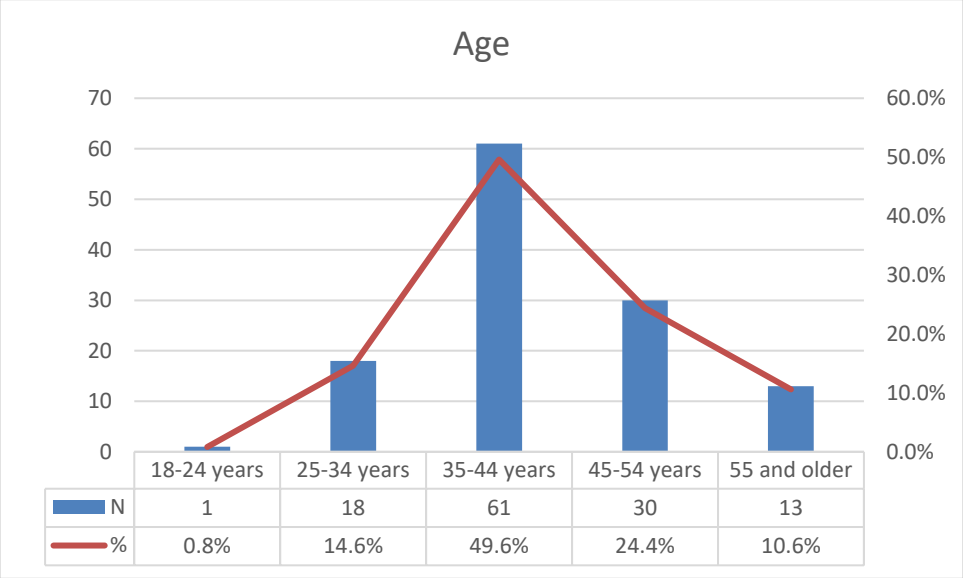


Figure 4.1: Age

4.2.2 *Gender*

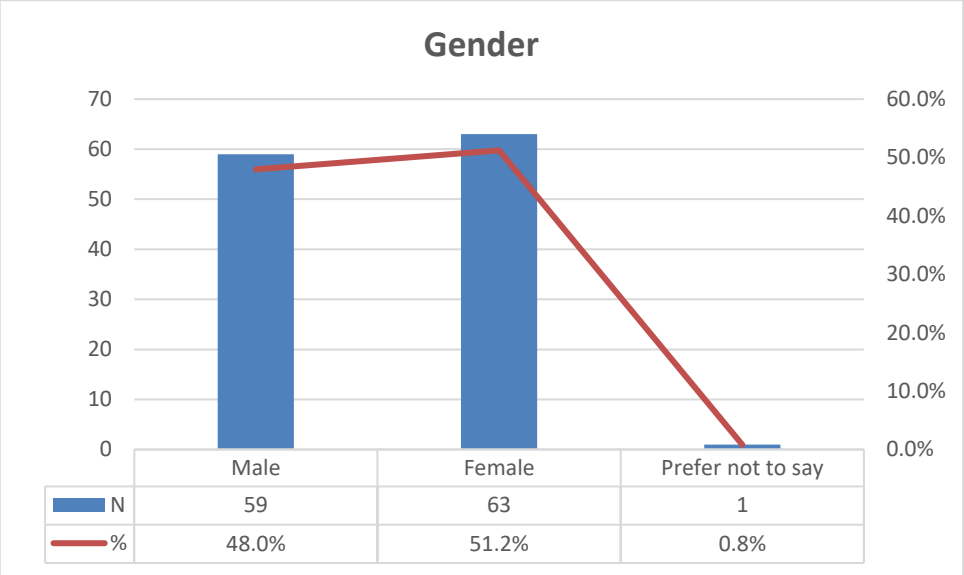


Figure 4.2: Gender

4.2.3 *Location*

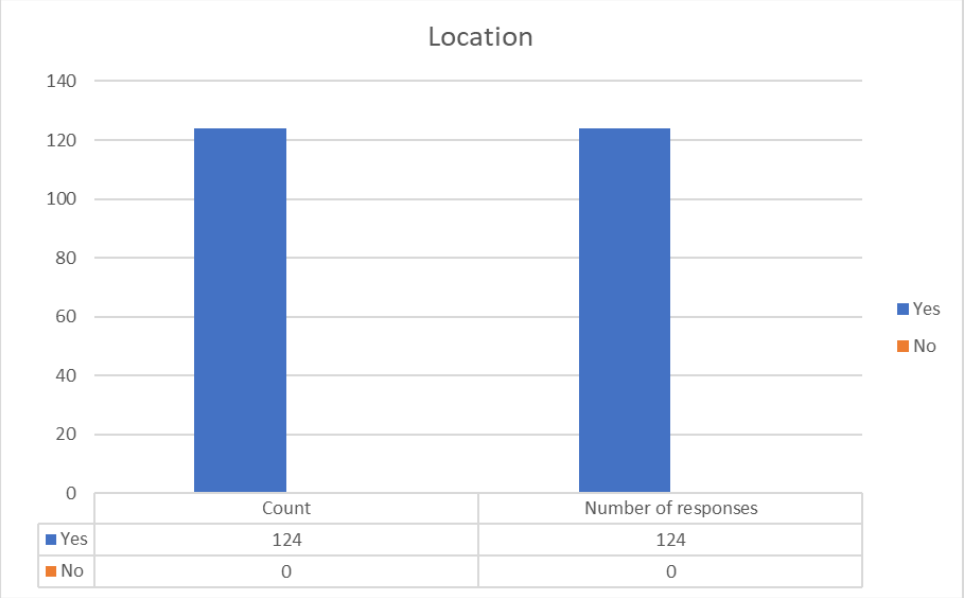


Figure 4.3: Location

4.3 Analysis of Validity and Reliability

The statistical software package used to analyse the was data was the SPSS data analysis tool (*IBM SPSS Statistics*, n.d.). The internal consistency reliability of a Likert scale or equivalent scale that evaluates a single construct with several items can be assessed using Cronbach's Alpha to assess the validity of the survey (Frost, 2022). Cronbach's Alpha assesses group similarity. It indicates a psychological test or survey instrument's dependability by measuring how well all items measure the same concept or construct (Frost, 2022).

The survey used a Likert scale, asking respondents to rate their agreement or disagreement on a symmetric agree-disagree scale to gather their opinions.

Higher Cronbach's Alpha scores indicate a more vital internal consistency. An alpha of 0.7 or above is generally acceptable, depending on context and measurement (Frost, 2022).

The reliability statistics calculated used 20 items, and SPSS Cronbach's Alpha indicates the scale for internal consistency. Results interpretation from Tables 4.1, 4.2 and 4.3 can be interpreted as follows:

Cronbach's Alpha Score was 0.727. This number measures scale internal consistency. A Cronbach's Alpha of 0.727 indicates that the scale's items measure the same construct reliably. An alpha of 0.7 or higher indicates good internal consistency for social science research. The Alpha is above 0.7, indicating that the scale items are consistent and reliable for study. This value should be interpreted considering the study's context and scope.

The Standards-Based Cronbach's Alpha calculated was 0.717. This figure is comparable to Cronbach's Alpha but uses each item's normalised values instead of raw scores. The slight variation between 0.727 and 0.717 supports the scale's internal consistency.

The standardised Alpha is useful when the scale's items have multiple response scales or need standardisation before calculating Cronbach's Alpha. The

closeness of the two alpha values shows that different scales across items (if present) do not significantly alter scale reliability.

Cronbach's Alpha calculation comprises of several scale components. A comprehensive 20-item scale can exaggerate the alpha value due to its length. However, an alpha above 0.7 with this many items shows that the scale items assess a single construct well.

