THE DEVELOPMENT AND MEASUREMENT OF FINANCIAL TECHNOLOGY LITERACY FOR MILLENNIALS AND GENERATION Z IN THE EASTERN CAPE

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ABSTRACT

South Africa has a small but fast-growing Fintech industry, but there is limited understanding of whether Millennials and Gen Z possess the financial and digital skills to use Fintech products effectively. This study aimed to develop a context-specific measurement instrument of Fintech and to measure the level of Fintech literacy among Millennials and Gen Z in the Eastern Cape of South Africa. Fintech literacy in this study is defined as a combination of digital and financial literacy that enables consumers to effectively use Fintech financial products and services while being aware of the digital risks involved. Therefore, Fintech literacy has two components: financial literacy and digital literacy.

A positivist paradigm was followed, using a quantitative, cross-sectional design. Primary data were collected using an online questionnaire distributed to individuals aged 18 to 43 who owned a mobile phone and used at least one mobile banking application. A non-probability sampling method was used, combining judgmental and snowball techniques. The questionnaire measured five dimensions: financial literacy, digital literacy, mobile banking proficiency, knowledge of Fintech products, and overall Fintech proficiency. Data were analysed using descriptive statistics, item difficulty, item discrimination, and content validity ratio (CVR) to test the reliability and validity of the instrument The results revealed that there is a contrast between digital and financial literacy levels: while digital literacy among Millennials and Gen Z in the Eastern Cape was high, financial literacy levels were relatively low. The overall level of Fintech literacy was low to moderate. Financial literacy emerged as a key area of concern, with many respondents struggling to understand essential concepts such as compound interest, inflation, and risk diversification. Digital literacy levels were higher, particularly in relation to ownership of a mobile device, but several respondents showed uncertainty when it came to using mobile settings. In terms of knowledge of Fintech products, the respondents showed a strong awareness of payment applications, but limited familiarity with tools such as robot-advisors, cryptocurrency platforms, and peer-to-peer lending services.

Based on these results, the study recommends that financial literacy be integrated more intentionally into high school and tertiary education with concepts focused on compound interest, inflation, and risk diversification, with content available in isiXhosa for accessibility. Digital literacy programmes should also be delivered through community centres and schools, focusing on practical mobile phone skills. To improve Fintech literacy, targeted awareness

initiatives should be introduced through universities, NGOs, and Fintech providers, emphasising simplifying Fintech concepts and offering support in both isiXhosa and English. This study contributes by developing a locally relevant measurement instrument and offering insights into the Fintech levels of the targeted sample in the Eastern Cape. The study can be used by future studies as a baseline for future research on Fintech literacy in South Africa. Fintech service providers, educators, and policymakers may use the results to develop products and education programmes to address Fintech literacy gaps among Millennials and Gen Z in South Africa.

Keywords: Fintech literacy, digital literacy, financial literacy, Millennials, Generation Z, Eastern Cape, South Africa.

DECLARATION

I declare that the thesis entitled “The development and measurement of financial technology literacy for millennials and Gen Z in the Eastern Cape,” which I hereby submit for the degree, Master of Commerce at Rhodes University, is my own work. I also declare that this dissertation has not previously been submitted by me for a degree at this or any other tertiary institution and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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CHAPTER 1
INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 OVERVIEW AND BACKGROUND OF THE STUDY

According to Summerfield (2020), the 2007/2008 global financial crisis marked the beginning of significant investment in financial technology (Fintech), which has since revolutionised financial services globally. The COVID-19 pandemic presented an even greater opportunity for Fintech innovation. As global growth continues, the demand for Fintech in South Africa has increased, as noted by Santosdiaz (2022). Fintech offers consumers more secure, personalised, and user-friendly financial services (Walden, 2022), and it is often referred to as digital financial products and services (Langley and Leyshon, 2020). Fintech includes emerging technologies that enable financial institutions to provide services faster and more efficiently than traditional methods (Kagan, Estevez, Bellucco-Chatham, 2022). Alternatively, Fintech can also be defined as innovative technology that improves traditional financial products while providing better financial services to consumers at a lower cost (Grace and Megargel, 2021). In this study, Fintech is defined as an innovative technology that uses traditional financial services and products to meet consumer needs.

Fintech encompasses a variety of products and services, including investment applications, payment applications, crypto applications, personal finance applications, payment systems, and online banking products (Kagan et al., 2022). These products and services are delivered to consumers through technology that aims to improve or automate the delivery of traditional financial products and services (Kagan et al., 2022). Fintech products and services are beneficial because they create ease of use and provide better financial products and services. For example, they make it easier for consumers to pay bills, link their credit cards to savings accounts, and set up direct deposits (Algoetech, 2022). Millennials and Generation Z (Gen Z) are the primary consumers of Fintech, as noted by Barclaycard's recent study (2022). These generations are digitally savvy and have a greater awareness of the global economy and innovative technologies such as Fintech (Hecht, 2022). However, Yakoboski, Lusardi, and Hasler (2018) found that to benefit from fintech, Millennials and Gen Z need elevated levels of financial technology literacy (Fintech literacy). Morgan, Huang, and Trinh (2019) also emphasised the importance of Fintech literacy to effectively use Fintech and avoid fraud, such as unauthorised use of data. Additionally, elevated levels of Fintech literacy can mitigate the

risks associated with using fintech, such as phishing, pharming, spyware, and SIM card swaps (Lyons and Kass-Hanna, 2021).

Fintech literacy is consumers' knowledge about using Fintech products and services (Prasad, 2018). Other studies agree that Fintech literacy is based on understanding Fintech products and services, which enables consumers to make informed financial decisions and improve their financial well-being (Schueffel, 2017). Peter et al. (2019) extend this definition by including knowledge and awareness of digital financial risks. The inclusion of digital risk awareness in the definition of Fintech literacy has been supported by various authors (Alliance for Financial Inclusion, 2021; Ravikuma, Prakrash, Vazirani, Krishna, 2022), who argue that consumers need to be aware of risks such as phishing, spyware, and SIM card swaps to protect their data and avoid financial losses. Morgan, Huang, and Trinh (2019) define Fintech literacy more broadly to include consumer rights, risk control, and regulatory knowledge. This study will not adopt their definition as those components go beyond the actual use of Fintech products and services. In addition, their definition lacks clear empirical validation and may not be suitable for the South African context. Instead, this study adopts the definitions used by Lyons and Kass-Hanna (2021) and Toni and Desai (2020), who define Fintech literacy as the financial literacy and digital literacy needed to use Fintech effectively. Therefore, Fintech literacy in this study is defined as a combination of digital and financial literacy that enables consumers to effectively use Fintech financial products and services while being aware of the digital risks involved.

International studies on Fintech literacy have mostly been conducted in Asian and European countries, while the Middle East and Sub-Saharan Africa have received little attention (Mishra, Agarwal, Sharahiley, Kandpal, 2024; Rai and Sharma, 2019). Rai and Sharma (2019) conducted a study to examine the Fintech literacy levels among students in higher education institutions in Delhi and found that their Fintech Literacy levels were low. Additionally, demographic factors such as gender, age, education, marital status, income, and place of residence have been found to affect consumers' Fintech literacy levels (Ravikuma et al., 2022). Mishra *et al.* (2024) focused on Indian women and showed how Fintech literacy improves financial decision-making. The study found low levels of Fintech literacy among the targeted sample. Despite increasing access to Fintech products and services, the study found that many women face obstacles when using Fintech products and services efficiently.

However, the context in developing countries such as India, where studies were conducted in Delhi, differs from that of South Africa, as the range of Fintech products and services available in South Africa is different (Geral, Tibane and Kern, 2018). There has been no research conducted on Fintech literacy among Millennials and Gen Z in South Africa. Previous studies on financial literacy in South Africa have focused on financial literacy without considering Fintech (Fatoki and Oni, 2014; Louw, 2013). Studies conducted in the Eastern Cape have also shown low levels of financial literacy among Millennials and Gen Z (Fatoki and Oni, 2014), which is a component of Fintech literacy. A study conducted by Simatele and Maciko (2022) suggests that Fintech can overcome distance barriers and enable users to access financial services and increase financial literacy in rural communities located in the Eastern Cape. To close the financial literacy gap and ensure inclusion of Millennials and Gen Z in the South African financial industry, it is important to develop high levels of Fintech literacy (Uviebinene, 2022). This will allow them to access digital financial products and combat financial frauds (Lukongo, 2018). Considering the low levels of financial literacy in the Eastern Cape (Maduku and Thusi, 2020), it is expected that the level of Fintech literacy among Millennials and Gen Z in the region is also low**.** However, the available measurement instruments for Fintech literacy have been used in Asian and European countries (Morgan and Trinh, 2019). Therefore, there is a need to develop a context-specific Fintech measurement instrument for Millennials and Gen Z.

1.2 PROBLEM STATEMENT

Despite the growing demand for Fintech across Africa—particularly in South Africa, Nigeria, Egypt, and Kenya—driven by rapid digitalisation and mobile adoption (BDO, 2024), the level of Fintech literacy among Millennials and Gen Z in South Africa remains unexplored. This is especially true for the Eastern Cape, a region characterised by urban and rural populations that are often underserved and economically marginalised (Westaway, 2012). As Lyons and Kass-Hanna (2021) emphasise, Fintech literacy is a critical enabler of financial inclusion, empowering individuals—especially those in vulnerable communities—to access and navigate digital financial services safely and effectively.

However, existing research suggests that the Eastern Cape struggles with low levels of financial literacy, a foundational component of Fintech literacy (Ndou, 2023; Akande, Hosu, Kabiti, Ndhleve and Garidzirai, 2023). In parallel, studies indicate that Millennials and Gen Z are the primary users of Fintech products and services, given their digital savviness and

exposure to financial innovation (Deloitte, 2025). As previously indicated, there been no research conducted on Fintech literacy among Millennials and Gen Z in South Africa. Previous studies on financial literacy in South Africa have focused on financial literacy without considering Fintech (Fatoki and Oni, 2014; Louw, 2013). Without a clear understanding of Fintech literacy levels among Millennials and Gen Z in South Africa, it is challenging to promote financial inclusion using Fintech products and services, especially among these generations. Therefore, there is a need to develop a research measurement instrument for Millennials and Gen Z and to inivestigate Fintech literacy levels among Millennials and Gen Z in the Eastern Cape.

1.3 RESEARCH OBJECTIVES

This section presents the primary objective of the study, followed by the secondary objectives, which are designed to support and affect the achievement of the primary objective.

1.3.1 PRIMARY OBJECTIVE

The study aims to develop a context-specific measurement instrument of Fintech and to measure the level of Fintech literacy among Millennials and Gen Z in the Eastern Cape.
To achieve the primary objective of the study, the following secondary objectives have been defined.

1.3.2 SECONDARY OBJECTIVES

To provide an overview of Fintech and adopt a theoretical framework for Fintech literacy.
To develop a valid and reliable Fintech literacy measurement instrument.
To measure the Fintech literacy of Millennials and Gen Z in the Eastern Cape.
To provide recommendations to Fintech providers and educators on how to improve the levels of Fintech literacy of Millennials and Gen Z.

1.4 RESEARCH DESIGN AND METHODOLOGY

This section will introduce the research design, which will be discussed in detail in Chapter 4. This study will adopt a positivistic paradigm and use a quantitative research methodology. The sample will consist of Millennials and Gen Z individuals aged 18 to 43, residing in the Eastern Cape, who will use at least one mobile banking application. Due to accessibility and resource limitations, this study will use a non-probability sampling method, specifically a combination of judgmental and snowball sampling techniques. Initially, respondents meeting

the study criteria will be identified (judgmental sampling), and these individuals will be encouraged to refer others (snowball sampling), thereby expanding the sample organically. Primary data was collected through an online questionnaire that was distributed to a target of 384 respondents.

The online questionnaire was created using Google Forms and include close-ended questions across six sections: demographic information, financial literacy, digital literacy, mobile banking proficiency, knowledge of Fintech products, and Fintech proficiency. Responses will be downloaded in CSV format, cleaned for accuracy, and analysed using statistical software. Ethics approval was obtained from the Rhodes University Ethics Committee.

Once data collection is complete, the validity and reliability of the instrument will be assessed. The validity and reliability of the instrument will be evaluated using item analysis techniques. Content validity will be determined through the Content Validity Ratio (CVR) based on expert evaluations and reliability which will align with the approach used by Lyons and Kass-Hanna (2022). Furthermore, the discrimination index will be used to determine how effectively each item differentiates between high- and low-performing respondents. Descriptive statistics were used to present respondent demographics and levels of Fintech literacy. Categorical variables such as gender, education level, and employment status will be summarised using frequencies and percentages. In contrast, continuous and ordinal variables, including age and composite scores, will be described using means and standard deviations. This will ensure a clear overview of the sample profile and the distribution of financial and digital literacy levels of Millennials and Gen Z in the Eastern Cape.

1.5 SCOPE AND DEMARCATION

This study investigates the Fintech literacy level among Millennials and Gen Z in the Eastern Cape province of South Africa. The study is confined to assessing their financial literacy, digital literacy. Financial literacy and digital literacy consist of components such usage of various Fintech products and services, such as payment applications, cryptocurrency applications, personal financial management applications, investment applications, financial robot advisors, and peer-to-peer lending platforms.

The study is delimited to Millennials and Gen Z individuals residing in the Eastern Cape, specifically those between 18 and 43. This age group was selected as it represents the most

active adopters of Fintech solutions. Furthermore, the study is restricted to individuals who own a mobile phone and use mobile banking applications. The scope of the study does not extend to other provinces in South Africa, nor does it aim to assess Fintech usage among other generations. The study adopts a quantitative approach using a structured online questionnaire as the primary data collection instrument. As such, qualitative insights such as personal experiences or in-depth behavioural motivations are beyond the scope of this research. This study primarily seeks to develop a context-specific measurement instrument of Fintech, as non-existent and shed light on the level of Fintech literacy among Millennials and Gen Z in the Eastern Cape.

1.6 SIGNIFICANCE OF THE STUDY

This study aims to develop a context-specific measurement instrument of Fintech and to measure the level of Fintech literacy among Millennials and Gen Z in the Eastern Cape. There is no research focused on Fintech Literacy for Millennials and Gen Z in the Eastern Cape. Previous studies have explored financial literacy broadly, but no study has examined Fintech literacy in terms of financial and digital literacy. This study developed a context-specific measurement instrument to measure Fintech literacy levels among Millennials and Gen Z.

Eastern Cape is a unique blend of urban and rural communities with different access levels to technology and financial inclusion (Mabeba, 2020). According to Mabeba (2020), financial inclusion in the Eastern Cape improved between 2009 and 2018, but the province still ranked 7th out of 9 in overall access and usage of formal financial services (Mabeba, 2020). This highlights the need for research that reflects the realities and challenges faced by marginalised youth in the region. This study responds to local calls by scholars such as Simatele and Maciko (2022) for research that reflects local realities and the distinct challenges faced by marginalised youth. Therefore, the results of the study can shed light on the levels of Fintech literacy in the Eastern Cape and may have implications for the youth in South Africa.

The development of a context-specific measurement instrument to measure Fintech literacy will help future studies to investigate Fintech literacy in different age groups and populations. Showing the validity and item analysis of context-specific measurement instruments to measure Fintech literacy will assist future studies to rely on the validity and reliability of the instrument. The methodology adopted in this study to develop the measurement instrument is transferable to other instruments and studies in the future. Future studies may rely on the

results and the instrument for future use on similar topics. Therefore, this study becomes a baseline for future studies investigating Fintech literacy.

The results of this study will benefit several stakeholders. Educators and curriculum developers may draw from the results to design financial education programmes that will improve the Fintech literacy of young people in South Africa. Fintech providers and financial institutions will benefit from a better understanding of the Fintech capabilities of Millennials and Gen Z, allowing them to create more targeted and inclusive financial products. Policymakers and regulators can use the results to guide inclusive Fintech policies.

1.7 STRUCTURE OF THE CHAPTERS

This section will provide information about the chapters in the study. Table 1.1 will provide a brief description of the chapters of the study.

TABLE 1.1: STRUCTURE OF CHAPTERS

Chapter	Content
Chapter 1	This chapter provides the introduction and background of the study. It defines key concepts, including Fintech and Fintech literacy, identifies the research problem, and outlines the study's primary objective, secondary objectives, and significance. It also presents the research design and methodology, as well as the scope and demarcation of the study.
Chapter 2	This chapter presents a comprehensive literature review. It explores Fintech's concept, importance, and historical development and details various Fintech products and services. The chapter also examines previous studies and the role of Fintech in promoting financial inclusion, especially in the African context.
Chapter 3	This chapter outlines the theoretical foundation of Fintech literacy. It presents the theoretical framework and explores related constructs such as financial literacy, digital literacy,

	and their components. The chapter also discusses and presents measures of financial and digital literacy.
Chapter 4	This chapter describes the research design and methodology employed in the study. It includes the research paradigm, sampling strategy, data collection techniques, questionnaire design and ethical considerations undertaken. It also outlines the data analysis methods, validity and reliability testing, and descriptive analysis.
Chapter 5	This chapter presents the empirical results of the study. It begins with a summary of the response rate and demographics of the respondents. The chapter then reports on the levels of financial and digital literacy and Fintech proficiency. It further evaluates the validity and reliability of the measurement instruments. A Fintech Literacy Index is calculated to assess overall literacy levels among Millennials and Gen Z in the Eastern Cape. The chapter concludes with a summary of the key findings.
Chapter 6	This chapter summarises the literature review of the study. It discusses the methodology and the results of the study. It offers recommendations for Fintech providers and educators to improve Fintech literacy among Millennials and Gen Z in the Eastern Cape. It outlines implications for, policymakers. The chapter concludes the study by summarising contributions, limitations, and suggestions for future research. Lastly, final remarks are provided.

Source: Researchers Construct

Table 1.1 shows that six chapters will be covered in this study to achieve the primary objective of the study.

1.8 SUMMARY

This chapter introduced the topic of the study and provided the background. Fintech has become increasingly important in South Africa, but there has been less research to measure and investigate Fintech literacy in South Africa. Therefore, limited research exists on Fintech

literacy in South Africa, particularly within the Eastern Cape. This led to the need to develop a context-specific measurement instrument for Fintech. The study showed that digital financial products and services are increasingly used by younger generations who require financial and digital literacy to navigate them effectively. The chapter then presented the problem statement, which highlighted the need to measure Fintech literacy levels in a region marked by low financial inclusion. The primary and secondary objectives of the study were presented. This was followed by the significance of the study.

This study adopts a quantitative approach using a structured online questionnaire distributed among Millennials and Gen Z. The chapter concludes with a discussion on the scope and demarcation of the study, which is limited to individuals aged 18 to 43 living in the Eastern Cape. The next chapter will comprehensively review the literature on Fintech's concept, importance, and historical development and detail various Fintech products and services.

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CHAPTER 2
OVERVIEW OF FINTECH

2.1 INTRODUCTION

In the previous chapter, this study highlighted the research context and looked at the rise of Fintech usage and its increased demand in South Africa's younger generation, particularly among millennials and Gen Z. After that, the study's primary objective was to develop a context-specific measurement instrument of Fintech and to measure the level of Fintech literacy among Millennials and Gen Z in the Eastern Cape. To achieve the primary objective of this study, this chapter establishes the secondary objective, which is to provide an overview of Fintech. The overview of Fintech begins with exploring the concept of Fintech and its importance and shedding light on the historical background of Fintech. This chapter further provides a detailed examination of Fintech products and services, explains how the Fintech ecosystem works, and reviews existing literature applicable to Fintech within the South African context. Lastly, the study will conclude with a summary of the chapter.

2.2 THE CONCEPT AND IMPORTANCE OF FINTECH

Fintech refers to technological innovation in the design of financial services and products (CFA, 2023). In an expanded definition, Kagan, Estevez, and Bellucco-Chatman (2023) describe Fintech as a new technology solution that seeks to improve and automate the delivery and usage of financial services. Fintech is also defined as using technology to improve financial services (Ward, 2016). Technological solutions encompass cloud computing, mobile banking, Artificial Intelligence (AI), virtual reality, and augmented reality (Invonto, 2023). As Oracle (2023) simplifies, cloud computing enables the rental of Internet Technology (IT) instead of the standard approach of purchasing databases, software, and hardware. Companies can access their computing power via the Internet, a more flexible and cost-effective alternative (Oracle, 2023). Mobile banking solutions, as defined by Fiserv (2023), are designed to provide consumers with convenient on-the-go access to banking, payment, and investment services through their mobile devices.