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
0.727	0.717	20

Table 4.1: Reliability Statistics

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.197	1.984	4.309	2.325	2.172	0.542	20
Item Variances	0.848	0.049	1.500	1.451	30.507	0.185	20

Table 4.2: Summary Item Statistics

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
63.935	54.766	7.4004	20

Table 4.3: Scale Statistics

The Fleiss' Kappa statistic measures inter-rater reliability by measuring raters' agreement beyond chance (Li et al., 2023). Interpreting the Fleiss' Multirater Kappa analysis calculated in Table 4.4: Fleiss Multirater Kappa Calculation for the survey responses is as follows:

The Kappa rating was -0.057. A negative Fleiss' Kappa indicates poor rater agreement, worse than expected by chance. The negative value shows rater disagreement (Li et al., 2023). Negative values occur when the observed agreement is less than chance. SE: 0.019: The standard error of the Kappa statistic measures estimate variability. Lower standard errors suggest better Kappa estimation precision. z: -3.064 Kappa's z-score reveals its standard deviation from the null hypothesis of 0 (no agreement beyond chance). A z-score of -3.064 indicates that the observed Kappa differs considerably from 0, which supports the lack of agreement. The significance level is 0.002. This p-value reflects the chance of receiving a Kappa statistic as extreme as or more extreme than the one recorded if the null hypothesis of no agreement were true (Li et al., 2023). The Kappa value appears statistically significant because the p-value is 0.002, below the alpha level 0.05. This significance is adverse because the negative Kappa value indicates strong disagreement. 95%CI: -0.094 to -0.021 The confidence interval gives a 95% confidence range for the genuine Kappa statistic. The entire interval is negative, supporting the conclusion that raters disagree. The interpretation and implications are that the four negative Fleiss' Kappa raters show significant disagreement that cannot be attributable to chance. When identifying the cause of disagreement, a qualitative examination of the negatively rated items or categories will be applied (Li et al., 2023).

Overall Agreement						
		Asymptotic			Asymptotic 95% Confidence Interval	
	Kappa	Standard Error	z	Sig.	Lower Bound	Upper Bound
Overall Agreement	-0.057	0.019	-3.064	0.002	-0.094	-0.021
a. Sample data contains 124 compelling subjects and four raters.						

Table 4.4: Fleiss Multirater Kappa Calculation

4.4 Descriptive Statistics:

Descriptive Statistics							
	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Age	124	4	1	5	3.29	0.872	0.761
Gender	124	3	1	4	1.54	0.547	0.299
Do you use online banking in South Africa?	124	0	1	1	1.00	0.000	0.000
Do you live in Gauteng?	124	0	1	1	1.00	0.000	0.000
“I know and understand what Artificial Intelligence (AI) is”?	124	4	1	5	4.31	1.163	1.352
familiar (AEI) concerning online banking?	124	4	1	5	2.64	1.239	1.534
Frequency using digital banking services?	124	3	2	5	4.09	0.996	0.992
satisfaction with the digital banking services	124	3	2	5	4.15	0.744	0.554
preferred bank for digital banking	124	7	1	8	4.68	1.651	2.724
Can AEI improve the online banking experience?	124	4	1	5	4.06	0.768	0.590
User experience	124	4	1	5	3.98	0.801	0.642
Privacy and security	124	4	1	5	3.56	1.128	1.272
Emotional manipulation	124	4	1	5	3.07	1.091	1.190
General well-being	124	4.0	1.0	5.0	3.540	0.8105	0.657
Awareness of ethical issues raised by AEI in South African digital banking?	124	4	1	5	2.30	1.133	1.284
concern of AEI in digital banking in South Africa?	124	4	1	5	3.21	1.157	1.338
has the inclusion of AEI affected confidence in digital banking services?	124	4	1	5	3.24	0.726	0.526
Winningness to use digital banking services that use AEI?	124	4	1	5	3.63	1.024	1.048
used South African digital banking services that use AEI?	124	4	1	5	3.13	0.910	0.829
If you have interacted with digital banking services using AEI	124	4	1	5	3.26	0.673	0.453
Access to devices	123	3	1	4	2.00	0.222	0.049
Access to the internet	123	3	1	4	1.98	0.256	0.065
AEI in digital banking affects your privacy in South Africa?	124	4	1	5	2.95	0.891	0.794
willing to give privacy a better user experience digital banking?	124	2	1	3	2.20	0.743	0.553
willing to give up privacy in exchange for free items like a coffee or a burger?	124	4	1	5	2.61	1.153	1.329
importance of control applied in digital banking?	124	4	1	5	4.10	0.801	0.641
transparency	124	4	1	5	4.19	0.917	0.840
Valid N (listwise)	123						

Table 4.5: Descriptive Figures

4.5 Regression Analysis:

This study used regression analysis to examine how independent variables affect a dependent variable in digital banking's Artificial Emotional Intelligence (AEI).

This statistical method was ideal for the study since it quantified how user awareness, privacy concerns, and technological limitations affect AEI technology user experience and adoption. Regression research revealed key drivers of client behaviour and happiness, helping us understand the dynamics. It also helped assess how these elements affected AEI-enhanced digital banking services' effectiveness and user acceptance. Regression analysis was used to analyse the degree and direction of correlations between variables, which helped produce specific recommendations for improving digital banking services using AEI. This solution helped digital banks build a solid framework to address and proactively manage AEI's ethical, privacy, and accessibility issues.

The following descriptive statistics give an overview of the dataset's variability and central tendencies. These characteristics are typically examined in a regression analysis to determine which ones to include as predictors (independent variables) for a dependent variable of interest (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021).

The following factors were taken into consideration for the regression analysis:

Variability: In a regression model, variables with more variation and range are more likely to yield insightful results (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021).

Mean Scores: Where a variable had limited variability at one end of the scale, high or low mean scores suggest potential ceiling or floor impacts and general trends (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021).

Potential Predictors: Several characteristics, including gender, age, acquaintance level with AEI, and privacy concerns, were used to forecast views regarding AEI (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021).

The TAM 2 theoretical framework, the research questions, and statistical factors like multicollinearity and variable distribution were considered when choosing the

variables for the regression models (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021).

4.6 Demographic impact

The demographic analysis of a survey on digital banking and Artificial Emotional Intelligence (AEI) usage trends reveals significant insights regarding the sector's growth and the equal gender representation among respondents. The data indicates a strong preference for older members of the audience having developed financial habits since 99% of participants are over 25 years old – referenced in Figure 4.1: Age. This finding indicates a potential for more robust financial stability or experience as indicated by (Yates, 2019). As highlighted by (Valenti and Alderman, 2021), the study correlates the need to prioritise mature audiences in digital banking and AEI while stressing the importance of studying younger demographics' active participation in the changing digital banking environment due to potential differences in perspectives and usage patterns.

The survey's gender distribution of 52% female, 48% male, and 1%, as referenced in Figure 4.2: Gender not answering, aimed to achieve a balanced representation of genders for assessing behaviours and beliefs regarding digital banking and AEI. Having equal gender representation is essential for ensuring unbiased results and understanding how women and men interact with financial technologies, as explained by (ILOSTAT, 2022). A balanced gender distribution helps ensure a fair evaluation of digital banking and AEI attitudes. The research correlates the significance of including gender perspectives in creating financial technology services and promoting banks to embrace a gender-inclusive strategy.

Moreover, the audience's maturity indicates a higher probability of being more open to AEI for improving and adapting banking services (Yates, 2019, p. 6). Nevertheless, it suggests a greater focus on privacy and data security, highlighting the need for banks to be cautious when incorporating AEI into their services to address these issues adequately. The gender equality seen in the

survey highlights the importance of creating AEI apps in digital banking that are inclusive and respond equally to the requirements and preferences of all consumers, regardless of gender by (ILOSTAT, 2022). This method guarantees that the progress in digital banking and AEI is available and advantageous to many people, encouraging inclusivity and fairness in the fast-evolving financial technology sector.

4.7 Testing of the Hypotheses

The analysis aimed to test 4 hypotheses based on the applications of Artificial Emotional Intelligence in digital banking to determine if demographic factors correlated with User Experience, knowledge of AI and AEI, and the implication of privacy and access on overall use.

4.7.1 *Results about [Hypothesis One]:*

Hypothesis 1: A greater confidence in the potential of AEI to improve the online banking experience correlated with a higher level of understanding of AI (Da Costa, 2018).

Dependent Variable: Belief in the ability of AEI to enhance the online banking experience in South Africa.

Independent variables: Knowledge in Artificial Intelligence (AI) and acquaintance with Artificial Emotional Intelligence (AEI) in relation to online banking.

Correlations				
		Do you think AEI can improve the South African online banking experience?	Artificial Intelligence AI involves making computers and robots smart enough to solve problems and help us in our everyday lives.	Are you familiar with Artificial Emotional Intelligence (AEI) concerning online banking?
Pearson Correlation	AEI can improve the South African online banking experience?	1.000	0.172	0.389
	"I know and understand what Artificial Intelligence (AI) is"?	0.172	1.000	-0.018
	familiar with (AEI) concerning online banking?	0.389	-0.018	1.000
Sig. (1-tailed)	AEI can improve the South African online banking experience?		0.028	0.000
	"I know and understand what Artificial Intelligence (AI) is"?	0.028		0.421
	Are you familiar with Artificial Emotional Intelligence (AEI)	0.000	0.421	
N	Do you think AEI can improve the South African online banking experience?	124	124	124
	"I know and understand what Artificial Intelligence (AI) is"?	124	124	124
	familiar with (AEI) concerning online banking?	124	124	124

Table 4.6: Hypothesis 1 – Correlations

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,428[a]	0.183	0.170	0.700

Table 4.7: Hypothesis 1 - Model Summary

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.309	2	6.655	13.580	<,001[b]
	Residual	59.295	121	0.490		
	Total	72.605	123			

Table 4.8: Hypothesis 1 – ANOVAa

Coefficients			
Model		Collinearity Statistics	
		Tolerance	VIF
1	"I know and understand what Artificial Intelligence (AI) is"?	1.000	1.000
	familiar with (AEI) concerning online banking?	1.000	1.000
a. Dependent Variable: AEI can improve the South African online banking experience?			

Table 4.9: Hypothesis 1 - Coefficients

4.7.2 *Results about [Hypothesis Two]:*

Hypothesis 2: Users' comprehension of AEI and favourable experiences with it positively correlate with the belief in its benefits for enhancing South African online banking services.

Dependent Variable: Belief in the advantages of AEI for improving the user experience of online banking in South Africa.

Independent variables include the level of understanding of AEI, the user's experience with AEI, age, gender, and other relevant demographic parameters.

Correlations

		Do you think AEI can improve the South African online banking experience?	Age	Gender	Artificial Intelligence AI involves making computers and robots smart enough to solve problems and help us in our everyday lives. "I know and understand what Artificial Intelligence (AI) is"?	Are you familiar with Artificial Emotional Intelligence (AEI) concerning online banking? Please indicate how well you understand AEI.	How willing are you to use South African digital banking services that use AEI?	Have you ever used South African digital banking services that use AEI?	If you have interacted with digital banking services using AEI
Pearson Correlation	Do you think AEI can improve the South African online banking experience?	1.000	-0.134	-0.151	0.172	0.389	0.420	0.175	0.396
	Age	-0.134	1.000	-0.008	-0.040	-0.060	-0.161	-0.058	-0.073
	Gender	-0.151	-0.008	1.000	0.019	-0.164	-0.089	-0.043	-0.006
	"I know and understand what Artificial Intelligence (AI) is"?	0.172	-0.040	0.019	1.000	-0.018	0.069	-0.053	0.044
	familiar with Artificial (AEI) concerning online banking?	0.389	-0.060	-0.164	-0.018	1.000	0.111	0.338	0.240

Correlations									
		Do you think AEI can improve the South African online banking experience?	Age	Gender	Artificial Intelligence AI involves making computers and robots smart enough to solve problems and help us in our everyday lives. “I know and understand what Artificial Intelligence (AI) is”?	Are you familiar with Artificial Emotional Intelligence (AEI) concerning online banking? Please indicate how well you understand AEI.	How willing are you to use South African digital banking services that use AEI?	Have you ever used South African digital banking services that use AEI?	If you have interacted with digital banking services using AEI
	willing to use digital banking services that use AEI?	0.420	-0.161	-0.089	0.069	0.111	1.000	0.156	0.400
	Have you digital banking services that use AEI?	0.175	-0.058	-0.043	-0.053	0.338	0.156	1.000	0.383
	interacted with digital banking services using AEI	0.396	-0.073	-0.006	0.044	0.240	0.400	0.383	1.000
Sig. (1-tailed)	AEI can improve the South African online banking experience?		0.069	0.048	0.028	0.000	0.000	0.026	0.000
	Age	0.069		0.466	0.328	0.255	0.037	0.262	0.209
	Gender	0.048	0.466		0.418	0.034	0.162	0.317	0.472
	“I know and understand what Artificial Intelligence (AI) is”?	0.028	0.328	0.418		0.421	0.223	0.279	0.316
	familiar with (AEI) concerning online banking?	0.000	0.255	0.034	0.421		0.110	0.000	0.004
	willing to use digital banking services that use AEI?	0.000	0.037	0.162	0.223	0.110		0.041	0.000
	Have you digital banking services that use AEI?	0.026	0.262	0.317	0.279	0.000	0.041		0.000
	interacted with digital banking services using AEI	0.000	0.209	0.472	0.316	0.004	0.000	0.000	
N	Do you think AEI can improve the South African online banking experience?	124	124	124	124	124	124	124	124

Correlations									
		Do you think AEI can improve the South African online banking experience?	Age	Gender	Artificial Intelligence AI involves making computers and robots smart enough to solve problems and help us in our everyday lives. "I know and understand what Artificial Intelligence (AI) is"?	Are you familiar with Artificial Emotional Intelligence (AEI) concerning online banking? Please indicate how well you understand AEI.	How willing are you to use South African digital banking services that use AEI?	Have you ever used South African digital banking services that use AEI?	If you have interacted with digital banking services using AEI
	Age	124	124	124	124	124	124	124	124
	Gender	124	124	124	124	124	124	124	124
	"I know and understand what Artificial Intelligence (AI) is"?	124	124	124	124	124	124	124	124
	familiar with (AEI) concerning online banking?	124	124	124	124	124	124	124	124
	willing to use digital banking services that use AEI?	124	124	124	124	124	124	124	124
	Have you digital banking services that use AEI?	124	124	124	124	124	124	124	124
	interacted with digital banking services using AEI	124	124	124	124	124	124	124	124

Table 4.10: Hypothesis 2 – Correlations

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,600[a]	0.360	0.321	0.633
a. Predictors: (Constant) If you have interacted with digital banking services using AEI. Gender and Artificial Intelligence AI involves making computers and robots smart enough to solve problems and help us in our everyday lives. "I know and understand what Artificial Intelligence (AI) is"? Age, Are you familiar with Artificial Emotional Intelligence (AEI) concerning online banking? Please indicate how well you understand AEI. How willing are you to use South African digital banking services that use AEI? Have you ever used South African digital banking services that use AEI?				

Table 4.11: Hypothesis 2 - Model Summary

Coefficients			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Age	0.970	1.031
	Gender	0.962	1.039
	Artificial Intelligence AI involves making computers and robots smart enough to solve problems and help us in our everyday lives. "I know and understand what Artificial Intelligence (AI) is"?	0.988	1.012
	Are you familiar with Artificial Emotional Intelligence (AEI) concerning online banking?	0.848	1.180
	How willing are you to use South African digital banking services that use AEI?	0.813	1.230
	Have you ever used South African digital banking services that use AEI?	0.785	1.274
	If you have interacted with digital banking services using AEI	0.721	1.386
a. Dependent Variable: Do you think AEI can improve the South African online banking experience?			

Table 4.12: Hypothesis 2 - Coefficients

4.7.3 *Results about [Hypothesis Three]:*

Hypothesis 3: There is a direct correlation between the significance of control over AEI applications in digital banking and user concerns about privacy.

Dependent Variable: Users' perceived significance of having autonomy in determining the timing and manner of AEI implementation in digital banking.

Independent variables include users' privacy concerns, their readiness to trade privacy for a better user experience, their knowledge of the ethical implications of AEI, and other relevant attitudes.

Correlations											
		How important is it to you that you have control over when and how AEI is applied in digital banking?	Age	Gender	To what extent do you believe AEI in digital banking affects your privacy in South Africa?	Are you willing to give up some of your privacy in exchange for a better user experience with AEI in digital banking?	Are you willing to give up some of your privacy in exchange for experiences, shopping discounts or free items like a coffee or a burger?	Do you think that digital financial providers should make the use of AEI in their systems transparent?	How willing are you to use South African digital banking services that use AEI?	How concerned are you about the ethical implications of AEI in digital banking in South Africa?	To what extent are you aware of the possible ethical issues raised by AEI in South African digital banking?
Pearson Correlation	you have control over when and how AEI is applied in digital banking?	1.000	0.134	0.177	-0.290	-0.101	-0.364	0.240	-0.134	0.189	-0.023
	Age	0.134	1.000	-0.008	-0.107	0.034	-0.187	-0.010	-0.161	0.108	-0.105
	Gender	0.177	-0.008	1.000	-0.096	0.010	-0.143	0.211	-0.089	0.025	-0.249
	AEI in digital banking affects your privacy in South Africa?	-0.290	-0.107	-0.096	1.000	-0.108	0.346	-0.028	0.435	-0.132	0.111
	willing to give up some of your privacy in exchange for a better user experience with AEI in digital banking?	-0.101	0.034	0.010	-0.108	1.000	-0.164	-0.010	-0.050	0.007	-0.120
	willing to give up some of your privacy in exchange for free items like a coffee or a burger?	-0.364	-0.187	-0.143	0.346	-0.164	1.000	0.025	0.284	-0.183	0.270
	digital financial providers should make the use of AEI in their systems transparent?	0.240	-0.010	0.211	-0.028	-0.010	0.025	1.000	0.198	-0.008	0.069
	willing are you to use digital banking services that use AEI?	-0.134	-0.161	-0.089	0.435	-0.050	0.284	0.198	1.000	-0.305	0.110
	concerned about the ethical implications of AEI in digital	0.189	0.108	0.025	-0.132	0.007	-0.183	-0.008	-0.305	1.000	0.126