Frankfield and Scott (2023) provide a straightforward definition of AI, characterising it as the ability of computers or machines to perform intelligent tasks that typically require human cognition, such as learning and decision-making. Finally, Sheldon (2022) describes virtual

and augmented reality as technologies that generate computer-generated, immersing consumers in alternate realities, even though they physically exist elsewhere.

The above definition demonstrates that innovation is crucial within Fintech, making Fintech a significant catalyst for innovation in the financial services industry. Innovation, as described by Boyles (2022), encompasses the creation and application of novel and imaginative technologies, processes, or business models. This study defines Fintech as using innovative technology and applying technology solutions to improve financial services and products to meet consumer financial needs. The next part will look at the importance of Fintech. According to Darangwa (2021), Fintech contributes significantly to innovation by merging technology with finance. Finance, as a field, pertains to the science of managing money. (Hayes, James, Kvilhaug, 2023). This integration includes advancements like generative AI, which has found wide adoption by banks globally and aids consumers in preventing fraud. Generative AI facilitates advanced predictive analytics and automated decision-making, allowing foreseeing future trends and events through data analysis (Cote, 2021). A practical example is JP Morgan and Chase. This American investment banking firm employs generative AI to make predictive forecast changes in interest rates, stock prices, and currency values, which has helped the company reduce losses and improve overall profitability (Segal, 2021).

Fintech's role as a catalyst for innovation is further illustrated by a report from BankservAfrica (2021), highlighting the innovative application of artificial intelligence. This innovative use of AI involves employing algorithms to analyse and cross-reference extensive datasets, including official identification documents and biometric information, which starkly contrasts the historical practice of manual verifications conducted by banks to verify account owners. The historical method often leads to human errors (BankservAfrica, 2021). The adoption of AI for identity verification streamlines the process and enhances accuracy by minimising the potential for human errors, thus revolutionising how financial institutions verify and manage customer identities.

Fintech is vital in promoting financial inclusion, which entails making financial products and services readily available and accessible to all consumers within a country (Singh and Singh Kondan, 2011). Financial products and services encompass a wide range of offerings provided by financial holding companies involving activities of a financial nature (LawInsider, 2023).

According to Gordon (2022) a financial holding company refers to a type of corporation that engages in banking related activities but offers non-banking financial services. Fintech serves as a catalyst for financial inclusion by extending accessibility to those who lack it. As per The World Bank (2022), many individuals are excluded from financial services due to inadequate infrastructure, such as physical bank branches and ATMs, which hinders their ability to access these services. Furthermore, economic barriers, such as minimum fees and balance requirements, create obstacles for low-income families seeking financial products and services (The World Bank, 2022).

These underserved consumers are often called "unbanked" (Garnett and Ashburn, 2022). Fintech is instrumental in bridging the gap, ensuring unbanked consumers can access financial products and services by eliminating traditional infrastructure limitations and the need for minimum fees when accounts are opened. Traditional refers to any existing or established items with a history (Bronner, 2000). In this study, traditional will be used to refer to any item with a history, such as traditional financial products and services, which is mentioned in section 2.4. Traditional infrastructure refers to the conventional physical facilities that support the functioning of a building (Kirk, 2023). An example of how Fintech is a catalyst of inclusion is the development of apps to address the accessibility challenges banking consumers encounter. For example, these apps can enable unbanked consumers to open a bank account with minimal requirements. Additionally, these applications give consumers access to the securities market, allowing them to participate in the buying and selling of shares without incurring commission fees (Terentev, 2021). This highlights the areas where barriers are diminishing for the unbanked, particularly in terms of commission fees for stock trading and the requirement of commercial banks for such fees. Section 2.3 will delve into the historical development of Fintech through different periods.

2.3 BACKGROUND OF FINTECH

Fintech, as defined by Daley (2022), is a combination of finance and technology. It began emerging in the latter half of the 20th century when significant advancements occurred in the financial industry internationally (Arner, Buckley, and Barberis, 2016). These advancements were first developed within the United States of America. The primary goal of these innovations was to create a robust infrastructure that would support the globalisation of financial services, enabling them to transcend national boundaries and be offered on a global scale across different countries (Kaur, 2023). Globalisation of financial services refers to

connecting a country's local financial system with the international financial markets and institutions (Verma and Thakur, 2019).

One of the key advancements that contributed to this global connectivity was the development of transatlantic cables in 1858, which played an essential role in reducing the communication time between Europe and North America (Kaur, 2023). Transatlantic cables are undersea cables that run beneath the Atlantic Ocean and were initially used for telegraph communication (Guarnieri, 2014). According to Write (2023), telegraph communication involved sending coded electric signals, known as Morse code, over long wires from sender to receiver. Operators would decipher the Morse code signals, allowing for the transmission of text over significant distances. The introduction of transatlantic cable made global communication much faster than older methods like messengers and postal services, where messages could take days to travel between countries, and transatlantic cables allowed messages to be received and sent within several hours (Little, 2021). The development of the transatlantic cable helped with the globalisation of financial services by providing a means for swift communication between major financial centres across the globe from different countries which fostered the interconnectedness of global economies (Krueger, 2002).

As Leong and Sung (2018) assert, the development of transatlantic cable influenced the emergence of a crucial messaging tool that facilitated the transmission of written messages. This tool eliminated the need for operators to decode Morse code and enabled messages to be conveyed directly in the desired language. This innovation, known as the global telex, gained importance in the post-World War II era, specifically from 1940 to 1950. It remains the inaugural electronic network communication system (Leong and Sung, 2018). Global telex, as an electronic communication tool, held significance because of the following advantages it created, according to Trade Finance Global (2023). Global telex allowed for global connectivity, enabling businesses and individuals to send messages to each other while in various parts of the world, and it established international communication that was not possible before. Another advantage was that it ensured accuracy, as messages were written in plain human language without decoding.

In the South African context, the first ever transatlantic cable was introduced in 1879, which connected South Africa to Europe; this was a single-line cable (Ward, Sivewright, Corner, Bowier, 1879). This single-line cable was significant because it improved communication;

before the introduction of cable, communication between the two countries depended on slower methods such as postal services. The introduction of the cable in South Africa also improved trade and commerce by enabling South Africa to have quicker access to European markets (Saho, 2019). These developments predated the various Fintech development periods.

According to Arner *et al*., (2016), fintech developments can be categorised into different periods. The first period, known as Fintech 1.0, occurred between 1886 and 1967 and involved the establishment of infrastructure that would support the globalisation of financial services. The infrastructure, instrumental in the globalisation of financial services, involved the development of the Fedwire in 1918, an abbreviation for the Federal Reserve Wire Network. Fedwire served as a real-time electronic fund transfer system. This Fedwire system enabled money transfers between Federal Reserve Banks within the United States. Previously, such money transfers were impossible (Kenton and Kelly, 2022). The Federal Reserve banks were divided into twelve regional banks where money transfers occurred between each regional bank (Kenton and Kelly, 2022). Because Fedwire focuses on the domestic United States market, it contributes indirectly to the globalisation of financial services by allowing large-value transactions to happen in the United States market, promoting efficiency, which helps integrate with the global market (Kelly and Kenton, 2022). Throughout this period, research indicates no developments in Fintech in South Africa (Nattrass and Seekings, 2011).

The second period, Fintech 2.0, spans from 1967 to 2008. The second period was marked first by banks' evolution, making banking solutions convenient and accessible to many consumers (Arner *et al*., 2016). The journey began in 1967 with the first installation of the ATM (Automated Teller Machine) by Barclays in the United Kingdom. The ATM is an electronic banking outlet that allows consumers to complete basic transactions without help from a teller in the branch (Kagan, Khartit, Bellucco-Chatham, 2023). The introduction of ATMs changed banking, offering 24/7 access to bank accounts while reducing in-branch queues during regular hours and enhancing customer privacy for discreet transactions (Batiz-Lazo, 2015). In this period, consumers could complete basic transactions such as cash withdrawals, print receipts, and cash deposits, and consumers could change pins without help from a teller after bank working hours (Ziedy, 2023). Therefore, there was great convenience and accessibility to banking services available to consumers.

Following the arrival of ATMs in 1976, the NASDAQ stock exchange was established in 1971. NASDAQ, an acronym for the National Association of Securities Dealers Automated Quotations, is an American stock exchange renowned for its emphasis on electronic trading platforms and internet-related and technological-related companies (Hayes, Scott, Schmitt, 2023). The introduction of NASDAQ played an essential role as it marked the inception of the first-ever electronic platform, representing a significant departure from the conventional floor-based trading on other exchanges to an electronic trading platform (Hayes *et al.*, 2023). Traditional floor-based trading relied on human traders conducting transactions on physical trading floors, using hand signals to place buy and sell orders. Traditional floor-based trading was limited in that it required physical presence on the trading floor where participation was limited to members associated with the exchange and excluded individual investors that could not afford membership (Venkataraman, 2001).

Electronic trading replaced this method primarily due to speed and efficiency (Hayes *et al*., 2023). Hayes, Scott, and Schmitt (2023) assert that NASDAQ deployment created many benefits for consumers, such as enabling consumers to have easy access to trading in a wide range of securities and providing real-time information on stock prices. Having real-time information meant that consumers had access to insightful stock market information created from transactions on the stock market exchanges as they happened; this gave consumers insights into unforeseen price fluctuations and prevented heavy business losses (Intrinio, 2022).

In the 1990s, the internet gained popularity, leading to the digitization of many banking facilities. The digitization of banking facilities refers to transitioning traditional banking operations into digital formats and facilities (Ram, Suraiya, Bhagat, Karkaria, 2023). Traditional banking refers to banks with a physical presence with a domestic licence (CHASE, 2023). For Instance, in 1996, Wells Fargo Bank, an American bank, was a pioneer of digitising its banking facility by allowing its customers to access their accounts online (Ivey, 2023). According to England (2023), the primary advantage of digitising banking facilities is its convenience to its consumers. Convenience to consumers means that consumers can conduct financial transactions and manage their accounts 24/7 without needing physical banks. Another significant benefit of digitising banking facilities is that it saves consumers both time and cost, as customers no longer need to commute to physical bank branches or wait in long lines for services.

During this period, demand grew for faster invoice payments, leading to the rise and popularity of PayPal (Arner *et al.*, 2016). Established in 1998, PayPal is a payment platform facilitating online money transfers between parties (Kagan et al., 2023). Before the introduction of PayPal, many online transactions relied on credit cards. However, PayPal allows for a secure method of transferring funds between consumers and facilitates the transfer of funds directly without exposing consumers' sensitive financial information—PayPal inputs credit card information into the payment platform (Finance Monthly, 2022). PayPal is beneficial for consumers as it offers its consumers a buyer protection program, so if a buyer does not receive a product or the product does not match the product description, the consumer's money is returned without problems (Tsymbaliuk, 2023). In addition, one of the challenges of using traditional methods such as credit cards without this payment application was an absence of buyer and seller protection mechanisms, resulting in a rise in fraud and disputes (Allison, 2023).

For instance, consumers who use credit cards are exposed to chances of fraud where their credit card information could be copied when physical purchases are made. One of the disadvantages of credit cards is that they were usually mailed to people's homes, so thieves could easily open a mailbox and steal sensitive financial information (Synovus, 2023). According to Allison (2023), in response to the challenges faced by traditional methods such as credit cards, PayPal's Chief Technology Officer, Max Levchin, worked to create a mechanism that would deter fraud syndicates from creating fake credit card information while not discouraging potential customers who want to use PayPal. PayPal pioneered an early version of CAPTCHA technology, which authenticates real human access to web content, helping prevent spammers, and is now widely used to block spammers from creating fake credit card information. Spammers would create fake credit card information to make unauthorised purchases online using someone else's details which is a form of credit card fraud (Hardekopf, 2023).

In the South African context, Fintech 2.0 marked the introduction of the first-ever ATM in 1981 by Standard Bank, a commercial bank. The innovative technology allowed consumers to conduct balance inquiries, cash withdrawals, and tasks typically carried out inside a physical branch (Standard Bank, 2011). The introduction of the ATM represented a significant shift in how consumers managed and accessed their finances in South Africa.

Previously, consumers in South Africa had to visit a bank to perform cash withdrawals and balance inquiries. ATMs provided consumers with more convenient and self-service options for these banking tasks (Paycorp, 2016).

In the late 1990s, South Africa launched its first-ever automated trading system, introduced by the well-known South African stock exchange JSE (Johannesburg Stock Exchange) (M and G Investments, 2023). The JSE is known for initially being established to facilitate the explosion of trade in gold in the Witwatersrand. On June 7, 1996, the traditional trading floor of the JSE, where traders shouted across gestures to sell or buy shares, was closed and replaced by the automated trading system known as Johannesburg Equities Trading (JET) system (SAHO, 2023). SAHO (2023) states that introducing the JET improved the efficiency of trading enabled by faster and more streamlined processes and created global integration by connecting South African financial markets with international traders and exchanges.

In addition to these developments, South Africa also introduced Electronic Funds Transfer (EFT) in 1996, which played a key role in changing how payments were processed and how consumers and businesses carried out financial transactions (Singh, 2004). At the time, many South African consumers continued to rely on ATMs, with the usage of EFTs remaining limited due to concerns around security and a general lack of trust in online platforms (Singh, 2004). As Singh (2004) points out, those who engaged with EFTs largely restricted their use to basic functions such as inter-account transfers and balance inquiries, reflecting a cautious uptake of this new form of banking. Even though these were concerns, the introduction of EFTs represented a critical milestone in the change of the South African financial sector.

The third period extends from 2008 to the present, often referred to as Fintech 3.0. This period was characterised by a shift in mindset caused by the global financial crisis, which changed the focus from the retail customer perspective to considering who could provide financial services and who had the resources to do so (Arner *et al*., 2016). This period supported innovative players in the financial services industry (Arner *et al*., 2016). Among these innovative players were digital currencies, with Bitcoin emerging in 2008 as the pioneer of decentralised currency, marking the rise of the cryptocurrency evolution (Kaur, 2023). According to Kaur (2023), the introduction of digital currencies allowed consumers to store and transfer value in a new way, disrupting the traditional financial landscape. The traditional financial landscape refers to the established and conventional system of financial services,

institutions, and practices that have been in place for a long time (Xinmin, 2020). These digital currencies offer consumers greater decentralisation, reducing central authorities' control and influence, leading to greater financial inclusivity and independence.

Another noteworthy player in this period included a mobile money transfer application known as Venmo. Founded in 2009, Venmo is a mobile money application primarily designed for friends and family looking to split bills (Li Gain, 2023). It was introduced in the post-global financial crisis when consumers were price-sensitive and sought cost-effective and convenient financial transaction solutions (Bloomenthal, Brown, Jackson, 2023). Venmo facilitates money transfers by enabling consumers to send funds to friends and contacts through a mobile application, linking their bank accounts for transactions (Li Gain, 2023). Li Gain (2023) highlighted that Venmo's appeal lies in its security, offering a safer alternative to cash, which can easily be misplaced.

In South Africa, Fintech 3.0 signifies a notable change in the traditional financial landscape. This period has witnessed the adoption of blockchain technology and the emergence of digital banks, providing alternatives to the traditional financial landscape (Santosdiaz, 2021). Notable among these innovative players is ChainEX, a cryptocurrency exchange established in South Africa in 2017. ChainEX is a platform enabling South Africans to buy, sell, and trade over forty digital assets using the South African rand as a fiat default flat buying currency (Chamisa, 2020). Fiat default flat buying currency refers to a government issued currency that is not backed by a physical commodity such as gold, but rather the government issues it (Chen, Anderson, Kvilhaug, 2023). Chamisa (2020) further explains the benefits of ChainEX, highlighting its user-friendly interface, which facilitates seamless trading for beginner and experienced users. Additionally, ChainEx has made a significant contribution by becoming South Africa's first cryptocurrency exchange, allowing South African consumers to access previously unavailable cryptocurrencies. With consumers having access to unavailable cryptocurrencies means that they have more investment options, and they can diversify their portfolio beyond traditional assets.

The BDOs (2022) report identifies several key drivers that are set to push Fintech development over the next decade in the country. These include a rapid rise in international funding and traditional banks and Mobile Network Operators (MNOs) (BDO, 2023). The primary trend highlighted in the BDO (2022) report is the substantial increase in international

funding. The trend is primarily a result of consumers in South Africa undergoing profound changes following the Global pandemic in 2020. South African consumers are now showing a clear preference for Fintech-driven products and services. The shift is reflected in the considerable increase in funding for South African Fintech, surging from half a billion dollars in 2020 to two billion dollars in 2021. This trend is expected to persist and accelerate exponentially (BDO, 2022).

An example is Entersekt, a South African Fintech company specialising in application security software and mobile-based authentication solutions for safeguarding online and mobile banking transactions (Entersekt, 2023). In 2021, Entersekt secured funding from a US-based private equity firm; However, the amount remains undisclosed. It has brought substantial growth in the company at present, and it maintains widespread usage, where it processes over one billion transactions monthly (Jackson, 2021). The next trend, highlighted in the BDO (2022) report, is the competition between traditional banks and Mobile Network Operators (MNOs). MNOs have recognized consumers seeking more straightforward, smartphone-based financial transactions and banking options, moving away from traditional banks. A smartphone has integrated computer-like capabilities (Kirvan, 2023). This shift has driven the development of new software and technologies. For example, MTN, an MNO, obtained a mobile money licence, a significant move that put pressure on traditional banks. In response, many traditional banks are considering getting similar licences to avoid losing market share (Erricson, 2023). This mobile money licence allows MTN to offer various mobile financial services, including mobile banking and money transfers via mobile phones. This expanded service offering attracts more customers and generates additional revenue streams for MTN (Ericsson, 2023). Section 2.4 will define and discuss the different Fintech products and services.

2.4 FINTECH PRODUCTS AND SERVICES

Fintech products and services refer to offerings provided by financial institutions to consumers to automate or enhance the delivery of traditional financial products and services (Kagan *et al.*, 2022). Traditional financial products and services encompass the well-established and widely used financial offerings provided by conventional institutions (Amal, 2020). These financial offerings include current accounts, savings accounts, certificates of deposits, mortgages, auto loans, personal loans, debit cards, ATM cards, and wire transfers (Daleel, 2022). In contrast, Fintech products and services are financial solutions that utilise

software, digital platforms, applications, and data-driven approaches to optimise financial services (Hazmah, Razak, Yahaya, Shamsuddin, Zahrin, 2022). Furthermore, according to Collier (2022), financial solutions are products, services, strategies, and tools designed to address specific financial needs and challenges.

Many Fintech products and services include payment applications, cryptocurrency applications, personal finance applications, online banking platforms, investment applications, and peer-to-peer lending platforms (Kagan *et al*., 2022; Aydin and Burnaz, 2016). A study by Flototto *et al*. (2022) states that automation reduces errors and makes things faster. One of the main benefits of using Fintech products and services is that these applications, platforms, and systems are automated (Bodson, 2019). Automating financial processes means processing them automatically without requiring extensive manual effort from users; it simplifies and speeds up transaction processes (Bodson, 2019).

Another significant benefit arises when Fintech products and services incorporate AI, enabling them to offer personalised experiences for consumers. For instance, a company named Betterment, as described by Friedberg, Chavarria, and Jasperson (2023), utilises AI to create personalised investment portfolios for users. This AI-driven platform continually makes optimal investment decisions based on prevailing market conditions. Section 2.5 provides an overview of the Fintech products and services.

2.4.1 SPECIFIC FINTECH PRODUCTS AND SERVICES

The section will discuss payment applications, cryptocurrency applications, personal finance applications, internet banking, investment applications, robot-advisors, and peer-to-peer lending in detail. These specific applications and platforms are selected for their direct relevance, their significant impact on consumers, and the availability of content on them. Payment applications have revolutionised the way payments are made and have provided greater security and convenience in the digital age (Khando, Islam, Gao, 2022).