Correlations											
		How important is it to you that you have control over when and how AEI is applied in digital banking?	Age	Gender	To what extent do you believe AEI in digital banking affects your privacy in South Africa?	Are you willing to give up some of your privacy in exchange for a better user experience with AEI in digital banking?	Are you willing to give up some of your privacy in exchange for experiences, shopping discounts or free items like a coffee or a burger?	Do you think that digital financial providers should make the use of AEI in their systems transparent?	How willing are you to use South African digital banking services that use AEI?	How concerned are you about the ethical implications of AEI in digital banking in South Africa?	To what extent are you aware of the possible ethical issues raised by AEI in South African digital banking?
	banking in South Africa?										
	you aware of the possible ethical issues raised by AEI in digital banking?	-0.023	-0.105	-0.249	0.111	-0.120	0.270	0.069	0.110	0.126	1.000
Sig. (1-tailed)	you have control over when and how AEI is applied in digital banking?		0.069	0.025	0.001	0.131	0.000	0.004	0.068	0.018	0.399
	Age	0.069		0.466	0.118	0.352	0.019	0.457	0.037	0.115	0.123
	Gender	0.025	0.466		0.144	0.457	0.057	0.009	0.162	0.391	0.003
	AEI in digital banking affects your privacy in South Africa?	0.001	0.118	0.144		0.117	0.000	0.378	0.000	0.072	0.110
	willing to give up some of your privacy in exchange for a better user experience with AEI in digital banking?	0.131	0.352	0.457	0.117		0.034	0.456	0.289	0.469	0.092
	willing to give up some of your privacy in exchange for free items like a coffee or a burger?	0.000	0.019	0.057	0.000	0.034		0.390	0.001	0.021	0.001
	digital financial providers should make the use of AEI in their systems transparent?	0.004	0.457	0.009	0.378	0.456	0.390		0.014	0.465	0.223
	willing are you to use digital banking	0.068	0.037	0.162	0.000	0.289	0.001	0.014		0.000	0.112

Correlations											
		How important is it to you that you have control over when and how AEI is applied in digital banking?	Age	Gender	To what extent do you believe AEI in digital banking affects your privacy in South Africa?	Are you willing to give up some of your privacy in exchange for a better user experience with AEI in digital banking?	Are you willing to give up some of your privacy in exchange for experiences, shopping discounts or free items like a coffee or a burger?	Do you think that digital financial providers should make the use of AEI in their systems transparent?	How willing are you to use South African digital banking services that use AEI?	How concerned are you about the ethical implications of AEI in digital banking in South Africa?	To what extent are you aware of the possible ethical issues raised by AEI in South African digital banking?
	services that use AEI?										
	concerned about the ethical implications of AEI in digital banking in South Africa?	0.018	0.115	0.391	0.072	0.469	0.021	0.465	0.000		0.082
	you aware of the possible ethical issues raised by AEI in digital banking?	0.399	0.123	0.003	0.110	0.092	0.001	0.223	0.112	0.082	
N	you have control over when and how AEI is applied in digital banking?	124	124	124	124	124	124	124	124	124	124
	Age	124	124	124	124	124	124	124	124	124	124
	Gender	124	124	124	124	124	124	124	124	124	124
	AEI in digital banking affects your privacy in South Africa?	124	124	124	124	124	124	124	124	124	124
	willing to give up some of your privacy in exchange for a better user experience with AEI in digital banking?	124	124	124	124	124	124	124	124	124	124
	willing to give up some of your privacy in exchange for free items like a coffee or a burger?	124	124	124	124	124	124	124	124	124	124
	digital financial providers should	124	124	124	124	124	124	124	124	124	124

Correlations											
		How important is it to you that you have control over when and how AEI is applied in digital banking?	Age	Gender	To what extent do you believe AEI in digital banking affects your privacy in South Africa?	Are you willing to give up some of your privacy in exchange for a better user experience with AEI in digital banking?	Are you willing to give up some of your privacy in exchange for experiences, shopping discounts or free items like a coffee or a burger?	Do you think that digital financial providers should make the use of AEI in their systems transparent?	How willing are you to use South African digital banking services that use AEI?	How concerned are you about the ethical implications of AEI in digital banking in South Africa?	To what extent are you aware of the possible ethical issues raised by AEI in South African digital banking?
	make the use of AEI in their systems transparent?										
	willing are you to use digital banking services that use AEI?	124	124	124	124	124	124	124	124	124	124
	concerned about the ethical implications of AEI in digital banking in South Africa?	124	124	124	124	124	124	124	124	124	124
	you aware of the possible ethical issues raised by AEI in digital banking?	124	124	124	124	124	124	124	124	124	124

Table 4.13: Hypothesis 3 – Correlations

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,523a	0.274	0.217	0.709
a. Predictors: (Constant) To what extent are you aware of the possible ethical issues raised by AEI in South African digital banking? Do you think that digital financial providers should make the use of AEI in their systems transparent? Age: Are you willing to relinquish some of your privacy for a better user experience with AEI in digital banking? How concerned are you about the ethical implications of AEI in digital banking in South Africa? To what extent do you believe AEI in digital banking affects your privacy in South Africa? Gender: Are you willing to give up some of your privacy in exchange for experiences, shopping discounts or free items like a coffee or a burger? How willing are you to use South African digital banking services that use AEI?				

Table 4.14: Hypothesis 3 - Model Summary

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.594	9	2.399	4.778	<,001[b]
	Residual	57.245	114	0.502		
	Total	78.839	123			
a. Dependent Variable: How important is it to you that you have control over when and how AEI is applied in digital banking?						
b. Predictors: (Constant) To what extent are you aware of the possible ethical issues raised by AEI in South African digital banking? Do you think that digital financial providers should make the use of AEI in their systems transparent? Age: Are you willing to give up some of your privacy in exchange for a better user experience with AEI in digital banking? How concerned are you about the ethical implications of AEI in digital banking in South Africa? To what extent do you believe AEI in digital banking affects your privacy in South Africa? Gender: Are you willing to give up some of your privacy in exchange for experiences, shopping discounts or free items like a coffee or a burger? How willing are you to use South African digital banking services that use AEI?						

Table 4.15: Hypothesis 3 - ANOVAa

Coefficients			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Age	0.942	1.061
	Gender	0.866	1.155
	To what extent do you believe AEI in digital banking affects your privacy in South Africa?	0.742	1.348
	Are you willing to give up some of your privacy in exchange for a better user experience with AEI in digital banking?	0.962	1.039
	Are you willing to give up some of your privacy in exchange for experiences, shopping discounts or free items like a coffee or a burger?	0.765	1.307
	Do you think that digital financial providers should make the use of AEI in their systems transparent?	0.880	1.136
	How willing are you to use South African digital banking services that use AEI?	0.682	1.465

Coefficients			
Model		Collinearity Statistics	
		Tolerance	VIF
	How concerned are you about the ethical implications of AEI in digital banking in South Africa?	0.855	1.170
	To what extent are you aware of the possible ethical issues raised by AEI in South African digital banking?	0.825	1.213
a. Dependent Variable: How important is it to you that you have control over when and how AEI is applied in digital banking?			

Table 4.16: Hypothesis 3 - Coefficients

Collinearity Diagnostics													
				Variance Proportions									
Model	Dimension	Eigenvalue	Condition Index	(Constant)	Age	Gender	To what extent do you believe AEI in digital banking affects your privacy in South Africa?	Are you willing to give up some of your privacy in exchange for a better user experience with AEI in digital banking?	Are you willing to give up some of your privacy in exchange for experiences, shopping discounts or free items like a coffee or a burger?	Do you think that digital financial providers should make the use of AEI in their systems transparent?	How willing are you to use South African digital banking services that use AEI?	How concerned are you about the ethical implications of AEI in digital banking in South Africa?	To what extent are you aware of the possible ethical issues raised by AEI in South African digital banking?
1	1	9.144	1.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2	0.245	6.112	0.00	0.01	0.06	0.01	0.04	0.14	0.00	0.00	0.02	0.21
	3	0.173	7.269	0.00	0.00	0.02	0.03	0.00	0.11	0.00	0.03	0.16	0.34
	4	0.107	9.234	0.00	0.00	0.29	0.00	0.49	0.04	0.00	0.01	0.06	0.00
	5	0.092	9.956	0.00	0.03	0.20	0.01	0.01	0.21	0.02	0.02	0.34	0.33
	6	0.082	10.534	0.00	0.05	0.07	0.16	0.25	0.41	0.00	0.10	0.00	0.00
	7	0.067	11.690	0.00	0.58	0.01	0.12	0.05	0.04	0.01	0.02	0.20	0.01
	8	0.049	13.597	0.00	0.05	0.15	0.36	0.02	0.01	0.27	0.19	0.06	0.08
	9	0.031	17.169	0.00	0.03	0.09	0.26	0.00	0.01	0.59	0.56	0.05	0.01
	10	0.009	31.532	1.00	0.25	0.10	0.05	0.15	0.05	0.11	0.08	0.12	0.02
a. Dependent Variable: How important is it to you that you have control over when and how AEI is applied in digital banking?													