2.4.1.1 PAYMENT APPLICATIONS

Payment applications refer to software installed in a mobile device that allows consumers who own bank accounts to make transactions such as making payments online, using virtual cards to make payments, transferring, and receiving funds, and making face-to-face payments to

retailers (Banco de Portugal, 2023; Neelam and Bhattacharya, 2023). The most common payment application includes PayPal, Apple Pay, and Google Pay which is widely used by consumers due to them having a user-friendly interface. These payment applications are common because these applications can be used widely in various retail shops (Brock and Velasquez, 2023). These payment applications are typical because these applications are used widely in various retail shops in South Africa such as Shoprite, pick n Pay, Spar, Woolworths to make payments (Jacobs, 2021). According to (Gomber, Koch, and Siering, 2017), the innovative aspect of these payment applications is that they use NFC (Near-Field Communication) and QR scanning (Quick Response Code). NFC is a type of technology that allows for communication between devices on a short wireless range and QR scanning, codes designed to scan using scanning devices (Smiley, 2022; Hayes and Estevez, 2021). NFC and QR scanning allow consumers to simply tap their devices on the end of a point-of-sale (POS) machine that is used to process transactions by retail consumers. This method removes the need for traditional card swiping, enhancing convenience for consumers (Bean, 2021).

2.4.1.2 CRYPTOCURRENCY APPLICATIONS

Cryptocurrency application is a software application that enables transactions to be conducted on a blockchain, renowned for its ability to decentralise transactions using digital currencies (Frakenfield, Brown, Logan, 2023). Blockchain is a distributed database that keeps a secure and unchangeable record of transactions using a network of computers (Hayes *et al.*, 2023). Hayes, Brown, and Kvilhaug (2023) state that blockchain plays a crucial role in cryptocurrency applications by maintaining a secure and decentralised record of transactions. A decentralised record of transactions means that a transaction is not controlled or authorised by one authority but by all the peer members available in the network at the time (Amazon Web Services, 2023). The benefits of decentralised records of transactions are stated by Montevirgen (2023) as the following decentralised records enable global access to financial and other systems, making it easier for people in various parts of the world to participate in economic activities.

Cryptocurrency applications bring several benefits to consumers. One significant advantage is that they let users have more control over their money. Banks and other institutions usually act as intermediaries in traditional finance. However, with cryptocurrency, users can make transactions directly with each other. This shift in control means less reliance on

intermediaries, which can lead to quicker and cheaper transactions for consumers (Tambe and Jain, 2023).

Another exciting benefit of cryptocurrency applications, as highlighted by Tambe and Jain (2023), is that they protect against inflation. Inflation refers to the rate of price increase over a given period (Oner, 2023). Cryptocurrency applications can help with inflation because they have a limited supply of cryptocurrencies, unlike traditional currencies that can keep getting printed (Tambe and Jain, 2023) and increase inflation. An example is a well-known cryptocurrency application, Bitcoin, which will only ever have twenty-one million coins (Abrol, 2022). For instance, when the supply of traditional currencies grows faster than cryptocurrencies like Bitcoin, the price of Bitcoin can go up. The rise in value can help counter inflation due to the limited supply of Bitcoin. Consumers usually perceive Bitcoin as a store of value like other assets such as gold or copper that can safeguard against a decrease in purchasing power caused by inflation (Murugappan, Nair, Krishnan, 2023).

However, studies suggest that some disadvantages of using Cryptocurrency applications are due to the drawback where some cryptocurrency applications rely on energy-intensive Proof-Of-Work (POW) systems to operate (Bohme, Christin, Edelman, Moore, 2015; Cheah, and Fry, 2015). POW system refers to a method that uses blockchain technology to verify and secure transactions on the network (Nevil and Anderson, 2023). Nevil and Anderson (2023) state that POW uses network participants, often referred to as "miners," to solve complex mathematical puzzles using powerful computers, which consume much electricity. This electricity use causes significant pollution and is therefore not good for the environment (Cheah and Fry, 2015). Next personal finance applications will be discussed.

2.4.1.3 PERSONAL FINANCE APPLICATIONS

Personal finance applications are critical because they enable consumers to take control of their finances efficiently and conveniently (Mckillop and Stewart, 2021). Personal finance applications are money management applications that consumers use to manage their funds to budget, track their spending, and plan for future spending (Raina, Mishra, Pote, 2022). These applications' interfaces allow consumers to make informed decisions using real-time information and help them make informed decisions about their financial situation (Robinson, 2022). Another benefit of personal finance applications is that they can provide real-time

information on consumer spending habits (Mckillop and Stewart, 2021). Real-time information is continuously updated and delivered as it becomes available (Gartner, 2023). Real-time information on spending habits can show consumers their financial status, helping them stay aware of their spending habits and available funds, and it helps consumers make less impulsive decisions (Mckillop and Stewart, 2021). One disadvantage of personal finance applications is the rise of fake applications. According to Insider (2023), Google recently removed over fifty applications from its marketplace, as they were found to contain malware that would allow a criminal to take control of a user's devices virtually. Insider (2023) states that to avoid being defrauded, users need to look for any clear indication of Fake applications, such as spelling errors in the application description. Another disadvantage is that most personal finance applications are designed for the masses rather than personal situations (Parker, 2023). Personal finance applications may be limited in not knowing individuals' complete financial situations, and only sometimes provide accurate information. Users are often cautioned to exercise discretion. The next item to be reviewed is internet banking.

2.4.1.4 INTERNET BANKING APPLICATIONS

Internet banking, also known as online banking, has changed how the banking industry operates, providing consumers quick and easy access to banking accounts (Windasari, Kusumawati, lasati, Amelia, 2022). Internet banking refers to a digital service provided by financial institutes such as banks that allows consumers to conduct financial transactions and manage their online accounts (Frankfeild *et al.).* Horton and Strohmn (2023) state that Internet banking has several advantages, including that it provides consumers with control over their finances and that online banking can go beyond and provide a basis for consumers to learn financial literacy. Financial literacy refers to understanding and knowledge of financial concepts such as financial decision-making, debt management, budgeting, saving, and investing (Fernando, Khartit, Schmitt, 2023). These benefits enable consumers to take charge of their financial lives, make better decisions, and work towards achieving their financial goals.

Certain drawbacks do exist with Internet banking, highlighted by Moore (2023). A drawback is a limitation on foreign currency because Internet banking primarily focuses on domestic financial transactions and services. It is difficult for Internet banking applications to access foreign currency or conduct foreign exchange transactions (Moore, 2023). This drawback is

due to currency exchange complexities where there are constant fluctuations in currency exchange rates and may need help to provide real-time competitive rates (Moore, 2023). Investment applications will be reviewed next.

2.4.1.5 INVESTMENT APPLICATIONS

Investment applications are growing increasingly popular (Brennen, 2022). Investment applications allow individuals to manage their investments, make financial decisions, and access information related to investment opportunities (Brennen, 2022). A good example is the Fundrise application, which allows users to invest in real estate collectively. Fundrise application allows users to purchase shares of real estate investment trusts (REITs) (Rodeck, 2022). REITs are companies that invest in and manage income-producing real estate, like apartment buildings, malls, or office complexes (Slater, 2023). Fundrise allows people to join forces to buy residential and commercial properties through crowdfunding. It offers access to a market typically controlled by big institutional investors (Rodeck, 2022). Fund rise is advantageous as it provides an opportunity for individuals to invest in real estate without the complications linked to owning physical properties (Cassel and Brown, 2023).

Another example of an investment application is Betterment, which specialises in automated investing. This means it can make investment decisions for users based on what is happening in the market. For instance, if there is a significant drop in stock prices, Betterment's algorithms and technology can quickly adjust the user's investment portfolio by selling or reallocating assets to minimise potential losses and capitalise on emerging opportunities. This automated approach optimises the user's investments in response to market fluctuations (Friedberg, Chavarria, Jasperson, 2023).

Ellevest is another investment application designed specifically for women. It is unique because it considers factors related to women's financial situations. For example, it considers the gender pay gap (women often earn less than men for the same job) and career interruptions (like taking time off work to raise a family). Considering these factors, Ellevest helps women plan and invest in a way that is more aligned with their financial goals and needs. In other words, it tailors its investment strategies to better support women in achieving their financial objectives (Tepper and Schmidt, 2023). Fidelity Investments is an investment application that helps institutions and regular people manage their money. This application offers various tools

and services, like research tools and investment accounts. These tools are handy for folks looking to invest in retirement or saving up for education (Grossman and Klammer, 2023). Investment applications empower users to oversee their investments and provide helpful tools for managing them effectively. The next application to be reviewed is robot-advisors.

2.4.1.6. ROBOT ADVISORS

The emergence of robot-advisors has allowed all consumers access to sophisticated investment and financial planning services at their fingertips, including those limited to investment knowledge (Fan and Chatterjee, 2020). Robo-advisors are important, especially for those with less access to this service and limited investment knowledge (Mathew, 2023). According to Frankfield, Murry, and Kvilhaug (2023), robot-advisors is a platform that is automated and provides investment services and financial planning to consumers without little to no human intervention. Robo-advisor offers lower fees and premiums to get started, less paperwork, and no need for in-person appointments (Mathews, 2023). Wealth front serves as a notable example of robot-advisors. It operates as a robot-advisory platform, providing automated, algorithm-driven investment and financial services (Friedberg, Silberstein, Klammer, 2023). Algorithm-driven investment is a methodology that uses computer algorithms to make investment decisions (Futurelearn, 2023). Wealth front is a desirable platform due to its low fees compared to a human advisor, which helps consumers keep more from their investment returns (Friedberg et al., 2023).

2.4.1.7 PEER-TO-PEER LENDING

Peer-to-peer lending (P2P) allows consumers to borrow money directly from each other (Kagan, Catalano, Bellucco-Chatham, 2023). P2P lending connects borrowers and lenders, setting interest rates. Some platforms focus on specific borrower categories, like Funding Circle for small businesses or Lending Club, which connects doctors offering financing programs with prospective patients in what is known as "patient solutions" (Kagan *et al.*, 2023). P2P lending employs a decentralised process, eliminating intermediaries between lenders and borrowers. This results in a direct relationship between the two parties (Johnson, 2023). P2P appeals to borrowers as they typically secure lower interest rates than traditional credit unions. It is also desirable to investors, offering compelling investment opportunities with the potential for higher returns than traditional investment products (Agarwal, 2023). P2P disadvantage highlighted by Beachey and Philips (2023) P2P may not receive the same

protection as they would if borrowed through a traditional lender. P2P lenders have historically had to pass off bad debt to debt collection agencies, which took consumers to court (Beachey and Philips, 2023). The next section will examine the impact of Fintech in Africa.

2.5 FINTECH IN AFRICA

The development of Fintech in South Africa is within the broader context of Fintech in Africa. There has been exponential growth and development of Fintech in Africa. Flototto, Gold, Olanrewaju, Jeenah, and Kuyoro (2022) state that the "Africa Fintech Industry is coming of age" where Fintech is growing across Africa at an unprecedented rate to such a degree that there has been an eruption of new start-up Fintech companies. The eruption of new start-up Fintech companies has increased Fintech products and services. According to Mortiboy-Harrison (2022), a Fintech company refers to a fledgling business that uses technology to provide a financial service. Fintech products and services refer to offerings provided by financial institutions to consumers to automate or enhance the delivery of traditional financial products and services (Kagan *et al*., 2022).

Fintech products and services have played a pivotal role in helping consumers in underserved countries in Africa gain access to financial products and services. For example, EcoCash in Zimbabwe is a mobile money platform that enables consumers to complete banking transactions directly from their mobile phones (Zambasa, 2022). Using EcoCash, consumers can transfer money to friends and family, receive money from others, pay bills, and buy airtime (Zambasa, 2022). According to EcoCash (2023), Zimbabwe's platform has empowered consumers facing dire hyperinflation and the challenges of carrying and transacting with rapidly devaluing local currency. It has made it easier for them to manage their finances, protect their assets, and access essential goods and services through a digital, inflation-resistant medium.

According to Zambasa (2022), another popular mobile money platform is M-Pesa, launched in Kenya. M-Pesa allows global and domestic merchants to transfer money online to various local and international recipients, such as Uganda, Tanzania, India, the United Kingdom, and other countries (Kagan and Potters, 2020). Merchants can accept payments from consumers using M-Pesa as a payment method. M-Pesa consumers can use M-Pesa for various financial transactions, such as spending and sending money to family and friends (Vodacom Group,

2022). M-Pesa is desirable because it offers convenience for merchants and consumers, as they can use a single mobile money platform to make transactions. This unified platform simplifies the process for all parties involved, streamlining financial transactions and enhancing overall ease of use (Vodacom Group, 2022). Another example is Flutterwave, which was launched in Nigeria to address the challenges faced by consumers in Nigeria when it came to performing cross-border payments. The traditional banking system in Nigeria had complexities that hindered seamless cross-border transactions. Flutterwave has actively formed partnerships and relationships between various African banks, enabling consumers to conduct cross-border payments more quickly and efficiently. Flutterwave has gained recognition as Africa's most valuable Fintech startup (Genga, 2022).

South Africa's Fintech start-ups have grown significantly which has been driven by different determinants such as changes in consumer behaviour, drive in demand for financial inclusion, and increased technological advancements (BDO, 2022). One notable innovation in this space is the payment application Nomanini, offered by the Fintech company of the same name. Nomanini's introduction is significant as it addresses crucial challenges in underserved communities. Nomanini empowers small retailers, including informal kiosks, by providing them with the tools and technology needed to offer digital financial services to their consumers. For instance, Nomanini allows these informal retailers to provide digital vouchers for services like electricity, which they can then sell to their consumers (Jackson, 2021).

Another example in the South African context is the introduction of PayFast. PayFast is a similar innovation that facilitates online payment processing for e-commerce businesses (PayFast, 2023). This payment platform supports merchants and consumers, incorporating advanced security layers and fraud detection mechanisms. PayFast employs Secure Sockets Layer (SSL) encryption to establish secure connections between users and the platform, ensuring the confidentiality of data transmitted between PayFast's servers and consumers (PayFast, 2023).

In the current landscape of Fintech startup companies in South Africa, there has been a concerted effort by regulatory frameworks and the government to foster the development of Fintech startups. In 2016, establishing the Intergovernmental Fintech Group (IFWG) marked a significant milestone, with its primary goal being to promote a mutual understanding among regulators and policymakers (Geral, Tibane, Kern, 2021). The IFWG plays a pivotal role in

assisting innovators in the market by addressing inquiries related to regulatory compliance. Moreover, it provides valuable guidance and support to market innovators, ensuring they have a clear and structured path to navigate the regulatory landscape (Geral, Tibane, Kern, 2021). Concurrently these Fintech startups are also increasingly forming partnerships with banks. A symbiotic relationship that is changing the financial landscape.

As noted previously, South African Fintech startups are increasingly forming partnerships with banks, as banks have come to recognize the significance of adopting these innovative technologies. Timm (2019) noted that "Fintech startups are introducing novel ways for banks to streamline payment processes, extend loans, and provide financial services to those who were previously underserved or unbanked." These collaborative efforts have led to the development of groundbreaking products and services within the banking industry. An illustrative instance of such collaboration is the acquisition of Snap Scan by Standard Bank in 2016, facilitating QR code payments for seamless, mobile-based transactional fees (Timm, 2019). The next section will review the development, challenges, and opportunities of Fintech companies.

2.6 DEVELOPMENT, CHALLENGES AND OPPORTUNITIES OF FINTECH COMPANIES.

As previously indicated, Fintech companies refer to a fledgling business that uses technology to provide a financial service (Kagan *et al*., 2022). Fintech companies are responsible for compliance with regulatory requirements, consumer protection, cybersecurity, financial inclusion, education and literacy, Anti-fraud measures (Zeidy, 2023). Within the concept of Fintech companies, there exists a classification such as Fintech startups.

Fintech start-ups are new and often innovative companies that leverage technology to provide financial products and services, as described by Kagan, Estevez, and Bellucco-Chatham (2023). In South Africa, there are thriving Fintech start-ups, with multiple start-ups specialising in areas such as insurance (utilising technology to transform the insurance industry), digital payments (offering electronic transaction solutions for both consumers and businesses), and online banking (providing banking services often without physical branches), as reported by Traxn (2023). Fintech start-up companies are at the forefront of innovating insurance platforms, exemplified by entities like Naked Insurance. These tech-driven

platforms leverage artificial intelligence and mobile technology to streamline insurance services, including coverage for homes, automobiles, and even unique items such as pineapples. A notable instance is Pineapple, an insurance company underwritten by Old Mutual, with premiums starting as low as R1 per month and tailoring rates to meet individual consumer needs (Mthwalo, 2022). However, as Money Saving Tips (2022) indicated, some consumers hesitate to embrace these innovative insurance firms due to their limited understanding of their operations and the mechanisms behind their ability to offer competitive premium rates. Therefore, it remains crucial for insurance companies to place a strong emphasis on persistent consumer education efforts to elucidate their services and product offerings. As noted, Fintech's influence extends beyond a singular industry and contributes significantly to South Africa's comprehensive development (Money Saving Tips, 2022).

Fintech development and opportunities span various domains, considering evolving market demands and the impact of government and institutional factors, as outlined by Mthwalo (2021). Among these critical areas ripe for Fintech innovation and growth, we find notable activity in the retail and insurance industries (Mthwalo, 2021).Fintech companies have brought about a transformative shift in the retail and e-commerce sectors by introducing secure and user-friendly payment solutions, benefiting financial institutions. This transformative phenomenon is commonly referred to as "disruptive innovation." Disruptive innovation is characterised by simplifying and rendering more affordable products and services, catering to underserved markets (Twin *et al.*, 2023).

To illustrate, consider the case of Pick 'n Pay, a consumer retail company that embraced Fintech innovation by partnering with Tyme Bank, a digital bank operating without physical branches across South Africa. Likewise, The Foschini Group (TFG), a major retail company, made substantial investments in digital initiatives, exceeding one billion rand in recent years (Mthwalo, 2021). Among these initiatives was TFG's collaboration with Tyme Bank, resulting in a trio of offerings connected to the "buy-now-pay-later" model. This model empowers consumers to obtain repayable loans via Tyme Bank's online banking platform (Malinga, 2021).

The demand for Fintech companies in South Africa is high, Price (2023) states that there are different areas for opportunities for Fintech companies. These areas are within alternative funding solutions, regulation technology and fraud analysis, and solar finance. Alternative

funding solutions is a financial arrangement that provides funding to consumers outside traditional banking (Nedjai, 2023). An example is a company known as fundinghub is a business marketplace in South Africa that connects small and medium-sized enterprises (SMEs) (Price, 2023). Fundinghub has partnered with a Fintech company. This partnership has brought about disruptive Fintech solutions. There is a growing need for more funding solutions that will partner with Fintech companies in helping provide financial solutions (Price, 2023).

The next significant opportunity lies at the intersection of regulatory technology and fraud analysis. These two fields, although distinct, are closely intertwined (Wiener, 2004). Regulatory technology, as defined by Wiener (2004), encompasses technology solutions that facilitate businesses in adhering to rules and regulations more efficiently and effectively. Conversely, fraud analysis involves the utilisation of technology to identify and prevent unlawful activities, such as financial theft (Kousika, Vishali, Sunandana, Vijay, 2021). Price (2023) emphasises that investors are actively seeking regulatory technology and fraud analysis software to bolster compliance and mitigate risks, especially within the banking sector. There is a growing interest in these areas, as the market for regulatory technology and fraud analysis software is projected to reach $22.3 billion by 2027, with a compounded annual growth rate of 19.8%, Price (2023).

South Africa is currently grappling with an energy crisis, as the International Monetary Fund (2023) pointed out. In response to this crisis, the country's substantial solar energy potential has spurred the growth of Fintech companies offering innovative financial models to provide businesses with access to clean energy solutions. Solar finance, as reported in the energy sector (Energy, 2023), encompasses the financial mechanisms and models employed by these Fintech companies to facilitate consumer and business access to solar energy solutions. The opportunities in solar finance are compelling, with Fintech companies in South Africa capitalising on the country's solar energy potential to meet the growing demand for clean energy solutions, as emphasised by Price (2023).

Nonetheless, as observed by Regenesys Business School (2022), several challenges loom on the horizon that could impact the growing Fintech companies. One such challenge is the banking industry's tendency towards oligopolistic behaviour in South Africa, where the five central banks hold a dominant position, potentially creating hurdles for new entrants.