Table 4.17: Hypothesis 3 – Collinearity Diagnostics

4.7.4 *Results about [Hypothesis Four]:*

Hypothesis 4: Obstacles related to Internet connectivity and device accessibility significantly impede the effective implementation and consumer adoption of Artificial Emotional Intelligence (AEI) innovations in the digital banking sector in South Africa.

Dependent Variable: Frequency of utilising South African digital banking services.

Independent variables include the availability of essential devices and internet for utilising AEI-enabled services, user satisfaction, apprehensions regarding privacy and security, emotional manipulation, and overall psychological and emotional state.

Correlations										
		How often do you utilise South African digital banking services?	"I have access to one or many of the required devices (example: laptop or tablet or cell phone) to use AEI-enabled digital banking services."	"I have access to the internet or data to use AEI-enabled digital banking services."	User experience	Privacy and security	Emotional manipulation	General well-being	Age	Gender
Pearson Correlation	Frequency using digital banking services?	1.000	0.111	0.134	0.105	0.090	0.123	0.229	-0.093	0.010
	Device access	0.111	1.000	0.868	-0.046	-0.163	-0.135	-0.136	-0.169	-0.067
	Internet access	0.134	0.868	1.000	-0.042	-0.167	-0.084	-0.116	-0.235	-0.054
	User experience	0.105	-0.046	-0.042	1.000	0.402	0.310	0.522	-0.083	-0.044
	Privacy and security	0.090	-0.163	-0.167	0.402	1.000	0.335	0.401	-0.084	-0.093
	Emotional manipulation	0.123	-0.135	-0.084	0.310	0.335	1.000	0.413	-0.097	-0.059
	General well-being	0.229	-0.136	-0.116	0.522	0.401	0.413	1.000	-0.188	0.066
	Age	-0.093	-0.169	-0.235	-0.083	-0.084	-0.097	-0.188	1.000	-0.005
	Gender	0.010	-0.067	-0.054	-0.044	-0.093	-0.059	0.066	-0.005	1.000
Sig. (1-tailed)	Frequency using digital banking services?		0.110	0.070	0.124	0.161	0.087	0.005	0.152	0.458
	Device access	0.110		0.000	0.307	0.036	0.068	0.066	0.031	0.229
	Internet access	0.070	0.000		0.323	0.033	0.177	0.102	0.004	0.275
	User experience	0.124	0.307	0.323		0.000	0.000	0.000	0.181	0.313
	Privacy and security	0.161	0.036	0.033	0.000		0.000	0.000	0.177	0.153
	Emotional manipulation	0.087	0.068	0.177	0.000	0.000		0.000	0.142	0.259
	General well-being	0.005	0.066	0.102	0.000	0.000	0.000		0.019	0.234
	Age	0.152	0.031	0.004	0.181	0.177	0.142	0.019		0.476
	Gender	0.458	0.229	0.275	0.313	0.153	0.259	0.234	0.476	
N	Frequency using digital banking services?	123	123	123	123	123	123	123	123	123
	Device access	123	123	123	123	123	123	123	123	123
	Internet access	123	123	123	123	123	123	123	123	123
	User experience	123	123	123	123	123	123	123	123	123
	Privacy and security	123	123	123	123	123	123	123	123	123
	Emotional manipulation	123	123	123	123	123	123	123	123	123
	General well-being	123	123	123	123	123	123	123	123	123
	Age	123	123	123	123	123	123	123	123	123

Correlations										
		How often do you utilise South African digital banking services?	"I have access to one or many of the required devices (example: laptop or tablet or cell phone) to use AEI-enabled digital banking services."	"I have access to the internet or data to use AEI-enabled digital banking services."	User experience	Privacy and security	Emotional manipulation	General well-being	Age	Gender
	Gender	123	123	123	123	123	123	123	123	123

Table 4.18: Hypothesis 4 – Correlations

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,285[a]	0.081	0.017	0.988

a. Predictors: (Constant), Gender, Age, User experience, "I have access to one or many of the required devices (example: laptop or tablet or cell phone) to use AEI-enabled digital banking services.", Emotional manipulation, privacy and security, General well-being, "I have access to the internet or data to use AEI-enabled digital banking services."

Table 4.19: Hypothesis 4 - Model Summary

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.845	8	1.231	1.260	,271[b]
	Residual	111.342	114	0.977		
	Total	121.187	122			

a. Dependent Variable: How often do you utilise South African digital banking services?

b. Predictors: (Constant), Gender, Age, User experience, "I have access to one or many of the required devices (example: laptop or tablet or cell phone) to use AEI-enabled digital banking services.", Emotional manipulation, privacy and security, General well-being, "I have access to the internet or data to use AEI-enabled digital banking services."

Table 4.20: Hypothesis 4 – ANOVAa

Coefficients			
		Collinearity Statistics	
Model		Tolerance	VIF
1	Device access	0.241	4.142
	Internet access	0.236	4.236
	User experience	0.674	1.485
	Privacy and security	0.738	1.355
	Emotional manipulation	0.777	1.287
	General well-being	0.603	1.659
	Age	0.891	1.122
	Gender	0.965	1.037

a. Dependent Variable: How often do you utilise South African digital banking services?

Table 4.21: Hypothesis 4 - Coefficients

CHAPTER 5. Research Discussion

5.1 Descriptive Analysis:

The explanation of descriptive data for the collection of variables from the survey in Table 4.5: Descriptive Figures:

When assessing Age, the average of 3.29 suggests that most respondents fall within the middle age group.

The gender distribution exhibits a bias towards females, with a mean value of 1.54.

The dataset was refined to only include individuals residing in Gauteng province who utilise online banking services in South Africa.

Participants exhibited a higher level of familiarity with AI (mean of 4.31) compared to AEI (mean of 2.64), indicating that AEI is relatively less recognised or comprehended.

The participants utilising online banking services often had an average of 4.09, which indicates a significant prevalence of online banking usage.

The average satisfaction rating when using Online Banking Services was 4.15, which shows a high level of satisfaction.

The preferred bank for online banking, as shown by a mean score of 4.68, is FNB.

The respondents' views on the impact of AEI on online banking indicate that the majority (with a mean score of 4.06) believe that AEI has the potential to improve the online banking experience.

Respondents showed a moderate level of concern regarding privacy (mean of 2.95) and ethical considerations (mean of 3.21) related to AEI.

The level of readiness to utilise AEI services varied among respondents, with a mean score of 3.63. The mean score for the willingness to sacrifice some privacy in exchange for an enhanced user experience was 2.61. Respondents also differed in their consideration of the trade-offs associated with AEI.

The ability to control the application of AEI and its timing is highly regarded with the mean of 4.10, as well as the need for transparency from digital financial providers (mean of 4.19).

Internet and device access are necessary for using AEI-enabled services. The mean ratings for internet and device access were 2.00 and 1.98, respectively, indicating potential challenges in adopting these services.

5.2 AEI's Influence on User Experience and Trust

The correlation analysis indicated a moderate, although statistically significant, positive association between participants' knowledge of AEI and their trust in its potential benefits ($r = 0.389$, $p < 0.001$). This statistical significance highlights the crucial role of user education in promoting a favourable view of AEI. A correlation coefficient of 0.172, with a significance level of $p < 0.05$, indicates a modest but noteworthy relationship between AI comprehension and overall tech savviness, influencing trust in AEI.

5.3 The finding of the hypotheses testing

The analysis aimed to test 4 hypotheses based on the applications of Artificial Emotional Intelligence in digital banking to determine if demographic factors correlated with User Experience, knowledge of AI and AEI, and the implication of privacy and access on overall use.

5.3.1 *Findings from Hypotheses One testing.*

Hypothesis 1: A greater confidence in the potential of AEI to improve the online banking experience correlates with a higher level of understanding of AI.