Additionally, these banks wield substantial influence and play pivotal roles in shaping the South African economy, further complicating the emergence of Fintech companies. The next section will review the Fintech ecosystem.

2.7 FINTECH ECOSYSTEM

The Fintech Ecosystem refers to four key attributes significantly impacting how Fintech companies operate (Hatch, Byrne, and Schmitz, 2023). As identified by Hatch, Byrne, and Schmitz (2023), these attributes are talent, market demand, policy and infrastructure, and capital. Various stakeholders influence each of these critical attributes. For instance, talent is shaped by academia, technology firms, and entrepreneurs, while consumers, corporations, and government initiatives drive demand. Government bodies and regulatory agencies primarily influence policy and infrastructure. In contrast, capital is sourced from IPO investors, angel investors, venture capital (VC) and private equity (PE) investors, as well as patient capital investors (Hatch *et al.,* 2023). (See figure 2.1). These four key attributes will be reviewed in detail.

The first key attribute is talent, which encompasses the availability and accessibility of individuals possessing knowledge, skills, and expertise across diverse domains (Gallardo, Dries, Gonzalez-Cruz, 2013; Koroleva, 2022). Talent is influenced by three primary role players: academia, entrepreneurs, and technology firms. Academia is pivotal in nurturing talent within the Fintech sector, primarily through research and education. Research efforts focus on emerging technologies, while curriculum development ensures that Fintech-focused courses and degrees are integrated (Qiu, Huo, Dai, 2022). Technology firms, often comprising innovative startups, significantly impact talent development. They are hubs for enhancing skills, training, collaboration, and sharing knowledge (Hatch et al., 2023). Barrosso and Laborda (2022) highlight this contribution to talent and note that technology firms frequently organise events like hackathons, innovation challenges, and coding competitions. These activities stimulate problem-solving, promote creativity, and generate fresh ideas. Entrepreneurs also play a substantial role in shaping talent within the Fintech industry. They drive job creation and foster innovation, encouraging experimentation and creative thinking among Fintech employees (Koroleva, 2022). Entrepreneurs further influence talent by offering innovation labs or dedicated spaces within their companies where employees can collaborate on experimental projects and innovative initiatives (Koroleva, 2022). The next attribute to be reviewed is market demand.

The second key attribute influencing Fintech companies is market demand. Market demand within the Fintech ecosystem signifies the needs of consumers that drive the creation of innovative Fintech solutions (Frantier, 2022). For instance, consumers play a pivotal role in spurring the invention of Fintech products and services due to their growing desire for secure and convenient means to manage their finances (Li, Khaliq, Olah, Chinove, 2023). Consumers consistently seek convenient, seamless transactions and uncomplicated digital experiences (Frantier, 2022). Consumers significantly contribute to heightened market demand for innovation. As such, consumers become the foremost driving force behind market demand. Another influential factor affecting demand is corporations or companies. Corporations represent legal entities distinct from their owners or shareholders (Morck, 2017). These entities actively seek ways to establish leadership in the market and maintain competitiveness. To achieve these goals, they frequently collaborate with Fintech start-ups to enhance their product offerings and, in turn, stimulate demand (Ponciano, 2023).

The government also exerts a considerable influence on market demand. In the context of the Fintech ecosystem, the government refers to regulatory bodies responsible for shaping laws that ensure the stability and integrity of financial markets, safeguard consumer interests, and prevent financial crimes such as fraud (Pollari, 2017). Additionally, governments often provide funding and grants to support research and development within Fintech companies. These financial incentives stimulate overall economic growth within a country (Lunia, 2022). According to Pollari (2017), governments also establish regulatory sandboxes or pilot programs. These sandboxes are controlled environments or frameworks created by the government to enable innovative companies, particularly Fintech companies, to test new products and services (Cornelli *et al*., 2022). This approach fosters innovation by reducing initial regulatory barriers and allowing Fintech companies to experiment with novel concepts without the burden of full regulatory compliance (Pollari, 2017). The next key attribute to be discussed is policy and infrastructure.

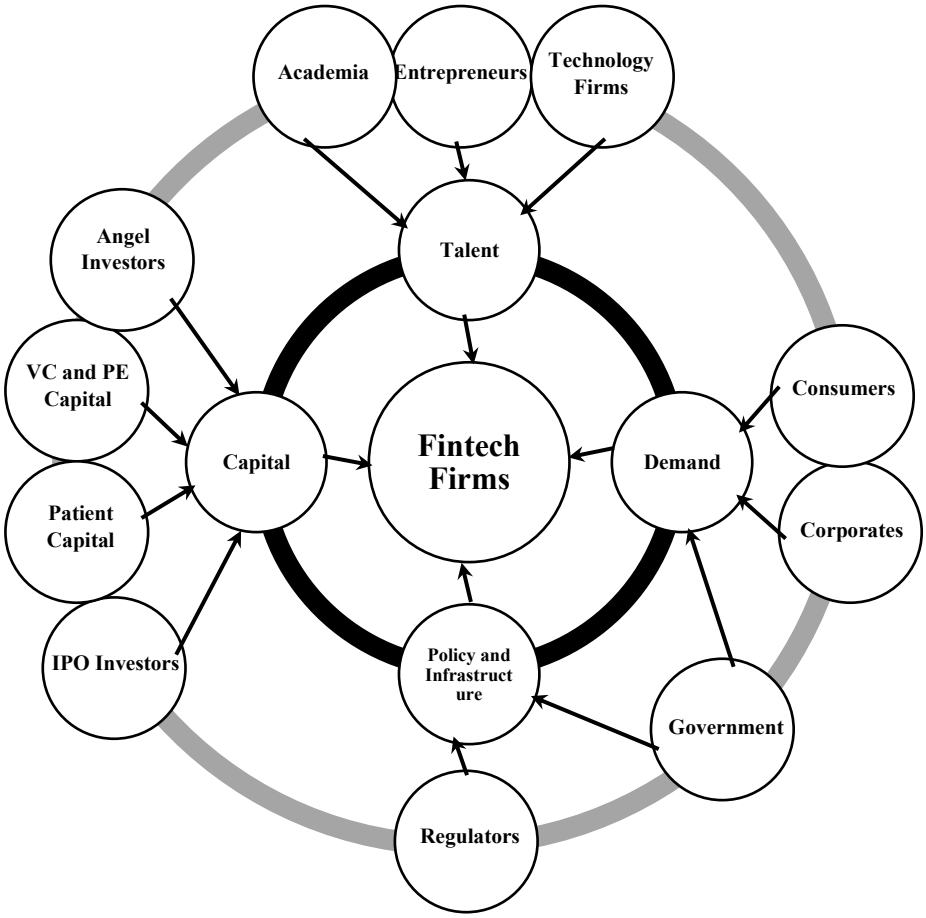
In the Fintech ecosystem, the third key attribute is policy and infrastructure. Governments and regulators have a major influence in this arena. Their role is to ensure compliance with regulations and safeguard consumers in the Fintech industry (Hatch *et al*., 2023). Governments play a vital role in shaping policy and infrastructure by focusing on regulatory compliance. This often involves requiring Fintech companies to obtain licences, with the

criteria for these licences typically set by government authorities (Ehrentraud, Ocampo, Garzoni, Piccolo, 2020). These licences act as safeguards to ensure that Fintech companies adhere to established standards and protect consumers (Ehrentraud *et al*., 2020). Striking a balance between promoting Fintech innovation and ensuring consumer protection is essential (Buckley *et al*., 2016). Regulators play a crucial role in achieving this equilibrium by developing and implementing legal and regulatory frameworks that govern Fintech companies. These frameworks usually include rules and guidelines related to consumer protection, compliance, and data security (Arkanudddin, Saragih, Nugroho, 2021). The last attribute to be reviewed is capital.

Capital constitutes the fourth attribute of the Fintech Ecosystem. Various investor types of influence capital within this ecosystem. Angel investors, for instance, provide financial backing to companies, usually in exchange for ownership equity (Investec, 2021). They play a significant role in the Fintech ecosystem, mainly because many companies are startups that may find it challenging to secure formal funding. Angel investors are more willing to invest in riskier startup ventures and can still support newly established Fintech companies (O'Brien, 2022). Research conducted by Cornelli, Doerr, Franco, and Frost (2021) has observed a notable increase in funding from VC and PE investors in the Fintech sector since 2010, indicating growing interest in Fintech firms. VC investors provide capital to startups believed to have long-term growth potential, much like angel investors. They are also comfortable with riskier investments, making them valuable sources of substantial capital, especially during the initial stages of Fintech companies when securing funding may be challenging (Thompsett, 2022). On the other hand, PE investors are investors that invest capital in a private company or take ownership stakes in private companies (Gompers, Kaplan, Mukharlyamov, 2016). They represent another influence on capital within the Fintech ecosystem. Patient investors are another essential player in shaping capital within the Fintech sector. These investors are willing to hold their investments for extended periods with the expectation of long-term gains (Wilson, 2021). Their patience is precious for Fintech companies because it allows for long-term capital infusions, aligning with the need for steady growth and returns over time (Wilson, 2021). Finally, IPO investors purchase a company's stock or shares during its initial public offering (Ashford, 2023). Fintech companies often go to the public to raise capital, and IPO investors play a pivotal role in providing that capital during this crucial phase of growth within Fintech firms (Fernando, Mansa, Kvilhaug, 2023).

In summary, the Fintech ecosystem relies on four key attributes: talent, demand, policy and infrastructure, and capital. At its core, the Fintech ecosystem is driven by Fintech companies who collaborate and compete to create and deliver innovative Fintech solutions. Figure 2.1 provides a comprehensive look at the various four attributes. The ecosystem helps individuals understand the changing industry of Fintech and identify opportunities for growth and partnership (Hatch *et al*., 2023).

FIGURE 2.1: AN OVERVIEW OF THE FINTECH ECOSYSTEM



Source: Hatch, Byrne, and Schmitz (2023).

Figure 2.1 shows all the attributes that influence the Fintech firms (see section 2.8) for more details on Fintech companies). The section below will provide previous literature on Fintech.

2.8 PREVIOUS STUDIES ON FINTECH IN SOUTH AFRICA

Few studies have been conducted on the Fintech phenomenon in South Africa. Most of the studies have been conducted in South Africa; these are based in Johannesburg and Cape Town, which are the major finance hubs of South Africa (RMB, 2023). These studies have

been a mixture of qualitative and quantitative studies. This section below will briefly describe the primary studies across South Africa.

In a study conducted by Crouse (2019), the research explored the perspectives of South African bankers concerning the Fintech phenomenon in the unique South African context. The study employed a blend of qualitative research methods and in-depth interviews to comprehensively assess the impact of Fintech on the financial landscape of South Africa. The data for this study was collected from a diverse group of five participants actively engaged in the financial industry. The findings of the research indicated that collaboration between traditional banking institutions and emerging Fintech companies can be a catalyst for mutual growth. Notably, the study revealed that bankers foresee an impending surge in competition as a direct consequence of the burgeoning Fintech sector. This intensification of competition is anticipated to be a significant result of the increasing influence and presence of Fintech companies within South Africa's financial landscape, as outlined by Crouse (2019).

In a study conducted by Raphoto (2021), an exploration was undertaken to understand the factors contributing to the success of Fintech startups. This study employed a qualitative research methodology, utilising semi-structured and open-ended questions to gather insights. This study's participants comprised nine individuals, specifically CEOs of Fintech companies. The research findings revealed a significant insight, emphasising that collaboration between Fintech companies and traditional banks can lead to an expansion in market reach and market share, which in turn plays a pivotal role in the success of Fintech startups. Furthermore, despite potential challenges such as market share shifts and limited budgets, this study recognized Fintech as a potential catalyst for positive change in the financial landscape. The study by Raphoto (2021) makes evident the transformative potential of such collaboration in the Fintech industry.

In a parallel study conducted by Kinyanjui in 2019, a comprehensive examination was undertaken to assess the economic impact of Fintech within the South African banking industry. This investigation employed a multi-faceted research approach, integrating qualitative and quantitative methodologies to paint a holistic picture of the subject matter. The qualitative component of the research was conducted through semi-structured interviews, while the quantitative data was sourced from Finmark. The findings of this study brought to light some significant insights. Notably, it was observed that individuals with lower incomes

who maintain a formal income source are more inclined to adopt financial services compared to those without a proper income. Moreover, the research underscored a noteworthy unevenness in including economic data, specifically among young adults with lower incomes in the age bracket of 18-29 years. The study underlined the importance of financial service providers collecting and analysing data from this demographic, as it was revealed that young, lower-income adults are more likely to utilise Internet banking services than their counterparts. The study by Kinyanjui (2019) highlights the dynamics and opportunities within the South African banking industry brought about by the influence of Fintech.

Mncube's (2021) study examined the experiences of individuals within the Fintech ecosystem, including start-ups, governments, financial institutions, customers, and technology developers. Using a phenomenological approach and interviewing fourteen participants, the research uncovered that inadequate government support and strict regulations could undermine the Fintech ecosystem. The study suggests that enhancing the ecosystem may be achieved through collaboration among these various participants.

In the study conducted by Cotzee (2019), the primary objective was to gauge the level of risk aversion among South African banks and how it relates to adopting Fintech solutions. The research drew data from multiple sources. These sources included annual reports from South African banks, academic journal articles on Fintech, relevant periodicals, and documents related to Fintech. This multi-faceted approach allowed for a comprehensive exploration of the complex dynamics in the South African banking sector. The study highlighted a significant theme, notably a prevailing sense of risk aversion within South African banks. This cautious approach to risk was found to be strongly influenced by a combination of factors, including stringent regulatory reforms and a historical track record of prudent financial practices. South African banks are guided by a sensible ethos from a history of stability and a deep-seated commitment to safeguarding their financial health. These findings shed light on the underlying factors that affect the banks' embrace or hesitation towards adopting Fintech solutions as the financial sector continues to evolve in the digital age.

In summary, Fintech research in South Africa has primarily focused on partnership prospects between traditional banks and emerging Fintech companies, as well as assessing the economic impact of Fintech on various demographic segments. However, a substantial limitation exists in Fintech literacy, particularly concerning its implications for financial inclusion among underserved populations and specific age brackets. This gap underscores the need for

comprehensive studies addressing Fintech literacy, usage patterns, and strategic adoption by financial institutions. Therefore, this study aims to delve deeper into the limitations of Fintech literacy by providing an overview of Fintech literacy and creating a measurement instrument to measure Fintech Literacy levels. A summary of this chapter will be provided next.

2.9 SUMMARY

The secondary objective of this study was to provide an overview of Fintech. This objective was achieved by reviewing the concept and importance of Fintech. The study highlighted that Fintech is essential because it catalyses innovation and drives financial inclusion for unbanked consumers. The study also gave a historical background on the development of Fintech. The history of Fintech goes back to the late 20th century when various technological advancements started impacting the financial industry, which aimed to improve different efficiencies. Different periods have categorised Fintech developments. From the establishment of infrastructure to globalising financial services, the digitisation of financial services, and the emergence of digital banking, to the current period of Fintech 3.0, categorised as advanced digital banking worldwide.

The study provided an extensive overview of various Fintech products and services, encompassing payment applications, cryptocurrency applications, personal finance applications, internet banking, investment applications, robot-advisors, and peer-to-peer lending. These Fintech offerings were examined in detail, highlighting their distinct benefits and applications. Subsequently, the study delved into the specific impact of Fintech in the African context, shedding light on how these innovations have effectively addressed consumer needs within the continent. The research revealed that Fintech has made substantial inroads in Africa, contributing to significant improvements in the financial industry. Overall, the study's findings are optimistic about the future of Fintech in Africa, indicating promising prospects for continued growth and evolution in this sector.

The study also delved into the development, challenges, and opportunities facing Fintech companies. It was evident that these Fintech companies are the leaders in revolutionising the financial industry, introducing innovative practices that transform how business is conducted and enhance consumers' lives. Furthermore, the study meticulously examined the Fintech ecosystem, focusing on critical factors such as talent, market demand, regulatory policies, infrastructure, and access to capital. The investigation revealed that these ecosystem

components play a pivotal role in influencing the growth and operations of Fintech companies. They serve as essential elements for understanding the evolving landscape of the Fintech industry, providing valuable insights into areas for potential expansion and collaboration. In closing, the study supplemented its findings with references to prior research that pertained to the topics discussed within the realm of Fintech. This additional context helps establish a comprehensive foundation for the themes explored in the study.

The upcoming chapter will offer an in-depth examination of Fintech literacy and its ramifications. It will comprehensively review the concept of Fintech literacy and its components. Following this, the chapter will explore millennials and Gen Z, explaining the rationale behind selecting them as the primary population for this study.

CHAPTER 3
FINTECH LITERACY

3.1 INTRODUCTION

The previous chapter provided a literature review on the concept of Fintech, including a historical background on Fintech. It also provided an overview of the different Fintech products and services, and Fintech's impact in Africa. The chapter reviewed the development, challenges, and opportunities of Fintech companies. Lastly, the chapter provided a detailed overview of the Fintech ecosystem and how it operates. To achieve the primary objective of the study, this chapter will adopt a theoretical framework of Fintech literacy for this study. This will be done by investigating literature on a foundational theory that can be used for this study to formulate a valid and reliable measurement for Fintech literacy in South Africa.

This chapter will discuss and define the concept of Fintech literacy, the components that makeup Fintech literacy, and Fintech literacy levels. The preceding section will review the concept of digital literacy and its importance, the components of digital literacy, the content areas of digital literacy, diverse types of mobile banking providers and products in South Africa. Furthermore, the levels of ownership of mobile devices and smartphones, and the levels of proficiency in mobile banking products and Fintech products will be discussed. This chapter will further give a detailed account of millennials and Gen Z as part of the study. Lastly, the chapter will conclude with a summary.

3.2 THE CONCEPT OF FINTECH LITERACY

There is no consistent definition of Fintech literacy; researchers use different definitions with different components. Lyons and Kass-Hanna (2021) define Fintech literacy as the use of financial literacy and digital literacy by consumers to make informed decisions when using Fintech products and services. Tony and Desai (2020) support the idea that Fintech literacy consists of two components, financial literacy, and digital literacy, which can be used to utilise Fintech products and services. Tony and Desai (2020) and Lyons and Kass-Hanna (2021) share a common definition of combining financial literacy and digital literacy to measure Fintech literacy. Similarly, other researchers define Fintech literacy as the application of digital literacy and financial literacy to obtain Fintech literacy (Ravikumar, Suresha, Prakash,

Vazirani, and Krishna, 2022). Based on these definitions, Fintech literacy consists of two components: digital literacy and financial literacy.

However, other studies include other components as part of Fintech literacy; for instance, Morgan, Huang, and Trinh (2019) include knowledge of Fintech products and services, awareness of Fintech risks, proficiency in Fintech risk control, and understanding of consumer rights and redress procedures. Similar components used by Morgan, Huang, and Trinh (2019) are employed by Rajdev, Modhvadiya, Sudra (2020) and Kumar, Pillai, Kumar, and Tabash (2023). These definitions by Morgan, Huang, and Trinh (2019) have been used due to the broader perspective that the definition offers and does not only focus on technical proficiency but also consumer protection, risk management, and regulatory awareness. This study will not adopt this definition because the additional concepts such as risk management and consumer protection do not measure or relate to fintech products. Furthermore, Lyons and Kass-Hanna (2021) rigorously evaluated their components using statistical methods such as Cronbach's alpha to ensure validity and reliability of the components. In contrast, Morgan, Huang, and Trinh (2019) did not provide detailed empirical validation of the components and might not be applicable in other geographical areas. Therefore, Lyons and Kass-Hanna (2021) approach provides a validated framework for understanding Fintech literacy, making the components from Lyons and Kass-Hanna the desirable measurement of Fintech Literacy for this study.

This study will use components of Fintech literacy, as mentioned by Toni and Desai (2020) and Lyons and Kass-Hanna (2022). This study deduces that Fintech literacy comprises two main components: financial and digital literacy. This study aims to develop a valid and reliable scale for the components of Fintech literacy in a South African context. This study will also examine the interplay between financial literacy and digital literacy to measure Fintech literacy. Therefore, Fintech literacy will be defined in this study as a combination of digital and financial literacy to use fintech financial products and services. Next, a discussion on the importance of Fintech literacy is included.