When referring to Table 4.6: Hypothesis 1 – Correlations, there is a moderate but substantial positive connection ($r = 0.389$, $p < 0.001$) between participants' beliefs in AEI's benefits for online banking and their familiarity with it (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021). The link between these beliefs and AI understanding was smaller ($r = 0.172$) but significant ($p < 0.05$).

The regression model used AI knowledge and AEI familiarity as predictors in Table 4.7. A good model fit is shown by the R Square of 0.183 and an Adjusted R Square of 0.170, which explained 18.3% of the variation in the perception that AEI may improve online banking (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021). The F-statistic of 13.580 ($p < 0.001$) in Table 4.8 confirms the model's significance, showing significant improvement in predicting AEI's perceived enhancement of online banking compared to the baseline mean (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021).

The output did not show the specific influence of each predictor (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021)., but familiarity with AEI influenced opinion in its prospective advantages. The regression analysis indicates that there is a strong correlation between knowledge of AEI and positive evaluations of its influence, highlighting the need for more education on AEI in digital banking. This was further confirmed by a study that was conducted by the World Economic Forum identified that the primary obstacle in expanding services to new or additional client segments was identified as consumer education, namely in the areas of digital and financial literacy. This pattern was observed consistently throughout all locations, industries, and degrees of economic advancement (Propson & Zhang, 2024, p. 11).

No multicollinearity was found as the VIF values were 1 (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021). as referenced in Table 4.9: Hypothesis 1 - Coefficients. This suggests that the

predictor variables contributed independently to the model (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021).

- Hypothesis 1: Confirmed that AI/AEI knowledge increases trust in its ability to improve online banking. The study conducted by (Furman & Seamans, 2019) confirms the hypothesis that when a user decides to change services, the current provider has a notable edge due to its familiarity with the consumer, allowing for personalised services that a new competitor cannot offer.

5.3.2 *Findings from Hypotheses Two testing*

Hypothesis 2: Users' comprehension of AEI and favourable experiences with it positively correlate with the belief in its benefits for enhancing South African online banking services.

Taking into consideration the output of the results indicated in Table 4.10: Hypothesis 2 – Correlations, Appendix (B), the understanding of AEI, desire to use these services, and past positive experiences are moderately positively correlated with a belief in its positive influence (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021). Age and gender have weak negative connections with AEI belief, suggesting they have little impact on technological acceptance.

The model in Table 4.11: Hypothesis 2 - Model Summary indicates a 36% variance in the perception that AEI can enhance banking, confirming the predictors' significance. Understanding AI and AEI, willingness to use AEI services, historical usage, and user experience are predictors. While research methods differ by country, studies indicate that client demographics are crucial for determining internet banking popularity and uptake. Jenkins et al., identified a similar trend that, that gender, education, age, and wealth greatly influenced electronic banking use in India. While an empirical study found that age significantly influenced electronic banking adoption in Ethiopia, while gender, income, education, and occupation did not. However, factor and covariance

analysis revealed that online banking on non-cell phone devices was equally popular among all ages, with younger users being more interested in mobile banking (Jenkins et al., 2022, p. 6169).

Collinearity statistics represented in Table 4.12: Hypothesis 2 - Coefficients show no predictor multicollinearity (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021).

The findings suggest that educational activities that improve AEI comprehension and user experience may increase the adoption of digital banking AEI. Age and gender did not affect AEI, suggesting it appeals to all user groups. The robust model suggests that future research could examine other potential variables not included in this study. This could help create user-centric AEI-enabled banking systems that meet customer expectations and improve banking experiences.

- Hypothesis 2: A positive association was found between AEI knowledge and experience and belief in its benefits, showing that education can promote digital banking adoption. This finding was emphasised by the outcomes of the study conducted by Boukherouaa et al., stating that improving organisational abilities, acquiring relevant skills, increasing knowledge, improving communication with external parties, and expanding consumer education initiatives can have a direct correlation with the adoption of digital banking (2021).

5.3.3 *Findings from Hypotheses Three testing*

Hypothesis 3: There is a direct correlation between the significance of control over AEI applications in digital banking and user concerns about privacy.

The key findings identified in the detailed correlation matrix from Table 4.13: Hypothesis 3 – Correlations indicate that gender differences in attitudes regarding control over AEI show a positive association, suggesting that one gender may prioritise this control more than the other. Moreover, there is an inverse relationship between the readiness to sacrifice privacy for benefits and

the importance placed on control, indicating that individuals prioritising control are less inclined to compromise their privacy.

AEI's effect on privacy perception: Greater belief in AEI's favourable effect on privacy is associated with a greater readiness to employ AEI-enabled services. This finding implies that people are more willing to interact with AEI if they do not think it harms their privacy. This is further correlated by the study by Valenti and Alderman, indicating that consumers' concerns about privacy, such as how much personal data is secured, are also rising. The security of banks' complex, interconnected environment is only as strong as its weakest link, therefore development in AI, 5G, and data exchange are feeding these concerns. A cyberattack on a bank's vendor or fintech partner could compromise its security (Valenti & Alderman, 2021).

Gender and Ethical Awareness: A notable inverse relationship between awareness of ethical issues indicates a potential gender disparity in awareness or worry about the ethical consequences of AEI.

The model in Table 4.14: Hypothesis 3 - Model Summary explains that 27.4% of the variance is relevant to having control over AEI, as shown by the R Square value. The Adjusted R Square offers a somewhat cautious estimate by considering the number of predictors and sample size (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021).

The regression model indicated in Table 4.15: Hypothesis 3 - ANOVAa is statistically significant based on the F-statistic and its related p-value, which is below 0.001. This indicates that the independent variables significantly influence respondents' need for control over AEI (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021).

Table 4.16: Hypothesis 3 - Coefficients implies that the variables' tolerance and VIF measures show no substantial multicollinearity, indicating that each variable contributes to the model.

Table 4.17: Hypothesis 3 – Collinearity Diagnostics, Appendix (B) highlights Condition Index values consistently below 30, coupled with variance proportions deviating from 1, suggesting that multicollinearity is not a significant issue, therefore confirming the dependability of the regression estimations (*Introduction to Regression with SPSS Lesson 2: SPSS Regression Diagnostics*, 2021).

- Hypothesis 3: Showed a desire for control over AEI application and privacy issues, with a significant model emphasising transparency and ethics in AEI deployment. The investigation emphasises a notable interest among participants in regulating AEI applications in digital banking. It correlates with the findings by (Lappeman et al., 2023, p. 353) that privacy is of utmost importance to digital banking users, and there is a strong need for financial providers to be transparent. The study by Ackermann et al., correlates with the finding that individuals are more inclined to provide specific data when they fully understand the purpose behind a company's request and how the data will be applied (Ackermann et al., 2022, p. 377). Based on these insights, digital financial service providers should prioritise user privacy and transparency when developing and implementing AEI technologies. Understanding these client concerns can help develop more reliable and morally upright digital banking services.

5.3.4 *Findings from Hypotheses Four testing*

Hypothesis 4: Obstacles related to Internet connectivity and device accessibility significantly impede the effective implementation and consumer adoption of Artificial Emotional Intelligence (AEI) innovations in the digital banking sector in South Africa.

The regression analysis tested Hypothesis 4, which proposed that obstacles related to Internet connectivity and device accessibility significantly hinder the effective implementation and consumer adoption of Artificial Emotional Intelligence (AEI) innovations in the digital banking sector in South Africa, resulting in the following detailed findings.

The Pearson correlation coefficients indicated in Table 4.18: Hypothesis 4 – Correlations show a slight association between the use of digital banking services and factors like access to necessary devices for AEI-enabled services (r=0.111), access to the internet or data for AEI-enabled services (r=0.134), and overall well-being (r=0.229), although these correlations are somewhat small. The most prominent connection is between device access and internet access (r=0.868), indicating a substantial overlap in these two aspects of accessibility.

The regression model summary and ANOVA findings in Table 4.20: Hypothesis 4 – ANOVAa provide a more detailed overview. The model, in Table 4.19: Hypothesis 4 - Model Summary incorporating predictors like device and internet access, user experience, privacy and security concerns, emotional manipulation awareness, general well-being, age, and gender, accounts for only 8.1% of the variability in the frequency of using South African digital banking services (R Square = 0.081). The adjusted R-squared value of 0.017 indicates that the model's explanatory power is significantly restricted even after considering the number of predictors. The ANOVA analysis yielded a non-significant F value (F=1.260, p=0.271), indicating that combined factors do not significantly affect digital banking service use in this study.

The coefficients in Table 4.21: Hypothesis 4 - Coefficients displays Variance Inflation Factor (VIF) values, with device access having a VIF of 4.142 and internet access having a VIF of 4.236. These values suggest a moderate level of multicollinearity, possibly due to the strong correlation between these two predictors.

Overall, although Pearson correlations indicate some connections between digital banking usage and the variables of interest, the regression analysis does not provide statistically significant support for Hypothesis 4. The study shows that device and internet access are related and have some influence on digital banking usage. However, other factors do not significantly hinder the successful implementation and consumer acceptance of AEI in South Africa's digital banking industry based on the statistical model used in the analysis. Other unknown

factors may have a more significant impact, or the model's variables may need to account for the intricacies of AEI acceptance and uses fully.

- Hypothesis 2: The data indicates that the hypothesis about the influence of user experience quality and device/internet accessibility on digital banking usage across South Africa should be reconsidered. The results suggest that additional variables not accounted for in the model may have a more significant impact on the use of digital banking services, which correlates with the findings by (Msweli, 2020, p. 12). This outcome highlights the need for additional research, which could focus on a more specific set of factors or include more data, to achieve a more precise comprehension of the factors affecting the use of digital banking services in South Africa, placing a broader focus on the current needs of the country that impact the use of AEI influenced digital banking services.

5.3.5 *Outcome Framework*

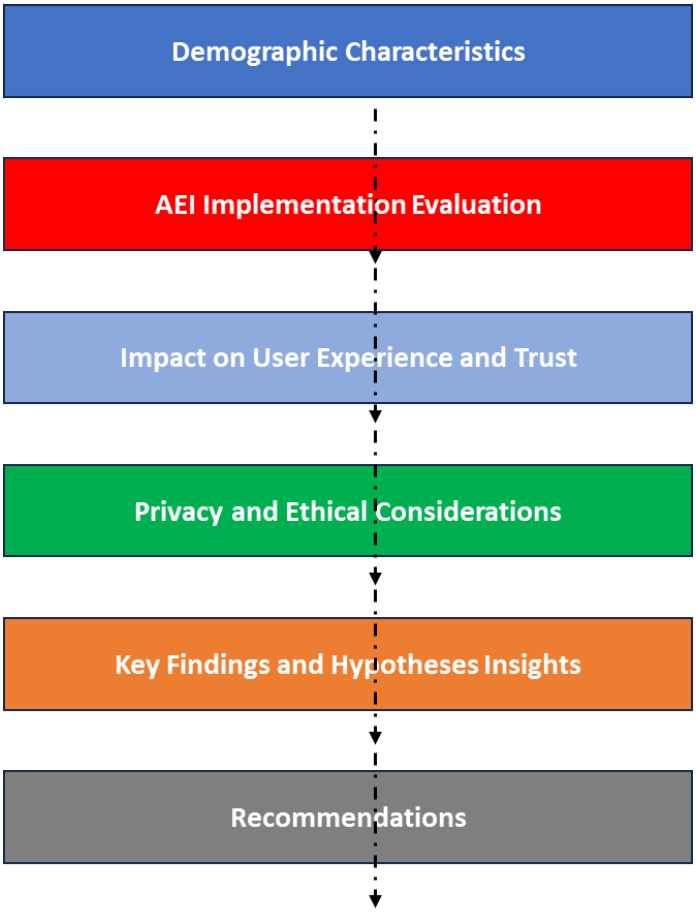


Diagram 2: Outcome Framework

As per research results, the diagram depicted in Diagram 2: Outcome Framework above demonstrates a systematic method for comprehending the integration of artificial emotional intelligence (AEI) with digital banking. It begins with participant demographics, then evaluates the implementation of AEI, examines its effects on trust and user experience, addresses privacy and ethical issues, highlights significant findings from hypothesis testing, and ends with implementation recommendations. This visual revised framework presents a concise, sequential summary of the main elements revealed in the research, making it more straightforward to grasp the study's results and relevance.

CHAPTER 6. Summary, Recommendations and Conclusion

6.1 Summary of findings

This analysis examined how Artificial Emotional Intelligence (AEI) affects internet banking in South Africa, including consumer trust, comprehension, privacy, and technological challenges. The analyses used hypothesis testing and regression models to yield the key findings.

The study showed a modest relationship between AI expertise, AEI acquaintance, and confidence in AEI's ability to improve online banking. AEI education is essential, according to the regression study's robust model fit. Awareness may improve digital banking AEI perceptions.

Research indicates a moderate positive correlation between AEI knowledge, willingness to use services, and happy online banking experiences. Educational initiatives can encourage AEI in digital banking regardless of age or gender; however, they seem to have little effect.

The research shows that consumers' privacy concerns are linked to their desire for AEI application control. Many respondents stressed AEI control since it reduced privacy intrusions. The need for control suggests that the use or application of AEI should be more transparent and ethical.

South African digital banking AEI adoption was not statistically proved to be hindered by Internet connectivity and device accessibility. Digital banking usage and accessibility characteristics correlated but did not affect AEI adoption. This access finding emphasises the need for further research on the characteristics of digital banking usage.

Integrating AEI into digital banking requires demographic considerations, education and awareness, ethical standards, and privacy and regulation. Notable suggestions include:

- Personalisation of digital banking platforms and services for senior consumers, without excluding other demographics.
- Building confidence in AEI by offering comprehensive educational resources and transparent information on its benefits, ethics, and data confidentiality.
- Promoting ethical design and transparency in AEI applications, strong privacy standards, and collaborative legislative frameworks for responsible innovation.
- Future research should address ethical and privacy issues, technology barriers to AEI integration, regulatory control, financial inclusion, and cross-cultural assessments.

This evaluation emphasises the importance of user education, ethical implementation, and AEI's ability to alter online banking experiences for South African users.

6.2 Proposals for Incorporating AEI in Digital Banking

Section	Recommendation	Objective	Implementation Strategy
Demographic Factors and Product Design	Cater to mature audiences while ensuring inclusivity for all age groups and genders.	To offer digital banking services that meet the financial objectives of users over 25 without alienating younger users or any gender.	Implement gender-neutral designs and messages. Focus on accessibility and usability across diverse demographics.
Education, Awareness, and Access	Improve awareness and trust in AEI through education, communication, and access.	To enhance user understanding and trust in AEI's ethical application and its impact on emotional data privacy.	Develop and disseminate educational material on AEI benefits and ethical considerations. Design strategies for digital literacy to ensure access to AEI-enhanced services for all, especially those with limited access to technology.
Ethics, Privacy, and Regulation	Prioritise ethical design and transparency in the development and deployment of AEI in digital banking.	To address privacy concerns and ethical issues associated with AEI, ensuring user consent, data protection, and transparency.	Adhere to rigorous ethical guidelines and privacy regulations. Collaborate with stakeholders to improve regulatory frameworks for AEI's ethical application.
Future Research	Conduct further research on AEI's impact, ethical challenges, and regulatory needs in digital banking.	To enhance understanding of AEI and address evolving challenges in its application within digital banking.	Investigate the impact of educational interventions on AEI acceptability, demographic influences on AEI perceptions, and the necessity for regulatory structures. Explore AEI's potential to enhance financial inclusion and perform cross-cultural analysis.
Policy Implications	To guarantee AEI integrates seamlessly and ethically into digital financial systems, adapt policies.	To create a regulatory environment that promotes innovative AEI use while respecting users' rights and privacy.	Work with politicians to create and improve AEI technology guidelines. This policy should require openness, user consent, and the possibility to opt out to ensure AEI implementations comply with national and international data protection legislation.

Table 6.1: Proposals for Incorporating AEI in Digital Banking

6.3 Limitations

i. The study largely concentrates on quantitative analysis within a specific regional context. It may not be directly applicable to other emphasises without considering local cultural and technological variations.

ii. Methodological Constraints: The reliance on self-reported data from surveys may create biases, as users' responses may be impacted by their present perceptions or understanding of AEI, potentially resulting in errors.

iii. The AEI technology and its applications in digital banking are undergoing rapid technological evolution. Therefore, the relevance of the findings may diminish as new technology and approaches arise. Subsequent investigations should consistently refresh the empirical data to stay abreast of technological progress.

6.4 Conclusion

South Africa's digital financial services industry is moving towards improving customer experiences and solving challenging technological adoption and ethical issues via Artificial Emotional Intelligence (AEI). Based on the Technology Adoption Model 2 (TAM2) and customised to South Africa's socio-economic and cultural environment, this study examined the factors influencing digital banking consumers' AEI adoption. Regression analysis and hypothesis testing have shown that AEI technologies are generally well received, highlighting their potential to transform digital financial services interactions.