3.3 IMPORTANCE OF FINTECH LITERACY

Fintech literacy is essential because consumers face different risks when they use Fintech products and services. These risks increase vulnerability to cyber-attacks where their confidential information can be leaked to the public (Morgan Huang and Trinh, 2022). World Bank (2021) states that consumers lack the necessary Fintech literacy to accurately assess and

use complex Fintech products such as peer-to-peer lending applications, this can lead to a risk in bad investment and borrowing decisions. Fintech literacy assists in providing consumers with valuable knowledge on mitigating these attacks, and regulatory knowledge protects them from being vulnerable (Morgan *et al*., 2022).

Hendricks (2019) states that consumers with higher levels of Fintech literacy can make more financially informed decisions and protect themselves from risks. However, consumers with lower levels of Fintech literacy are prone to making uninformed financial decisions and are more vulnerable to financial risks (Hendricks, 2019). Fintech literacy can play an essential role in consumers' lives, enabling them to make informed decisions and improve their financial well-being. A study by Khan, Liew, and Lee (2023), states that Fintech literacy enables consumers to adopt good financial practices such as regular savings. Some Fintech applications consist of a savings tracker that allows consumers to see how much they are saving and thus accumulated in terms of net worth which is the net value of assets minus liabilities. For example, First National Bank Application (FNB APP) included a Navigation pane in their mobile banking application which allows consumers to manage money and track their savings their net worth (News24, 2022).

As the financial services industry is rapidly undergoing transformation and being influenced by technological innovations to help resolve societal issues such as rising student debt, financial exclusion, and threats from financial fraud, consumers who are Fintech literate can identify how fintech products improves personal financial planning, well-being, and societal welfare within this technological-driven era (Panos and Wilson, 2020).

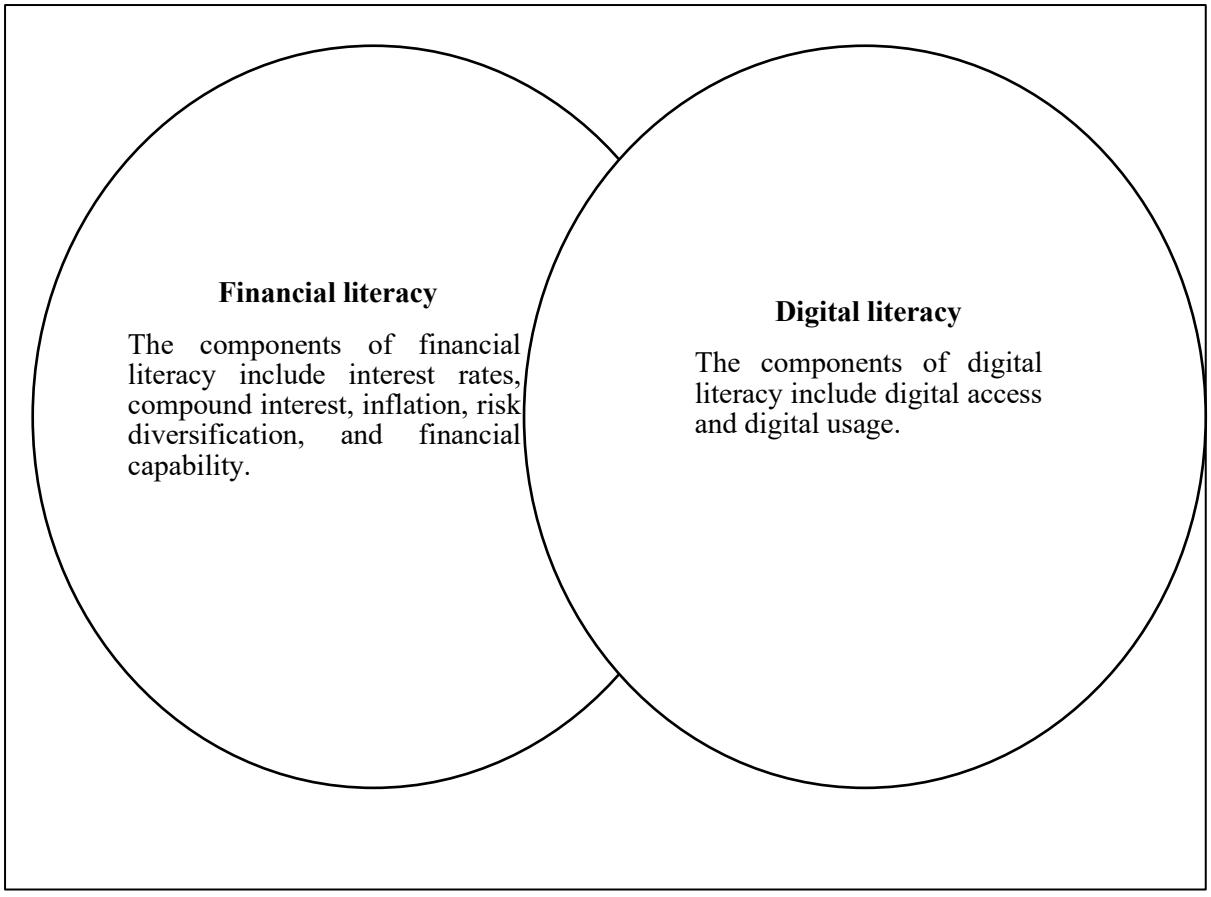
Most studies highlight the importance of Fintech literacy, with most of them agreeing that Fintech literacy is important because it allows consumers to make informed decisions (Liew and Khan, 2023; Wright, 2024). Khan and Lee (2023) states that Fintech Literacy is also important because it allows consumers to participate in the economy, where previously some products and services were not available to certain demographics of the economy. Supporting the statement of Fintech literacy promoting consumer’s participation in the economy, Panos and Wilson (2020) reflect on the mass adoption of technology being utilized in the financial industry to simplify personal finance and financial planning processes and how this not only promotes innovation for start-ups and existing platforms but also encourages and facilitates Fintech education amongst consumers. Consumers need to be knowledgeable of Fintech

financial products and services and aware of Fintech risks to manage and prevent these risks. The following section will review the crucial role of financial and digital literacy in Fintech literacy.

3.4 THE COMPONENTS OF FINTECH LITERACY

As previously mentioned in section 3.2 Fintech literacy's components are financial and digital literacy for this study. Figure 3.1 shows the framework of the study and the different content areas within the framework. The components and content of Lyons, Kass-Hanna, and Liu (2022) has been adopted in many studies such as Choung, Youngchoo, Chatterjee, Swarn, Park and Tae-young (2023) and Didenko, Petrenko and Pudlo, (2023).

FIGURE 3.1: THE FRAMEWORK OF FINTECH LITERACY



Source: Researcher's Construct.

Figure 3.1 shows the components of financial literacy and digital literacy. The financial literacy and digital literacy will be used to measure Fintech literacy in this study. Figure 3.1

is the framework for Fintech literacy that will be used in this study. The framework is discussed below:

This study will use financial literacy as a component because financial literacy is important for Fintech products and services. Consumers need to understand complex concepts such as algorithmic trading, and cryptocurrency investments when dealing with Fintech products (Esade Business and Law School, 2022). For instance, algorithmic trading employs computer programs to execute trades based on predefined instructions. Algorithmic trading demands not only technical knowledge but also a deep understanding of financial markets (Seth, Catalano, Kazel, 2023). Financial literacy equips consumers with the understanding needed to comprehend these concepts and their mechanisms and to be able to effectively use Fintech products and services (Kirkman, 2023). This assertion is supported by Kirkman (2023), who explains that the consequences of financial illiteracy can make it challenging for consumers to achieve their long-term financial goals and use fintech products and services. This is a concern since Fintech companies can help mitigate or narrow the knowledge gap and empower consumers to make better financial decisions, but this is difficult without adequate levels of financial literacy.

Lastly, financial literacy also proves vital for Fintech utility by ensuring consumers can effectively use tools available within the diverse range of Fintech products and services. The tools that can be derived from Fintech include data analytics and insights; automated budgeting and expense tracking; financial goal setting and planning; and customer support and assistance (Propelr, 2022). Each tool creates value for the consumer in its own unique way for example data analytics and insights can help consumers analyse their spending habits; automated budgeting and expense tracking can help consumers track their spending patterns and depending on their goals, technology can generate a tailor-made budget to improve financial decision-making; financial goal setting and planning can help consumers achieve their life-long goals, such as retirement, and help improve their money management; and customer support and assistance gives consumers access to further advice and assistance on financial matters. Overall, these tools help consumers in meeting their financial goals.

Digital literacy will be used as a second component of fintech literacy because consumers need to adopt modern technologies and adapt to new digital tools whenever there is an advancement in Fintech products and services. A research study by Abu Basar, Mohd Zain,

Tamsir, Abdul Rahman, Ibrahim, and Poniran (2022) states how digital literacy allows consumers to adopt new Fintech products and services. The research shows how consumers' understanding of how to use contactless payment systems, such as tapping with the phone to make a payment, has allowed for desires for other modern technologies, such as using biometrics connected to their phones to purchase groceries, which the Fintech products and service providers have created. Digital literacy is the ability to use digital technology and communication tools to locate, evaluate, use, and create information (Osterman, 2012). Zahanor, Tin Fah, and Chrisniyanti (2023) state that digital literacy may provide consumers with knowledge of the best features of different Fintech products and services. With digital literacy skills, consumers can effectively navigate through various Fintech platforms, understand the functionalities offered, and assess which features align best with their specific needs and preferences. The following section will review Fintech literacy levels from previous studies.

3.5 FINTECH LITERACY LEVELS FROM PREVIOUS STUDIES

Most Fintech literacy studies have been conducted in developing countries within Southern Asia, the section below aims to broaden this scope by reviewing Fintech literacy studies from South Asia and Sub-Saharan Africa.

This section will begin with a review on a study by Lyons, Kass-Hanna, Liu (2022) who examined how financial and digital literacy affect financial behaviours such as saving, borrowing, and managing risks among young people in South Asia and Sub-Saharan African countries. The study used survey data from Intermedia Financial Inclusion Insights (FII). The study used the following components to measure financial literacy: interest rates, compound interest, inflation, risk diversification, and financial capability. The study used the following components to measure digital literacy: ownership of a mobile device, mobile phone proficiency and mobile money proficiency. The study found that there is a relationship between financial and digital literacy on financial behaviours. The study found that both financial and digital literacy are key factors to building inclusiveness and financial resilience. The study states that there were differences found between regions and among diverse types of households. Therefore, promoting financial and digital literacy is crucial for fostering inclusiveness and promoting financial resilience among young people in South Asia and Sub-Saharan Africa.

A study by Choung, Chatterjee, and Pak (2020) examined the link between digital financial literacy and financial well-being among Korean adults in South Korea. The research utilised online survey data to investigate how digital financial literacy influences financial well-being. This study emphasised the knowledge and skills necessary for conducting financial transactions on digital platforms. The study found that digital financial literacy significantly impacts financial well-being, primarily through financial knowledge and the ability to protect against digital fraud. The effect of digital financial literacy was more substantial compared to general financial knowledge and was significant across various sociodemographic groups.

A study by George (2022) examined the influence of Fintech literacy levels on financial inclusion in India. The study also examined various demographic variables that affect Fintech literacy. The study used financial and digital literacy as components. This study focused on applications by consumers such as mobile banking applications. They surveyed 162 respondents based on their age groups. The study divided respondents into age categories. The study found low levels of Fintech literacy among the respondents. However, the study stated that groups aged 18-28 and 29-39 had higher levels of Fintech literacy than those between 40-60 and 60 and above. These results make sense since young consumers tend to have higher levels of Fintech literacy than older consumers. The study concluded that Fintech literacy is essential for financial inclusion and efforts.

A study by Rajdev, Modhvadiya, and Sudra (2020) analysed the level of Fintech literacy of graduate and postgraduate students of the Saurashtra region in India. The study used different components to measure Fintech literacy such as knowledge of digital financial literacy, awareness of digital financial risks, consumer rights, and redress procedures, and knowledge of risk control. This study developed a questionnaire using 38 items and found that, on average, students answered 47% of the digital financial literacy questions correctly, with a median of 57%. Postgraduate students have a high digital financial literacy compared to graduates.

A research study by Hayati and Syofyan (2021) analysed the Fintech literacy of students at universities in Negeri Padang, Indonesia. The study defined Fintech literacy as effectively managing finances using digital tools and technologies. The study used many components to measure Fintech literacy. These components included: general knowledge of digital finance, understanding different financial institutions, savings and money loans, insurance, and

investment. The study used a survey methodology. The study sample consisted of 115 students from the university, and it was found that the students' Fintech literacy was adequate. This means that respondents scored a percentage of 67.85%, meaning that their Fintech literacy levels were deemed adequate. The next section will review the concept of financial literacy.

3.6 THE CONCEPT OF FINANCIAL LITERACY

Numerous studies on financial literacy exist, and no standardised definition of financial literacy. One of the most widely recognized definitions of financial literacy comes from Lusardi and Mitchell (2014), which defines it as people's ability to process economic information and make informed decisions. This definition has been adopted by numerous studies, such as Karaa and Kugu (2015), Gjorgijovska and Ruggeri (2018), and Kaiser, Lusardi, Menkoff, and Urban (2022). The definition proposed by Lusardi and Mitchell suggests that financial literacy has two components, namely knowledge and application of financial knowledge as a skill. Therefore, financial literacy means knowing financial concepts and using that knowledge to make informed decisions.

The definition by Organisation for Economic Co-operation and Development (OECD) extends the definition of financial literacy to include attitudes, behaviours. OECD (2011) defines financial literacy as a combination of financial awareness, knowledge, skills, attitudes, and behaviours necessary to make sound financial decisions and achieve financial well-being. This definition is not solely about knowledge but also attitudes and behaviours that influence decision making. Therefore, financial literacy starts with financial awareness and ends with the behaviour performed by the individual. This study will define financial literacy using Lusardi and Mitchell (2014). Lusardi and Mitchell (2014) defines financial literacy as knowledge and application. This definition agrees with many studies that measure financial literacy (Gjorgijovska and Ruggeri, 2018; Arrondel, 2021; Kaiser *et al.*, 2022). In this study financial literacy will have two components, knowledge (understanding financial concepts) and skill, however one must be able to effectively apply that knowledge in the financial market. Therefore, financial capability will be included in the ways of measuring financial literacy.

Lusardi and Mitchell (2019) developed the "Big Three" questions in measuring financial literacy. The study further suggests that financial literacy is primarily measured through

knowledge and ability to perform numeracy such as the calculation of interest rates, compound interest rates, understanding of inflation, and risk diversification. These components and measurements assess an individual's understanding of fundamental financial concepts necessary for financial decision-making.

This study will also include financial capability as a measure of financial literacy. This is essential because financial capability provides insight into underlying consumer behaviours and the factors that drive their decisions (Xiao, 2016). Financial capability refers to the internal capacity of a consumer to act in their best financial interest, given socioeconomic and environmental conditions. It includes knowledge, skills and behaviours of consumers with respect to understanding, selecting, and using financial products and services (World Bank, 2023). Next the importance of financial literacy is discussed.

3.7 IMPORTANCE OF FINANCIAL LITERACY

As a clearer understanding of financial literacy emerges, it becomes increasingly vital to delve more deeply into its importance. The study by Lusardi and Mitchell (2014) sheds light on the significance of financial literacy. It emphasises that consumers with financial literacy possess the knowledge and skills to engage in financial markets actively. They can confidently navigate investment decisions, comprehend various financial products and services, and effectively assess risks (Lusardi and Mitchell, 2014). Consequently, this enhanced financial acumen fosters more significant participation in activities such as security trading, empowering consumers to capitalise on opportunities for wealth creation (Lusardi and Mitchell, 2014).

Building upon the importance of financial literacy, a study by Hall (2008) underscores the pivotal role of financial literacy in achieving various financial objectives. Hall (2008) highlights that financial literacy enables consumers to pursue essential goals such as homeownership and saving for their children's education. Moreover, the study emphasises the critical aspect of financial literacy in retirement planning. Consumers with a solid foundation in financial literacy are better equipped to make informed contributions to their retirement plans, ensuring a secure and comfortable retirement (Hall, 2008). In a Sanlam-commissioned study, 5000 South Africans participated in a survey where it was revealed that only 17.6% of consumers who are between the ages of 25 to 29 have a retirement product, which implies that most of the youth in South Africa are not planning for retirement (Kirkman, 2023).

Kirkman (2023) further explains that the consequences of not applying good financial literacy practices can be cyclical and be passed onto their own children. Another study by Barhat (2024) states that financial literacy significantly helps people from unprivileged classes to grow their wealth over time and improve income. A study by Alvarez, and Litvinov (2023) states how personal finance classes helped close wealth gaps for historically discriminated Black people from the 1900s by equipping them with the knowledge and skills to overcome past barriers. For example, a Black educator experienced barriers through paternal and maternal lineage. The paternal side had access to land, while the maternal side was restricted by discriminatory housing laws in the US, preventing the accumulation of assets. Through available personal finance classes, the educator has bridged the gap within their lineage and closed the wealth gap within the family.

Both studies underscore the multifaceted importance of financial literacy. From enabling active participation in financial markets to facilitating the attainment of vital financial milestones like homeownership and retirement security, financial literacy is a cornerstone for consumers to navigate the complexities of the modern economy and achieve their long-term financial aspirations. The following section will review the components of financial literacy.

3.8 THE COMPONENTS OF FINANCIAL LITERACY

As previously indicated, financial literacy has two components: financial knowledge and skill. This section is going to discuss the components of financial literacy in detail. However, financial literacy can also be measured as financial capability, and thus financial capability will also be included in the measurement of financial literacy, for confidence to apply financial knowledge.

3.8.1 FINANCIAL KNOWLEDGE

This study aligns closely with the perspective of Lyons, Kass-Hanna, and Liu (2022), who view financial knowledge as an essential component of financial literacy. A study conducted by Khan, Rothwell, Cherney, and Sussman (2016) defines financial knowledge as one's comprehension of financial matters. This understanding is elaborated upon by Lusardi et al. (2016), who emphasize the importance of grasping concepts such as how financial products function, budgeting, money management, and the role of education in making informed financial decisions and managing finances responsibly. Andreou and Phillip (2018) further define financial knowledge as understanding financial concepts and risks crucial for informed

decision-making in financial tasks like managing credit card debt and avoiding fraudulent investments.

There are two types of financial knowledge these include basic financial literacy and advanced financial literacy (Robb and Woodyward, 2011). Basic financial literacy involves understanding fundamental concepts like budgeting, saving, and debt management, interests rates, inflation essential for day-to-day financial management (Robb and Woodyward, 2011) and advanced financial literacy includes investment require a deeper comprehension of complex topics such as investing, retirement planning and taxation (Robb and Woodward, 2011). This study will use basic financial literacy in uncovering financial knowledge of consumers in relation to fundamental economic topics such as inflation, interest rates, and risk diversification. This is because basic financial literacy makes up the fundamental building blocks to understanding advanced and complex issues. Therefore, when a consumer lacks basic financial literacy, they are not able to utilize their resources optimally and contribute towards macroeconomic problems (Lusardi and Mitchell, 2023). Lusardi and Mitchell (2023) illustrate this point by reflecting on the COVID-19 pandemic and how consumers became more dependent on incurring debt due to the lack of financial security.

Lusardi and Mitchell (2007) stress the importance of both comprehension and practical application in financial literacy, Andreou, and Phillip's (2018) definition is more straightforward, focusing on essential financial concepts for daily operations. Therefore, this study integrates these definitions, emphasizing fundamental topics such as inflation, interest rates, and risk diversification as foundational content areas of financial knowledge (Khan et al., 2016) necessary for consumers to make informed decisions. Several studies, including Lyons, Kass-Hanna, and Liu (2022), have also utilized interest rates, inflation, and risk diversification to measure financial knowledge. The next section will discuss financial skills.

3.8.2 FINANCIAL SKILL

Financial skill refers to a consumer making use of financial knowledge in practice and is defined as the ability of consumers to understand financial concepts and apply them effectively (Frisancho, Herrera, Prina, 2023). It involves the capacity to mitigate and manage potential financial problems when making decisions (Dewi, Febrian, Effendi, and Anwar, 2020). Lusardi and Mitchell define financial skill as the capability of consumers to manage their financial resources and make informed decisions competently. Similarly, Kumar, Pillai,

Kumar, and Tabash (2023) describe financial skills as the combination of financial acumen, budgeting skills, and analytical abilities used to manage financial situations and leverage opportunities. Both definitions emphasise the importance of understanding financial concepts and applying this knowledge to inform decision-making. Therefore, in the context of this study, financial skill is defined as the application of individuals' comprehension of financial concepts and their ability to make informed decisions based on this understanding.

The Consumer Financial Protection Bureau (2018) measures financial skills based on consumers' ability to find reliable information, process financial data, execute decisions, and adapt, as necessary. Lyons, Kass-Hanna, and Liu (2022) developed probit models to empirically investigate the components of financial skills needed to navigate financial systems. This study will utilize their measurements, focusing on key content areas such as interest rates, inflation, and risk diversification. These key content areas will be used to see whether consumers can effectively manage their finances and make sound financial decisions. The next section will discuss the concept of financial capability.

3.8.3 FINANCIAL CAPABILITY

As previously indicated, other studies measure financial literacy as financial capability. Financial capability is a multifaceted concept encompassing consumers' knowledge, skills, and behaviours in managing their finances effectively. Scholars such as Sherraden (2010), Xiao and Niel (2016), and Kempson, Collard, and Moore (2005) emphasize that financial capability extends beyond mere possession of financial knowledge and skills; it also involves understanding one's financial circumstances and engaging in desirable financial behaviours. For this study, financial capability is defined as consumers' capacity to comprehend their financial situation, possess the necessary knowledge and skills, and enact behaviours conducive to effective financial management.

Measurement of financial capability involves a range of approaches, reflecting its complexity. As Lee, Lee, and Kim (2020) identified, objective measures include factors like liquidity management, financial ratios, and debt levels. Meanwhile, subjective measures encompass financial satisfaction and individuals' self-assessments of their financial status. Despite this diversity, a universal metric for assessing financial capability has yet to be assessed. Recent studies have often relied on subjective assessments, such as those provided by the Consumer Financial Protection Bureau (2017). Birkenmaier, Rothwell, and Agar (2022) conducted a

study to explore how financial capability, and its components are measured in quantitative literature, revealing a common operationalization involving objective financial knowledge and financial access. Disparities in measuring financial access were noted, with a predominant focus on formal financial access, such as bank account ownership. However, in this study financial capability will not include financial access because financial capability will refer to financial knowledge, skill, and behaviour. This approach is like a study by Lyons, Kass-Hanna, and Liu (2022). The study measured financial capability in relation to knowledge, skill, and behaviour.

In alignment with Lyons, Kass-Hanna, and Liu (2022), this study adopts a subjective measurement approach, specifically self-reported financial capability. Therefore, a singular research question may be used to measure financial capability with the statement: "I believe you possess the skills and knowledge required to manage (behaviour) your finances effectively?". The next section of this study will review financial literacy content areas.

3.9 MEASUREMENTS OF FINANCIAL LITERACY

This section will discuss the content areas of financial literacy. This section will discuss interest rates, inflation rate, and risk diversification. These content areas are deemed necessary for basic financial literacy of consumers.

3.9.1 INTEREST RATES

Interest rates refer to the monetary charge for the privilege of borrowing money (Chen et al., 2023). Interest rates also refer to the amount charged over and above the principal amount by the lender from the borrower (The Economic Times, 2023). Interest rates are also defined as the amount a lender charges a borrower and is a percentage of the principal the amount loaned (Banton, Drury, and Li, 2023). The definitions share the fundamental concept of describing interest rates as the monetary charge imposed for borrowing money, emphasizing that borrowers incur an additional cost beyond the principal amount. A study by Lusardi and Mitchell (2014) highlights that measuring interest rates in financial literacy is crucial because knowledge about interest rates and being able to calculate the interest rates, namely the financial skill, has implications for making informed decisions. Consumers who understand interest rates can gauge the growth of their savings, understand how inflation affects their finances, and understand what the cost of borrowing means for them. Previous studies, such as those conducted by Hastings, Madrian, and Skimmyhorn (2013) and Nanziri Leibbrandt

(2018), have utilized knowledge related to interest rates as content areas for financial literacy and have employed interest rates to understand financial literacy levels. This study uses knowledge of interest rates to measure financial literacy levels. Furthermore, while interest rates represent the immediate cost of borrowing money, compound interest delves into the long-term implications of saving and investing.

There are two types of interest rates: simple and compound interest rates. Simple interest rates refer to the interest rate remaining constant over time, and interest being calculated only on the original principal amount (Picardo, James, Kvilhaug, 2023). Compound interest refers to a method of calculating interest on the principal amount where interest is added to the principal amount at regular intervals, and subsequent interest calculations are based on the updated total, including both the original principal and previously accumulated interest (Alejandro, Augusto, and Karolina, 2024). According to the Consumer Credit Market Report, South Africa's makeup R2,31 trillion of debt and over 50% of that debt is attributable towards loan structures which make use of compound interest (Thorne, 2024). Although studying simple interest could provide the study insight regarding short-term loans; fixed-income investments; and basic savings accounts, this study will focus on compound interest rates as it delves into more mainstream financial products which individuals use such as long-term investments; savings and checking accounts; and mortgages and loans (Alejandro et al., 2024).

Compound interest represents the accruing interest on savings calculated based on the original principal amount and the cumulative interest from prior periods (Fernando, Anderson, Li, 2023). Compound interest refers to earning interest on previously earned interest (Bennett and Beers, 2023). Both definitions of compound interest emphasize the accumulation of interest over time. However, a difference is present in the wording used to explain compound interest. Fernando, Anderson, and Li (2023) focus on the cumulative interest from prior periods, while Bennett and Beers (2023) highlight earning interest on previously earned interest. Both terminologies convey the same concept of compound interest and its role in financial growth. The formula for determining compound interest is = $[P(1+i)^n-1]$ where p = principal, i = annual interest rate, and n = number of compounding periods (Fernando et al., 2023).

Compounding has many advantages, which can help individuals build long-term wealth in savings and investment by reinvesting the earnings from investment to generate additional

earnings over time (Fernando et al., 2023). Another advantage is that it mitigates wealth erosion. By constantly reinvesting earnings, the investment grows faster than the rate of inflation or taxation (Dowden, 2019). Lastly, by understanding how interest rates work individuals can financially plan which loan repayment structure works best for them in terms of number of payments required, total amount due at the end of the period, and the size of their monthly repayments required to pay of their debt in the agreed upon loan structure (Alejandro et al., 2024).

By consistently making payments, the outstanding balance decreases, resulting in lower interest charges in subsequent periods. However, compounding has disadvantages, which include sometimes having minimum payments on high-interest debts. While compounding can work in favour of investments, it can work against consumers who make only minimum payments on high-interest debts. High-interest debt can accumulate rapidly due to compounding interest, making it difficult for borrowers to repay their debts (Wagner and Brown, 2022). Another disadvantage highlighted by Wagner and Brown (2022) states that taxation of return and tax liabilities can reduce the overall returns on investments, affecting the effectiveness of compounding as a wealth-building strategy.

Numerous studies have used compound interest as a content area and measurement for financial literacy (Lusardi and Mitchell, 2014; Hubbard et al., 2016; Ovaska, Sumell, 2017). Within Fintech literacy, the financial literacy aspect of compound interest finds its application. Lyons and Kass-Hanna (2021) employed compound interest as a gauge for financial literacy, categorizing it into two measurements: compound interest 1 and compound interest 2. However, a clear definition of compound interest 1 and compound interest 2 still needs to be discovered. Table 3.1 shows the questions to measure compounded interest regarding financial literacy levels.

TABLE 3. 1: POSSIBLE QUESTIONS FOR COMPOUND INTEREST

Compound Interest 1	“Suppose you put your money in the bank for two years and the bank agrees to add 15% per year to your account. will the bank add more money to your account the second year than it did in the first year, or will it add the same amount of money both years?”

Compound interest 2	"Suppose you had 100 *[units of national currency]* in a savings account and the bank adds 10 % per year to the account. How much money would you have in the account after five years if you did not remove any money from the account?"
Adapted question for South African Context (Question 1)	Suppose you need to borrow an amount of R100. Which option would cost you less in terms of the repayment amount? . Borrowing R100 with no additional charges . Borrowing R100 with an additional charge of 3% . Borrowing R100 with an additional charge of 5% . Do not know
Adapted question for South African Context (Question 2)	Suppose you put R5000 in the bank for two years and the bank adds 10% of interest per year in the bank account. How much interest will you earn in the second year? . I will earn more than R500 as interest in the 2nd year. . I will earn R500 as interest in the first and second year. . Do not know. . None of the above.
Adapted question for South African Context (Question 3)	If you have R100 in a savings account, and the bank adds 10% per year, how much money will you have after five years: . Do not know. . Less than R150 . More than R150 . Exactly 150

Source: Lyons, Kass-Hanna, and Liu, (2022)

The next section will review inflation.

3.9.2 INFLATION

Inflation encompasses the rise in prices over time (Oner, 2023). Inflation also signifies an extended increase in the price level of goods and services (Hoflmayr, 2022). Another study by Wernig (2022) defines inflation as the general increase in prices of goods over time. All

these definitions emphasize the notion that inflation represents a persistent upward trend in prices.

The Consumer Price Index (CPI) is the primary metric for measuring inflation, tracking changes in the price levels of a predetermined basket of goods and services over time. This basket's composition can vary by country (Banton and Kelly, 2023). In South Africa, the CPI is calculated by aggregating the costs of a standard "basket of goods" and services commonly purchased by the average South African. Inflation is then determined by assessing the price increase of this basket over 12 months, expressed as a percentage (%) (Old Mutual, 2023). The impact of inflation on South African consumers has been significant, particularly with the recent surge of 5.4% year-on-year. This upward trend has led to a higher cost of living, notably affecting essential items such as food and fuel (Panchia, 2023). As noted by Panchia (2023), this surge has eroded consumers' purchasing power, outpacing income growth, and making it increasingly difficult for them to afford the same quantity of goods and services.

Understanding inflation is crucial for financial literacy, as it signifies the gradual decline in the purchasing power of money, indicating that the same amount of money will purchase fewer goods and services in the future (Bashiri, 2022). Real values represent an item's adjusted value considering inflation (Ganti and Walters, 2021), while nominal values denote the unadjusted rate, excluding inflation effects (Ganti and Scott, 2021). Many studies have utilized the inflation rate to measure financial literacy levels. For instance, Agarwal, Amromin, Ben-David, Chomsisengphet, and Evanoff (2015) utilized inflation to gauge financial literacy levels by directly questioning respondents about its impact on purchasing power. Specifically, participants were asked whether they could afford more, the same, or less after one year if the interest rate on their savings account was 1% per year and inflation stood at 2% per year. Similarly, Lyons, Kass-Hanna, and Liu (2022) employed this question to measure financial literacy levels, a methodology also adopted for this study.

Within Fintech literacy, the financial literacy aspect of inflation finds its application. Table 3.2 shows the questions to measure inflation regarding financial literacy levels.

TABLE 3. 2: POSSIBLE QUESTIONS FOR INFLATION

Inflation	"If prices double over the next 10 years, and your income doubles, will you be able to buy the same (Option A) or more (Option B) or less (Option C) than today?"
Adapted question for South African context	If the prices of a basket of food double over the next 10 years, and your income doubles, will you be able to buy: . The same basket of food . More food in the basket . Do not know. . Less food in the basket.

Source, Struwig, Roberts and Gordon, (2013).

Risk diversification will be reviewed in detail next.

3.9.3 RISK DIVERSIFICATION

Risk diversification refers to a risk management strategy that creates a mix of various investments within a portfolio (Segal, Scott, Bellucco-Chatham, 2023). Another study by Olsen (2021) supports this definition by defining risk diversification as investing across various industries and categories within one portfolio. Yield Street (2023) concurs that risk diversification involves combining various investment types and shares in various industries in a portfolio to help reduce overall exposure to risk. The common thread among the definitions is the risk diversification strategy by combining various shares or securities across different industries and asset classes to mitigate overall risk exposure in a portfolio.

Risk diversification is essential to understand when investing money in a portfolio of shares, known as an investment portfolio. An investment portfolio refers to a collection of asset classes, such as shares of ownership, bonds, real estate, and commodities held by an investor (Bartkus and Paleviciene, 2013). Investment portfolios can be composed of various asset classes. Assets classes refer to a grouping of securities into which a person can put money and usually share behaviour, characteristics, and regulations in the financial markets (Brock, 2023). Asset classes include the following: cash and cash equivalents, equities, fixed income, and alternative assets (Brock, 2023). Cash and cash equivalents refer to a line item on the

balance sheet that reports the value of a company's assets that can be converted into cash immediately (Tuovila, James, Courage, 2023). Examples of cash and cash equivalents include money market funds, treasury bills, and certificates of deposits. If consumers allocate a portion of their portfolio to cash and cash equivalents, investors can mitigate risks associated with market fluctuations and ensure they have ready funds for unforeseen expenses (Touvila et al., 2023).

Investments based on a strategic risk management approach involve crafting a diversified investment portfolio of various asset classes (Segal et al., 2023). It encompasses investing in assets with minimal correlation in their performance over time (Lehman, 2023). Equities, also known as shareholders equity or shares, is the amount of money given to a company's shareholders if all its assets were sold and all its debts were paid off (The Economic Times, 2023). Fixed income is a type of asset class that pays the investor a fixed amount on a fixed schedule, and examples include bonds (Chen, Boyle, Williams, 2023). Lastly, alternative assets are a broad asset class category for anything that is not cash, equity, or fixed income, including real estate, commodities, or cryptocurrency (Brock, 2023).

Guiso and Jappelli's (2009) study underscore the contribution of risk diversification to financial literacy, emphasizing that consumers proficient in constructing an optimal asset portfolio possess sophisticated knowledge, particularly understanding the variance-covariance matrix of asset returns. The variance of returns signifies an investment's fluctuation over time (Robinhood, 2021), while the covariance matrix measures the directional relationship between two assets' returns (Hayes, Murray, Courage, 2023). Hence, the variance-covariance matrix encapsulates the variances and covariances of stocks within a portfolio (Thakar and Divakar, 2023). Consumers who understand the variance-covariance matrix can remove assets that do not sync within a portfolio, reducing overall portfolio risk (Thakar and Divakar, 2023). Mastery of these concepts—optimal portfolio selection based on the variance-covariance matrix and profound comprehension of the advantages of risk diversification—is a reliable indicator of high financial literacy concerning risk diversification.

Kantowski (2021) underscores the advantages of risk diversification, particularly in mitigating individual share risks. He notes that investing in shares is inherently aggressive, with the stock exchange prone to significant fluctuations at any given time. The security

exchange refers to several exchanges in which shares of publicly listed companies are bought and sold by investors (Chen, Murray, Schmitt, 2023). By constructing a diversified portfolio, investors safeguard their investments. For instance, if a consumer holds investments in both a small-capitalisation portfolio and a large-capitalisation portfolio, if the share price of the small-cap portfolio increases and the share price of the large-cap portfolio decreases. The consumer risk exposure is minimised.

A small-cap portfolio refers to a share where the total market value is about R4.7 billion to R37.86 billion (Barone, Scott, Schmitt, 2023. A large-cap portfolio refers to shares where the total market value is more than R189 billion (Chen, Scott, Velasquez, 2022). Diversification acts as a protective measure, ensuring that not all investments are concentrated in a single company, thereby reducing the impact of losses from one specific share.

Within Fintech literacy, the financial literacy aspect of risk diversification finds its application. Table 3.3 shows the questions to measure risk diversification regarding financial literacy levels.

TABLE 3.3: POSSIBLE QUESTION FOR RISK DIVERSIFICATION.

Risk Diversification	"Is it safer to put your money into multiple business or investments (Option A) or One business or investment (Option B)"
Adapted question for South African context	Is it safer to put your money into multiple businesses or investments? . Multiple business or investments . One business or investment . Do not know. . It depends on the risk tolerance and goals of the investors

Source, Flint, Seymour, and Chikurunhe, (2020). This study is about Fintech Literacy, and since the concept consists of both financial and digital literacy, it is important to turn the discussions to digital literacyto the e

3.10 LEVELS OF FINANCIAL LITERACY IN SOUTH AFRICA

Many studies in South Africa find that financial literacy levels of consumers are low particularly among the youth. A study by Nanziri and Leibbrandt (2018) investigated financial literacy levels among South Africans. The study analysed data collected on attitudes over the period 2005-2009. The study used content areas such as credit knowledge, interest rates, and life insurance in measuring financial literacy levels. The study found that the financial literacy levels ranged from 0 to 100, with a mean score of 48.4. The study highlighted that most South Africans fall above the national mean. The study further stated that provinces like the Western Cape, Kwa-Zulu Natal, and Gauteng have above-average financial literacy scores. While provinces such as the Eastern Cape and Northern Cape lag. This study will focus on the Eastern Cape to measure the financial literacy scores and how these scores are related to digital literacy. Nanziri and Leibbrandt (2018) stated that financial literacy among the youth in the Eastern Cape reveals noteworthy insights, the youth partially between the ages of 18 to 29 exhibit lower-than average levels of financial literacy. These low levels of financial literacy between the ages of 18 to 29 might be a concern for digital literacy and for Fintech literacy. Therefore, this study will focus on millennials and Gen Z, who fall within the age range of 18-43, segmented into five- year brackets.

Another study by Dhlembeu, Kekana, and Mpinda (2022) utilized secondary data from the 2011 South African Social Attitudes Survey (SASAS) to delve into the financial literacy behaviour of diverse demographic groups, including gender, age, race, education, and income levels. Employing various content areas such as arithmetic, interest rates, inflation, and risk diversification, the research aimed to gauge the financial literacy levels across these groups. The findings revealed a notable trend: more than half of the sample exhibited a firm grasp of financial concepts, scoring within the 60% to 100% range. This measurement aligns with the classification by Chen and Volpe (2002), wherein scores exceeding 60% denote an elevated level of financial literacy. This observation underscores the overall proficiency of the sampled population in navigating financial matters. This motivates further exploration into the components contributing to financial literacy disparities and developing targeted interventions which is one of the objectives of this study. The study by Thembu, kekana, Mpinda (2022) found varying levels of financial literacy among the youth. The results revealed that younger age groups, specifically those between 25-35, exhibited slightly lower financial literacy levels compared to older generations.

Another study by Matemane (2018) examined the financial literacy levels of black South Africans working in Pretoria and Johannesburg with a commerce tertiary qualification. Of the respondents, 171 were surveyed. Similarly, the study used a set of questions covering different areas, such as interest rates, inflation, and risk diversification, to measure financial literacy. Other characteristics were measured, such as gender, income levels, and age. The study found that the financial literacy score was 60.8%, with more than half of the respondents scoring between 60% and 100%. Additionally, respondents with a commerce tertiary qualification and those who reported having savings had an elevated level of financial literacy. Therefore, it is noted that most studies highlight that financial literacy levels in South Africa are low, particularly among the youth. These studies used components such as interest rates, inflation, risk diversification and practical financial knowledge to measure financial literacy. Building on these findings, this study will measure financial literacy levels in the Eastern Cape. This study is about Fintech Literacy, and since the concept consists of both financial and digital literacy, it is important to turn the discussions to digital literacy

3.11 DIGITAL LITERACY

Digital literacy has evolved with various definitions offered by different authors. One of the earliest definitions was put forth by Glister (1997), who described it as the ability to understand, appreciate, and utilize information presented through different technology platforms. These technology platforms include text, images, audio, video, documents, spreadsheets (Glister, 1997). Another definition by Shophova (2014) defined digital literacy as not just understanding but navigating and using digital technologies platforms effectively. A recent study by Spires, Paul, and Kerkhoff (2019) further refines the concept. They define digital literacy as the capacity to interact proficiently with digital content across three core processes: locating and consuming digital content available on the internet, creating digital content, including documents, multimedia presentations, websites, or any other digital media forms; and communicating digital content through various communication tools such as email, social media platforms, or online collaboration tools. This definition by Spires, Paul, Kerkhoff (2019) includes not just consuming digital content but creating it and sharing it too. For the purposes of the study, digital literacy will be defined as evaluating and creating digital content on different technology platforms. This means that consumers would be expected to effectively search for information, critically assess its credibility and produce their own content using various digital tools.

According to a study by Martin (2006), digital literacy is a broad area and can include specific skills and knowledge. Martin (2006) proposes one of the components of digital literacy, which is relevant to the scope of this study: digital access. The first component, digital access, pertains to the ownership of digital technology. A study by UNESCO (2018) defines digital literacy as the ability to access and use digital technologies for a desired goal, such as employment, entrepreneurship, or research. This highlights the importance of digital access as a foundational aspect of digital literacy. According to Reder (2015), financial literacy is dependent on the amount of digital access a person has and is demonstrated by how well they can make use of technology to solve personal, work, or civic purposes. In alignment with these definitions, the second component adopted for this study is digital usage, which relates to the effective utilisation of digital technology to accomplish various objectives. The next section will provide an overview of each component of digital literacy.

3.12 COMPONENTS OF DIGITAL LITERACY

As previously indicated, digital literacy has two components: digital access and digital usage. This section is going to discuss the components of digital literacy in detail.

3.12.1 DIGITAL ACCESS

Digital access is described as access to devices such as smartphones and computers, and the necessary digital skills to use the devices (GGI Insights, 2024). This definition suggests that digital access is not only about owning devices but also knowing how to use them well. Digital access is also defined as the ability to access digital networks, devices, services, information, and software (Spacey, 2023). This definition of digital access is supported by other studies, like Kiarra (2021), who state that digital access consists of three main components, namely: connectivity, digital skills, and devices. In this study, the focus will be on access to connectivity, digital skills, and devices because they comprehensively address the essential components required for meaningful access (Kiarra, 2021). Ownership of a mobile phone will be considered in section 3.12.

Before discussing how digital access will be measured using ownership of a mobile phone and a smartphone, it is important to review the common components of digital access. As stated earlier a study by Kiarra (2021) states that the main component of digital access includes: connectivity, digital skills, and devices. Connectivity refers to the range of ways

people can be connected to the internet, which includes dial-up, telephone lines, broadband connections, and wireless devices (Krishnasamy, 2022). Digital skills refer to training needed to use the necessary devices and programs for one's needs (Kiarra, 2021). Devices refers to systems or objects that have a specific purpose, like electronic communication devices like mobile devices (Lee, 2017). In this study digital skills will be measured as digital usage, and this is because digital usage provides a practical and observable way to assess how consumers can use digital technologies effectively in real-life cases.

While connectivity and digital skills are critical components of digital access, this study will only focus on ownership of devices (mobile phones and smartphones) for digital access. Firstly, measuring device ownership provides a clear measurement that can be easily assessed among consumers. The study is focusing on device ownership which aligns with the approach of Lyons, Kass-Hanna, and Liu (2022). Providing consistency with existing research methodologies in relation to Fintech literacy. As previously indicated digital skills will be measured as digital usage, digital usage will include mobile banking proficiency and Fintech product proficiency. The next section will review digital usage.

3.12.2 DIGITAL USAGE

Digital usage refers to the extent to which individuals incorporate digital devices into their daily routines and activities (Mcdonell, 2024). Digital usage refers to the utilisation of digital technology, encompassing a wide range of communication devices such as radio, television, mobile devices, computers, networks, hardware, and software (Solomon, and Klyton, 2022). Digital usage can also be defined as how people use technology like digital devices such as mobile phones (Akhter, 2010). For this study, digital usage is defined as how well people use digital technologies such as mobile phones or smartphones to perform various tasks, including communicating, engaging in social media, and navigating applications.

A study by Henderson, Selwyn, Finger, and Aston (2015) measured digital usage of students and used a questionnaire to understand the levels of digital usage among this targeted group. The study focused on assessing how students used digital devices, particularly mobile phones, for academic purposes. The study found that moderate usage of digital devices improved academic performance. This study will measure digital usage by asking questions such as, that relate to how well consumers can navigate within their mobile devices or smartphones.

Another study by Afzal, Ahmed, Daud, and Khan (2023) made use of a survey questionnaire, with a sample size of 400 students from various phases of basic education, to investigate the impact of the student's access to technology and its influence on their education. The study revealed that 30% of students within the intermediate phase (Grades 4-6) made use of technology for at least 5 hours per week; 50% of students within the senior phase (Grades 7-9) made use of technology for at least 10 hours per week; and 70% of students within the further education and training (Grades 10-12) made use of technology for at least 15 hours per week. The study revealed that as students progressed through higher levels of education, both the average time spent on technology and the percentage of students using mobile devices for learning increased significantly as the necessity for technology helped improve students' performance by supplementing their learning.

Measurement of digital usage involves a range of different approaches. These questions were in alignment with Lyons, Kass-Hanna, and Liu (2022), based on providing a survey questionnaire to the targeted population. The next section will review digital literacy measurements.

3.13 MEASUREMENT OF DIGITAL LITERACY

As previously indicated, digital literacy will be measured using two components, digital access, and digital usage. To measure digital access, this study will use ownership of a mobile phone and ownership of a smartphone. To measure digital usage, this study will use mobile phone proficiency and mobile banking proficiency. This way of measuring digital access and digital usage is like the approach of Lyons and Kass-Hanna (2021). The next section will discuss ownership of a mobile phone.

3.13.1 OWNERSHIP OF A MOBILE PHONE

A mobile phone is a wireless handheld device that allows consumers to make and receive calls (Rouse, 2017). A study by Llyod (2007) defines a mobile phone as a technological communication device designed for making phone calls while on the move. Mobile phones are long-range, non-stationary electronic devices for voice and data communication (Frankfield, Estevez, Jackson, 2022). The definitions provided emphasize the wireless nature of mobile phones, indicating that they do not require physical connections to operate. The definitions also indicate that the mobile phone is a handheld device that is portable and easy to carry around.

To measure access to mobile phones, one needs to consider the ownership of mobile phones in South Africa. According to Archangeli (2023) the South African Census results reveal that 92.1% of the population in South Africa owns a mobile phone. This means that most people in South Africa own and have access to a mobile phone. The study by Archangeli (2023) further states that while cell phone ownership in provinces in South Africa is universal, exceptions include the Eastern Cape which had mobile phone ownership were 87.9% of the population owning mobile phones. It is for this reason that the study will focus on the Eastern Cape, to see how digital access affects financial literacy and thus Fintech in the study. The study further highlighted that the findings from the census results supports the data from the 2022 state of the ICT report by ICASA, indicating increased mobile and smartphone ownership and a decline of households without internet access.

Another study conducted by Miyajima (2020) reviewed mobile phone ownership within the South African context as shown in Table 3.4. The data from the study spanned across five waves from 2008 to 2017. This allowed for examination in trends on mobile phone ownership in South Africa. Based on the study mobile ownership has been increasing over the period from 2008 to 2017. The study also highlighted some key interesting points.

The data showed that there is clear association between educational attainment and mobile phone ownership. The ownership increases with higher levels of education. Employment status also plays a significant role, individuals with a job are more likely to own a mobile phone compared to those without employment. The ownership rate is 89 % for employed individuals and 78% for unemployed individuals.

TABLE 3.4: MOBILE PHONE OWNERSHIP

	Education (%)					**Employment (%)**	
Wave	Tertiary and up	Secondary	Primary Upper	Primary lower	No Schooling	employed	Unemployed
1	90.0	71.5	54.4	49.6	43.3	73.1	52.8
2	82.6	72.1	60.8	56.2	44.1	76.7	57.7

3	95.1	89.4	81.3	75.1	66.9	89.6	78.2
4	91.7	86.6	78.2	71.0	66.3	85.6	75.7
5	91.3	88.0	81.2	76.5	66.7	88.5	77,5
Average	90.1	81.5	71.2	65.7	57.5	82.7	68.4

Source: Miyajima (2022)

To confirm the association between educational attainment and mobile phone ownership, demographic variables such as educational level and employment status will be included for analysis in this study. Table 3.4 shows mobile phone ownership increases with higher levels of education. Miyajima (2022) further highlights that mobile phone ownership is significantly higher among employed individuals compared to those without employment in South Africa.

Another key variable includes ethnicity that needs to be considered when measuring ownership in South Africa. Table 3.5 shows disparities of mobile phone ownership within South Africa. Where Whites and African ethnicities had 95% and 84% ownerships respectively while Asia/Indian and coloured individuals both had ownership levels of 70%. This means there are noticeable differences in mobile ownership among different ethnic groups in South Africa.

TABLE 3.5: MOBILE PHONE OWNERSHIP (%) (CONTINUED)

	Population Group				**Gender**		**Geography**		
Wave	White	African	Asian/Indian	Coloured	Female	Male	Urban, Informal	Urban, Formal	Rural, Informal
1	78.2	61.9	52.5	48.9	61.3	59.0	66.2	65.3	56.7
2	69.1	65.5	60.0	52.8	64.8	62.2	68.9	68.4	60.4
3	92.7	84.5	85.0	68.9	82.5	83.4	83.7	84.1	83.2
4	90.9	81.6	70.0	70.2	79.8	81.4	84.5	81.2	79.9
5	94.6	83.9	72.5	71.8	82.2	83.4	81.6	82.8	83.0
Average	85.1	75.5	68.0	62.5	74.1	73.9	77.0	76.4	72.6

Source: Miyajima (2022)

The other key variables included in Table 3.5, such as age and geography, were also considered. This study will analyse the relationship between age, geography, and mobile phone ownership.

There are many advantages with owning a mobile phone. Goodman (2023) states that owning a mobile phone allows instant communication with friends and family. Another benefit is that mobile phones provide the means to organize finances; consumers can access online banking products and services from their mobile phones, check their account balances, transfer money, and pay bills (Goodman, 2023). Another study by Silver, Smith, Johnson, Jiang, Anderson, Rainie (2019) states that mobile phones allow consumers to enjoy entertainment such as playing games, watching on demand video content, and access to social media applications.

The disadvantages of owning a mobile phone include that it can be distracting; a call or text can come at any time; due to the advancement of most mobile applications, notifications from various applications, including social media applications, may interrupt consumers, drawing their attention away from essential tasks (Goodman, 2023). Another disadvantage of mobile phones is that they are usually reliant on battery power, and they must be regularly recharged for them to work. The overall life of a mobile phone battery is just three years. The following section will review smartphone ownership.

3.13.2 OWNERSHIP OF A MOBILE PHONE

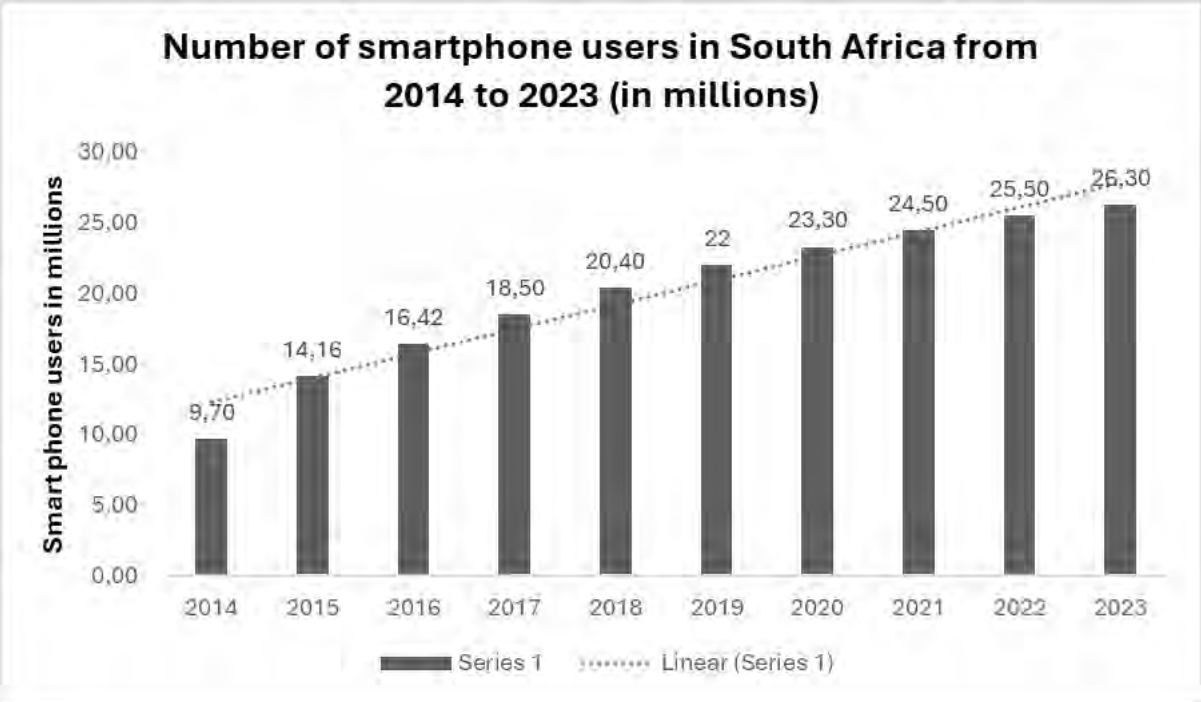
A smartphone is a handheld electronic device that connects to a cellular network (Frankenfield, Estevez, Jackson, 2022). Frankenfield, Estevez, and Jackson (2022) further suggested that a smartphone is an extension of a mobile phone, consisting of "a mobile phone and a computer in one." A study by Theoharidou, Mylonas, and Gritzalis (2012) stated that smartphones are defined as state-of-the-art cell phone devices. These devices are deemed "smart" and are distinguished from ordinary and technologically constrained cell phone devices.

A report by (Taylor, 2023) shows the projected number of smartphone consumers in South Africa from 2014 to 2023. The report showed that ownership had increased from 9.7 million users in 2014 to 26.3 million users in 2023. This accounts for about one-third of the country's population. The number of smartphone consumers is expected to grow even higher in the next

few years (Taylor, 2023). The most popular smartphone brands in South Africa include Samsung, Apple, Huawei, and Oppo (Illige, 2023). Illige (2023) states that as smartphone penetration grows in South Africa, consumers are willing to buy more smartphones with advanced features, such as newer operating systems (Illige, 2023). An operating system is a software system that manages computer hardware and software resources (Bigelow, 2023). Geopoll (2023) stated that Samsung and Huawei are the most used phone brands in South Africa. The desire for most is an Apple phone, but due to the excessive cost, most consumers opt for phones such as Samsung and Huawei. Geopoll (2023) stated that storage space was the most crucial decision to buy a phone, followed by how long a phone battery lasted.

Another study by Taylor (2019), which supports the facts presented above, published the number of smartphone users in South Africa from 2014 to 2023 (in millions). The study stated that 22 million people in South Africa use a smartphone, which is one-third of the population.

FIGURE 3.2: SHOWS THE NUMBER OF SMARTPHONE USERS IN SOUTH AFRICA TO 2023.



Source: Taylor (2019)

Table 3.6 has been included to highlight the advantages and disadvantages of owning a smartphone.

TABLE 3.6: THE ADVANTAGES AND DISADVANTAGES OF OWNING A SMARTPHONE.

Advantages	**Disadvantages**
Mobility and Accessibility: Smartphones can be used anytime and anywhere, giving users on-the-go access to services and information.	Security Concerns: Perceived as less secure than computers due to the risk of exposing confidential information.
Real-time Information Sharing: Enables real-time communication through social media and apps, enhancing global connectivity.	Price: High upfront costs and ongoing data expenses may be unaffordable for some users.
Convenience: Compact and portable design makes smartphones ideal for daily use and multitasking.	Complexity: Some users find smartphones harder to operate than computers, leading to potential usability issues.
	Size Limitations: Smaller screens may hinder functionality and ease of use for certain tasks.

Source: Gafni and Geri (2013).

Table 3.6 shows that smartphones offer numerous benefits, such as mobility, accessibility, and real-time information sharing, but they also come with drawbacks like security concerns, complexity, and cost. These perceptions may vary among consumers and may be influenced by factors such as operating systems and the length of ownership. As much as it is important to measure access to mobile phones and smartphones, it is important to measure digital usage to capture digital literacy. This study will measure digital usage as mobile phone proficiency. The next section will review mobile phone proficiency in detail.

TABLE 3.7: POSSIBLE QUESTIONS FOR MOBILE PHONE OWNERSHIP.

Question Number	**Question**
1.	Do you own a smartphone? . Yes . No

2.	Do you own a mobile phone? . Yes . No

Source: Researchers Construct

3.13.3 MOBILE PHONE PROFICIENCY

As previously indicated, digital usage will be measured by mobile phone proficiency, which refers to how well consumers use mobile phones (Roque and Boot, 2016). Another study by Petrovcic, Boot, Burnik, and Dolnicar (2019) states that mobile phone proficiency refers to a consumer's ability to use and navigate mobile applications effectively. A study by Andrade, Bido, De Barros, Boot, and Bertolucci (2023) states mobile phone proficiency assists in communication and navigation of mobile devices. Lack of mobile phone proficiency can hinder consumers from utilizing these benefits (Andrade et al., 2023). This study will measure general mobile phone proficiency, which assesses how well a phone is utilized to its total capacity. Additionally, this study will measure mobile banking proficiency, which evaluates how effectively consumers navigate various banking applications. Mobile banking proficiency will be expanded upon in section 3.12.5.

There are specific skills and factors other previous studies have used to measure mobile phone proficiency. A study by Oulasvirta, Wahlstrom, and Ericsson (2011) stated that mobile phone proficiency involves more than just knowing how to make calls or send text messages. It involves a deeper understanding of the device functions, interface, and the ability to navigate through tasks efficiently. For example, in terms of Wi-Fi connection, users need to know how to navigate through multiple steps such as choosing the WLAN (Wireless Local-Area Network) scanning, searching for WLAN, selecting a network, and confirming choices. WLAN is a group of collocated computers that form a network based on radio transmissions rather than a wired connection (Cisco, 2024).

Oulasvirta *et al*. (2011) stated that mobile phone consumers have different proficiency levels – novice, casual users, and experts. Casual users learn through routine use, such as familiarizing themselves with a new phone or following media content about their phone. Experts engage in more systematic learning. Lastly, Novice consumers perform unnecessary actions compared to the other two, who tend to evaluate options less frequently. For example,

during a video capture task, novices struggled to find the correct button on the side of the phone and mistakenly used the secondary camera, while casual users and experts did not face the same difficulty (Oulasvirta *et al*., 2011)

Another study by Lyons, Kass-Hanna, and Liu (2022) highlights a few measures of mobile phone proficiency. One study by Lyons and Kass-Hanna (2021) measures mobile phone proficiency by these six indicators, which include sending or receiving calls, sending, or receiving text messages, sending, or receiving photos, browsing, or using the internet, downloading music videos or games, making financial transactions, and using networking sites. These indicators collectively gauge a consumer's usage in essential communication, multimedia engagements, and online activities and online proficiency in using a mobile phone as an integrated tool for everyday living. The studies by Oulasvirta *et al*. (2011) and Lyons, Kass-Hanna, and Liu (2022) offer differing perspectives on mobile phone proficiency. Oulasvirta *et al.* (2011) delve into the qualitative aspects, examining consumer learning patterns and behaviours, emphasizing understanding of device function and task navigation. For example, the study explored how users discovered new features on their phones through trial and error, the study further analysed how they adapted to changes in the interface after software updates.

Meanwhile, Lyons, Kass-Hanna, and Liu (2022) take a quantitative approach, proposing specific indicators to measure mobile phone proficiency. While Oulasvirta *et al.* (2011) study provides insights into cognitive processes, Lyons, Kass-Hanna, and Liu's (2022) framework offers a comprehensive method for assessing mobile phone proficiency, which aligns with the research objective. Next access to mobile money and mobile banking will be reviewed.

3.13.4 MOBILE MONEY AND MOBILE BANKING

Mobile money refers to a financial service provided primarily by telecommunications companies, allowing consumers to perform various financial transactions through mobile phones (Suri, 2017). Mobile money is a financial service that enables consumers to perform various transactions using their mobile phones, such as transfers, payments, and savings (Aron, 2018). The study by Aron (2018) states that mobile money has emerged as an influential tool because it can solve societal issues such as financial inclusion. Financial inclusion refers to consumers accessing valuable and affordable financial products and services that meet their needs (World Bank, 2023). It solves these issues by providing an

alternative means to a traditional bank where consumers can access these mobile money applications from their phones. However, it is important to distinguish mobile money from mobile banking. Mobile banking refers to an online banking service provided by banks to their customers to access their banking accounts for conducting a myriad of transactions using a mobile device, including a mobile phone, smartphone, or tablet, whenever users are connected to the internet (Prahdan, 2024). Mobile money allows consumers to send and receive money with the help of a mobile phone or device. At the same time, mobile banking allows consumers to conduct banking-related transactions or transfers through a banking app (ICICI Bank, 2023). The difference between mobile banking and mobile money are highlighted in Table 3.8.

TABLE 3.8: COMPARISON OF MOBILE MONEY AND MOBILE BANKING.

Criteria	**Mobile Money**	**Mobile Banking**
What is the primary focus?	To provide basic financial services via mobile phone to achieve financial inclusion	To deliver existing banking services via mobile phone to make them easily accessible
Deployed in which countries?	Developing economies	Developed and developing economies
Who is the target customer?	Low-Income population with limited access to financial services	Existing Customers
What is the banking business opportunity?	Little credit provision	Deposit-taking and credit services.
What are examples?	M-Pesa	FNB banking application

Source: Nan (2018).

Table 3.8 shows the difference between mobile money and mobile banking. This study will use mobile banking to measure digital usage. This is because mobile money providers are still emerging in South Africa, with the market still projected to grow (Gilbert, 2023). Mobile money providers in South Africa are few and include MoMo, owned by a telecommunications

company that provides financial services such as Mo Eazi, which allows consumers to manage their finances more efficiently. It allows for payment using a SIM card without the complexities of registering a complete profile (Gilbert, 2023). Another is M-PESA, which is owned by Vodafone, A telecommunications company founded by M-Pesa to allow consumers to transfer money to each other using a sim card (Gilbert, 2023). However, these services are still more limited in South Africa than mobile banking, many consumers are using mobile banking where 44.2 % of South Africans aged 15 years and older use mobile banking (Statista, 2022). This is due to the familiarity of the mobile banking products and easy accessibility as most consumers already have bank accounts with the main mobile banking providers (Statista, 2022).

This study will use mobile banking. Mobile banking in South Africa is available to all consumers with a bank account and mobile device and thus facilitates convenient access to financial services; these services are provided by ABSA, Capitec, FNB, Nedbank, and Standard Bank. These banks are known as top 5 main banks with market penetration of a sizeable portion of the population. These Banks offer mobile banking applications that allow consumers to check their account balance, make national and international transfers, set up scheduled payments, change card limits, cancel, or order a new bank card, apply for, or manage a loan, and other products and services (Burger, 2024).

Firstly, ABSA, a prominent player in the mobile banking sector, introduced its mobile banking platform in 2012, which quickly gained traction with 200,000 transacting subscribers within its inaugural year (Vermeulen, 2012). The ABSA interface is compatible with various mobile phone providers, including Samsung and Huawei (Vermeulen, 2012). Noteworthy features of ABSA's mobile banking products and services encompass functionalities such as Cash Send, Pin Retrieval, Statement Retrieval, Viewing Card Details, purchasing funeral cover, applying for life cover, making EFT payments, and engaging in lottery and Powerball activities (ABSA, 2024).

Moving on, Capitec Bank, another prominent South African institution, unveiled its inaugural mobile banking application in 2014 (Bronkhorst, 2014). Capitec's mobile banking offerings empower consumers to execute various transactions, including peer-to-peer payments, purchasing electricity, settling DSTV accounts, and facilitating cash transfers to family and friends. Additionally, Capitec offers savings tools for efficient money management and credit

products, enabling consumers to monitor their credit rating, adjust card limits, and access funeral cover, mirroring ABSA's comprehensive range of services (Capitec, 2024).

FNB (First National Bank), an industry pioneer, launched its mobile banking application in 2011 (Alfreds, 2011). FNB's mobile banking suite encompasses functionalities such as making payments (including one-off payments and money transfers), accessing detailed balance and transaction history, managing FNB bank cards, and offering a unique feature known as the e-wallet, allowing users to send money to South Africa phone numbers (FNB, 2024).

Nedbank launched its mobile banking platform in 2012 (Tubbs, 2012). The mobile banking application offers different services such as online share trading, corporate batch authorisations. Other similar services as FNB such as send Imali, a cash send service, where Nedbank consumers can send money to each other (Tubbs, 2012). The next section will review mobile and smartphone ownership in South Africa.

Mudzingwa (2020) states that mobile money in South Africa failed to take off in 2012 and 2016 due to competition from mobile banking product providers. However, in 2020, MTN relaunched MoMo, one of the only well-known mobile money providers in South Africa, and there is a jury as to whether it will be a success due to most mobile banking providers in South Africa providing products and services that are present on mobile money Mudzingwa (2020).

As such, the scope of mobile money proficiency may not capture the breadth of digital financial services for consumers in South Africa. However, the prevalence of mobile banking solutions provided by established banks offers a robust alternative to measuring digital literacy. Given the context, this study proposes a shift from focusing on mobile money products and services to mobile banking offerings within South Africa. Therefore, by adapting the framework developed by Lyons, Kass-Hanna, and Liu (2022) to encompass mobile banking products and services, the study will be able to complete its research objective of measuring Fintech literacy. The study will measure indicators such as checking account balances, making national transfers, cancelling, or ordering a new bank card, making QR payments, and authenticating and verifying transactions. The next section will review mobile banking proficiency.

3.13.5 MOBILE BANKING PROFICIENCY

Mobile banking proficiency refers to the usage of banking services and operations through mobile phones or smartphones, allowing consumers to initiate and perform banking tasks remotely (Saikia, 2022). These tasks include checking bank balances, transferring money, purchasing goods and services, managing investments, accessing banking information and statements (Saikia, 2022). Another study by (Hashim, and Hassan, 2023) defines mobile banking proficiency as the usage of banking services 24/7, enabling consumers to conduct transactions remotely through mobile phones or smartphones. This study will define mobile banking proficiency as how well consumers use mobile banking applications to perform a variety of banking tasks such as checking account balances and managing bank transactions.

There are several mobile banking products that can be utilized by consumers using mobile phones. These include updating profile, account services, card services, cheque book services, and tools (Pradhan, 2024). This study aims to measure mobile banking proficiency, aligning more closely with the South African context. Building on Lyons and Kass-Hanna's (2021) approach, this study proposes indicators like navigating the mobile banking interface, performing specific actions within the app, and effectively managing transactions. Unlike other regions with more mobile money options, South Africa's mobile banking landscape is less diverse.

This study will focus on the following mobile banking products and services as used by consumers, being able to open mobile banking applications, finding menu items within banking applications autonomously, initiating transactions without assistance and completing transactions independently through banking applications, correcting errors in transaction details, and reversing or cancelling transactions. To sum up, this study will evaluate individuals' effective usage in managing their finances using mobile banking apps, considering the unique context of South Africa's mobile banking environment. Lyons and Kass-Hanna's (2021) approach study focuses on mobile money and banking, but consumers need to be knowledgeable and use Fintech products. Therefore, this study will include the knowledge and use of Fintech products to measure the Fintech product proficiency in a South African context. Next, the proficiency of Fintech products will be reviewed in detail.

TABLE 3.9: POSSIBLE QUESTIONS FOR MOBILE BANKING PROFICIENCY.

Question Number	**Questions**
1.	I can open a mobile banking application without help from anyone. . Yes . No
2.	I can find a menu item in my banking application without assistance from anyone. . Yes . No
3.	I can initiate a transaction in my mobile banking application without help from anyone. . Yes . No
4.	I can complete a transaction in my mobile banking application without assistance from anyone. . Yes . No
5.	I can correct an error in the amount or phone number of a receipt in my mobile banking application without assistance from anyone. . Yes . No
6.	I can reverse or cancel a transaction in my mobile banking application without help from anyone. . Yes . No

Source: Lyons and Kass-Hanna (2021).

3.14 FINTECH PRODUCTS PROFICIENCY

Millennials and Gen Z need to know more than mobile banking in a South African context to participate in the Fintech Industry successfully. Therefore, this study will include the knowledge level and usage of Fintech products to determine the Fintech product proficiency of the millennials and Gen Z.

In this study millennials and Gen Z will have to be proficient on the following Fintech products: payment applications, cryptocurrency applications, personal financial applications, investment applications, financial robot-applications, peer-to-peer lending platforms. As illustrated in section 2.4 Millennials and Gen Z in South Africa need to be proficient in a range of Fintech products. Payment applications like PayPal and apple pay have reshaped transactions involving payments (Jacobs, 2021). Skinner (2024) highlights that applications such as cryptocurrency allow South African consumers to have greater control of their finances and help them in protecting against inflation. Therefore, South African consumers need to have knowledge and know how to use these Fintech products. The Chartered Financial Analyst Institute (CFA) (2016) released a report that assessed consumers' knowledge of Fintech products and services. It aimed to measure Fintech product proficiency, which included the knowledge level. The report included evaluating consumers' understanding of the use of financial robot advisors, cryptocurrency, and peer-to-peer lending. The CFA Institute (2016) will serve as a guide on how the Fintech knowledge questions will be assessed in this study as it closely relates to the scope of the study.

A study by Nambiar (2022) assessed consumers' knowledge and usage on electronic payment methods, traditional payment methods, and digital payment methods such as the use of payment applications in India. The study consisted of 25 various questions that were specific to consumers within India. This study adopted one of the questions and amended it to be relevant to the South African context.

TABLE 3.10: QUESTION FOR PAYMENT APPLICATIONS.

Payment application	Are you aware of various payment applications? . Paytm	

	. Google Pay . Phonepe . Net Banking	
Adapted question for South African context	Please select one or more payment applications that you are aware of in South Africa. Snap Scan Voda pay Don't know. Fast Pay	

Sources: Nambir, (2022); Thompson, (2023).

Table 3.10 shows one of the questions measuring the awareness of Fintech products. This study will also measure Fintech proficiency and will be referred to usage of Fintech products. In previous studies usage of Fintech products was not measured but focus on factors influencing usage such as perceived usefulness, perceived ease of use, perceived risk, trust, perceived benefit, customer characteristics, and Fintech usage intention (Cahyadi, Tarigan, Masman, Trisnawati, Wijaya, 2024; Slazus, and Bick, 2022). This study does not seek to investigate the influence of factors on usage but how the respondents use the fintech products. Therefore, this study had to develop questions relevant to the usage of Fintech products and services. The questions included usage of Fintech products such as cryptocurrency applications, personal finance applications, investment applications, financial robot-advisors, peer-to-peer lending. The next section will discuss the relevance of millennials and Gen Z. Table 3.11 is presented below which includes questions in measuring Fintech proficiency and assesses consumers experience with different Fintech products and services.

TABLE 3.11: FINTECH PROFICIENCY QUESTIONS

Question Number	**Questions**

1.	Have you ever used a cryptocurrency application to buy, sell, or manage your investments? . Yes . No
2.	Have you ever used a personal finance application to track or manage your spending? . Yes . No
3.	Have you ever used a personal finance application to buy, sell, or manage your investments? . Yes . No
4.	Have you ever used a peer-to-peer lending platform to lend or borrow money? . Yes . No

Source: Lyons and Kass-Hana (2021)

3.15 MILLENNIALS, GEN Z AND FINTECH.

According to Nicholas (2015), millennials are typically defined as individuals born between the early 1981 and the 1996. Gen Z, on the other hand, is considered to include those born in the early 1997 through to 2012 (Schlee, Eveland, Hariach, 2019). It is important to note that Schlee et al. (2019) emphasized that Gen Z is a distinct generation succeeding millennials and not a subset of them. Consequently, Gen Z have similar characteristics to millennials. Numerous studies offer varying insights into these two groups (Nicholas, 2015; Akbar, Gunawijaya,2022)

Millennials and Gen Z play a crucial role in this study because of their unique behaviours and characteristics, especially when adopting and using Fintech products and services. Referred to as digital natives, these generations have grown up in the age of the internet, making them highly familiar and comfortable with technology (Nicholas, 2015; Thompson, 2023). Their

strong commitment to diversity and inclusivity is evident in how they use social media to advocate for various social causes like gender equality and environmental sustainability (Deloitte, 2023; Hastell, 2021).

Millennials and Generation Z are among the first adopters of Fintech solutions, with a particular affinity for digital banking platforms (White, 2023). Past research has consistently revealed that these generational cohorts favour online platforms and mobile banking applications for their financial transactions. This preference is rooted in their propensity to embrace innovative Fintech products and services (Louw and Nieuwenheizen, 2020). The convenience provided by Fintech solutions aligns seamlessly with the digital lifestyles of both millennials and Generation Z, making these technologies an ideal fit for their banking needs.

Fintech has significantly influenced the investment landscape for Millennials and Generation Z. One notable development is the rise of robot-advisors. These algorithm-based digital platforms provide investment advice, which has gained substantial popularity among these generations (Iacurci, 2020). Millennials and Generation Z particularly value the cost-effectiveness of robot-advisors, which has made investing accessible to a broader and more diverse demographic.

Fintech has played a pivotal role in reducing the financial literacy gap among Millennials and Generation Z. Many Fintech platforms offer a range of educational resources and interactive tools designed to enhance users' understanding of financial management (Nguyen, 2022). Additionally, a study conducted by Samushonga (2022) highlights that South Africa has made significant investments in education, with a growing interest in educational technology. Prior research has consistently demonstrated that Fintech exerts a substantial influence on Millennials and Generation Z, reshaping the way they interact with financial services.

The significance of this study lies in their preference for digital banking and Fintech solutions. Understanding their preferences is crucial for companies catering to these tech-savvy generations (Deloitte, 2023). Millennials and Gen Z's comfort with digital technologies highlight the need to focus on their needs and preferences in Fintech, presenting an opportunity to address the financial literacy gap and shape the future of financial services (Deloitte, 2023; Liebenberg, 2023). The next section will provide a summary of the chapter.

3.16 SUMMARY

One of the secondary objectives of this study was to provide an overview of Fintech literacy. To achieve this objective, this study provided an overview of critical topics on Fintech literacy. The concept of Fintech literacy and the components of Fintech literacy and Fintech literacy levels from previous studies were discussed. After that, the study provided a foundational framework to measure Fintech literacy, which comprises financial and digital literacy. Financial literacy and its importance were reviewed in detail, as well as the components that make up financial literacy. These components consisted of financial skill, knowledge, and capability. The study then looked at how financial literacy would be measured, these measurements included interest rates, inflation, and risk diversification.

The study further looked at digital literacy, discussing its definition and reviewing the components of digital literacy which are digital access and digital usage. The measurements within digital literacy, which include ownership of a mobile phone, a smartphone, and mobile banking proficiency. The study further looked at the ownership of mobile phones and smartphones in South Africa. And the major mobile banking providers in South Africa. The study also suggested that reviewing ownership of a mobile phone, and a smartphone was not enough to measure the Fintech literacy. This study goes beyond that by including Fintech product proficiency. Fintech product proficiency measures the knowledge and usage of consumers on the different Fintech products and services from chapter 2.4.

After that, Fintech's impact on millennials and Gen Z was reviewed, and the study found that millennials and Gen Z are the two generations that widely adopt these Fintech solutions and have positive attitudes and behaviours toward these solutions.

Lastly, the study explained that due to the impact of Fintech on millennials and Gen Z and their characteristics, it will focus on Fintech literacy influence on millennials and Gen Z as the target population. The next chapter will discuss this study's research methodology and design.

CHAPTER 4
RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

This chapter's primary objective is to develop a context-specific measurement instrument of Fintech and to measure the level of Fintech literacy among Millennials and Gen Z in the Eastern Cape. The previous chapter explored the concept of Fintech literacy, outlined a framework for Fintech literacy, and provided an overview of Millennials and Gen Z. This chapter focuses on identifying the research design and methodology necessary for collecting primary data from Millennials and Gen Z. Accordingly, this chapter aims to achieve the study's secondary objective, developing a questionnaire to create a valid and reliable instrument for measuring Fintech literacy. This requires a literature review of the research methodology to select the most appropriate research methodology and techniques to achieve the secondary objective.

To establish the study's research design and methodology, this chapter will begin by discussing the research paradigm, design, research approach and methodology. After that, the study will explore sampling techniques, the questionnaire design, data collection methods, data instruments, and measurement procedures, which are part of the research methodology. Then, the ethical considerations and data analysis techniques used in this study will be discussed. Lastly, the chapter will end with a summary.

4.2 RESEARCH PARADIGM

Ulz (2023) states that a research paradigm comprises the beliefs and assumptions that structure a research study. Several research paradigms exist, with the main philosophies being pragmatism, positivism, realism, and interpretivism (Saunders, 2015). A pragmatic paradigm argues that the research question is crucial when choosing a philosophy. Pragmatism considers all approaches and critiques each to identify the best paradigm for answering the question (Park, Konge and Artino, 2020).

The positivist paradigm relies on measurement and reason, where knowledge is revealed through neutral and measurable observation (Comte and Bridges, 2015). Park, Antino, and Konge (2019) define the positivist paradigm as the idea that there is a single, objective reality

that can be measured. It uses structured methods, like forming a hypothesis and testing it through experiments, to find cause-and-effect relationships. Realism, closely related to positivism in epistemology, also assumes a scientific approach to knowledge development, viewing reality as objective truth (Ugwu, Ekere, and Onoh, 2021).

In contrast, an interpretivist paradigm holds that reality is subjective, multiple, and socially constructed (Pervin and Mokhtar, 2022). Interpretivism suggests that reality differs from person to person and is influenced by individual beliefs, backgrounds, and experiences (Gemma, 2018).

Table 4.1, adapted from Collis and Hussey (2017), presents a typology of assumptions across a continuum of paradigms, highlighting the differences between the key paradigms.

TABLE 4.1: TYPOLOGY OF ASSUMPTIONS ON A CONTINUUM OF PARADIGMS

Positivism ⟷						**Interpretivism**
Ontological l assumption	Reality as a concrete construct	Reality as a concrete construct	Reality as a contextual field of information	Reality as a realm of symbolic discourse	Reality as a social constructio n	Reality as a projection of human imagination
Epistemology logical stance	To construct positivist science	To build systems, processes , change	To map context	To understan d patterns of symbolic discourse	To understand how social realities are created	To obtain a phenomenon n-logical insight, revelation
Research Methods	Experiments, surveys	Historical l analysis	Interpretiv e contextual analysis	Symbolic analysis	Hermeneuti cs	Exploration of pure subjectivity

Source: Collins and Hussey (2017).

As highlighted in Table 4.1, the positivist paradigm emphasises research methods such as experiments and surveys, while the interpretivism paradigm explores subjective reality. The primary goal of the positivist paradigm is to "formulate abstract and universal laws on the operative dynamics of the social universe" (Turner, 2001). It focuses on experimentation, observation, control, measurement, reliability, and validity (Nel, 2016).

This study, which measures the level of Fintech literacy among Millennials and Gen Z, is based on an independent, objective, and measurable topic without researcher involvement. Therefore, a positivist paradigm is employed, aligning with a quantitative research design by collecting primary data via a survey questionnaire. The following section will discuss the research design used in this study and compare it to other potential designs.

4.3 RESEARCH DESIGN

There are two main types of research designs: qualitative and quantitative. Qualitative research design seeks an in-depth understanding of social phenomena within their natural setting (Hoover, 2021). Instead of relying on logical and statistical procedures, qualitative research uses multiple inquiry methods to study human experiences and behaviour (Hoover, 2021). The data types used in qualitative research are typically non-numerical, capturing information through words, images, audio, and narratives. These can be collected through interviews, focus groups, observations, and document analysis (Kirstein, 2014). According to Hoover (2021), qualitative research is often conducted with smaller, non-random samples selected based on the specific purpose of the study. Sampling methods commonly used in qualitative research include purposive sampling, which involves selecting respondents with relevant characteristics, and snowball sampling, where initial respondents refer to others who meet the study's criteria, creating a "snowball" effect (Gill, 2020).

Saunders (2015) outlines several standard data analysis approaches in qualitative research. These include thematic analysis, which identifies and reports patterns in data, typically collected from interviews or focus groups; narrative analysis, which focuses on the stories respondents share and examines their structure and content; and grounded theory analysis, used to develop a theory based on the findings from the collected data.

A quantitative research design involves gathering numerical data to conduct sophisticated statistical analyses that reveal patterns and relationships within the data (Coghlan and Brydon-Miller, 2014