Despite the bright outlook, privacy, data protection, and ethical use of emotional intelligence algorithms are concerning. This study found that mature digital banking customers are technologically knowledgeable and cautious and value privacy and ethical data practices. User education, transparency, and ethical governance are crucial to the future of AEI technology trust and acceptability.

This study adds to the discourse on AEI in digital banking by offering financial providers strategies to address ethical and privacy concerns. It promotes ethical AI use, strict privacy protocols, and extensive user education. This research encourages additional research, notably on AEI's changing ethical, technological, and regulatory landscapes.

An in-depth look at AEI's impact on Gauteng digital banking customers demonstrated a complex link between demography, technology, and privacy. The study highlighted that transparency and user education improve user views and trust in AEI, enabling more secure and tailored banking services.

In conclusion, the research emphasises the challenge of using AEI in digital banking and the necessity for education, openness, and privacy to improve user acceptability and experience. It also proposes studying younger demographics and potential AEI adoption hurdles beyond the surveyed factors. AEI in South Africa's digital banking provides ethical and privacy issues and opportunities. Digital banks must emphasise client service, ethical innovation, and regulatory flexibility to use AEI. This research enhances academic and practical debate on

AEI in digital banking, providing industry stakeholders committed to the responsible use of emotional intelligence technologies in the financial sector with valuable insights and recommendations.

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APPENDIX (A) Survey Questions

A Likert scale survey will be applied to collect feedback from respondents.

Dear respondent,

My name is Sanusha Reddy. I am a master's student (student number 2370774) at Wits Business School. I am researching Artificial Emotional Intelligence (AEI).

AEI gives computers the ability to understand emotions. AEI helps computers identify text, words, spoken emotions like that which can be identified by someone's face and statements. When you talk to your computer, AEI helps it understand your words and feelings.

The purpose of this study is to investigate the implications of the Consumer Implications of AEI in the specific context of Digital Banking in South Africa, focusing on the Gauteng region. The survey will be confidential and anonymous. Your name or any information that could identify you will remain confidential. With your permission, I would like to use the data you provide to answer my research questions.

This data will be stored on my laptop for two years. Only the researcher (myself) will have access to the data. If you have any questions during or afterward about this research study, feel free to contact me (2370774@students.wits.ac.za / 0820405406) or my supervisor (cheryl.genga@wits.ac.za).

If you have any concerns or complaints about the ethical procedures of this research study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), by telephone at +27(0) 11 717 1408, email hrecnon-medical@wits.ac.za.

Please confirm if you are willing to proceed in this research project?

1. Information on participants:

1.1. Age:

- 18-24 years
- 25-34 years
- 35-44 years
- 45-54 years
- 65 and older 55 to 64

1.2. Age:

- gender: male
- gender: female
- Non-binary
- Rather not disclose

1.3. Do you use online banking in South Africa?

- Yes
- No

1.4. Do you use online banking in South Africa?

- Yes
- No

2. Knowledge and understanding of AEI

2.1. Artificial Intelligence AI involves making computers and robots smart enough to solve problems and help us in our everyday lives. “I know and understand what Artificial Intelligence (AI) is”?

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

2.2. Are you familiar with Artificial Emotional Intelligence (AEI) concerning online banking?

Please indicate how well you understand AEI on a scale of 1 to 5, where 1 is "Not Understand at All" and 5 is "Fully Understand."

- 1 (Not Understand at All)
- 2
- 3
- 4
- 5 (Fully Understand)

3. Use of Digital Banking:

3.1. How often do you utilise South African digital banking services?

- A lot of the time
- Frequently
- Occasionally
- Rarely
- Never

3.2. Please indicate your overall level of satisfaction with the digital banking services you now use on a scale of 1 to 5, where 1 signifies "Very Dissatisfied" and 5 signifies "Very Satisfied."

- 1 (Very Dissatisfied)
- 2
- 3
- 4
- 5 (Very Satisfied)

4. How AEI is Seen in Digital Banking:

4.1. Do you think AEI can improve the South African online banking experience?

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

4.2. To What degree do you believe AEI can have an impact on the following facets of digital banking? Please give each item a rating from 1 to 5, with 1 representing "Negative Impact" and 5 representing "Positive Impact."

4.2.1. User experience

- 1 (Negative Impact)
- 2
- 3
- 4
- 5 (Positive Impact)

4.2.2. privacy and security

- 1 (Negative Impact)
- 2
- 3
- 4
- 5 (Positive Impact)

4.2.3. Emotional manipulation

- 1 (Negative Impact)
- 2
- 3
- 4
- 5 (Positive Impact)

4.2.4. bias and fairness

- 1 (Negative Impact)
- 2
- 3
- 4
- 5 (Positive Impact)

4.2.5. General well-being

- 1 (Negative Impact)
- 2
- 3
- 4
- 5 (Positive Impact)

4.3. To what extent are you aware of the possible ethical issues raised by AEI in South African digital banking?

- Not Familiar
- Slightly Familiar
- Moderately Familiar
- Very Familiar
- Extremely Familiar

5. Ethical Concerns and User Trust:

5.1. How concerned are you about the ethical implications of AEI in digital banking in South Africa? Rate your concern on a scale of 1 to 5, where 1 is "Not Concerned at All" and 5 is "Extremely Concerned."

- 1 (Not Concerned at All)
- 2
- 3
- 4
- 5 (Extremely Concerned)

5.2. How much has the inclusion of AEI affected your confidence in South Africa's digital banking services? Rate your level of trust on a scale of 1 to 5, with 1 representing "Decreased Trust" and 5 representing "Increased Trust."

- 1 (Decreased Trust)
- 2
- 3
- 4
- 5 (Increased Trust)

6. User Behaviour and Interaction with AEI

6.1. How willing are you to use South African digital banking services that use AEI? Rank your level of willingness on a scale of 1 to 5, with 1 denoting "Very Unwilling" and 5 denoting "Very Willing."

- 1 (Very Unwilling)
- 2
- 3
- 4
- 5 (Very Willing)

6.2. Have you ever used South African digital banking services that employ AEI?

- Yes
- No
- Not sure

6.3. If you have interacted with digital banking services using AEI, please rate your experience on a scale of 1 to 5, where 1 is "Very Negative" and 5 is "Very Positive."

- 1 (Very Negative)
- 2
- 3

- 4
- 5 (Very Positive)

6.4. "I have access to one or many of the required devices (example: laptop or tablet or cell phone) to use AEI-enabled digital banking services."

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

6.5. "I have the infrastructure or access to the internet or data to use AEI-enabled digital banking services."

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

7. Impact on User Privacy:

7.1. To what extent do you believe AEI in digital banking affects your privacy in South Africa? Rate your perception on a scale of 1 to 5, where 1 is "Negative Impact" and 5 is "Positive Impact."

- 1 (Negative Impact)
- 2
- 3
- 4
- 5 (Positive Impact)

7.2. Are you willing to give up some of your privacy in exchange for a better user experience with AEI in digital banking?

- Yes
- No
- I am not sure if I will be "giving up" my privacy.

7.3. Are you willing to give up some of your privacy in exchange for experiences, shopping discounts or free items like a coffee or a burger?

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

8. Accessibility and User Control:

8.1. How important is it to you that you have control over when and how AEI is applied in digital banking?

- Not Important
- Slightly Important
- Moderately Important
- Very Important
- Extremely Important

8.2. Do you think that digital financial providers should make the use of AEI in their systems transparent?

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

9. Open Ended Question

9.1. Do you have any further comments to make on AEI and South African digital banking?

I appreciate your participation in this questionnaire. Your insightful comments are highly valued and will help us better understand the effects of artificial emotional intelligence (AEI) on South African digital banking.

Please know that we will keep everything you say completely private. We value your privacy and will only use the data we collect for legitimate research.

This survey's objective is to learn more about various client perspectives and issues with AEI in South African digital banking. Your thoughtful and sincere replies will go much further towards helping us accomplish this goal.

APPENDIX (B) Ethical Clearance

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

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

Ethics Clearance Certificate

Ethics protocol number: WBS/DB2370774/653

This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below)

Project title	Investigating the ethics and consequences of Artificial Emotional Intelligence (AEI) in human-computer interaction.
Investigator / Researcher	Mrs Sanusha Reddy
Nature of Project	MM (Digital Business)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed confidentialty.
Issue Date of Certificate	2023/10/17
Expiry date	Date of submission of the project / research report
Chairperson	Dr Pius Oba +27 11 717 3976 +27 82 733 6587 pius.oba@wits.ac.za

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Declaration by Researcher

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

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

Signature

29/02/2024

Date: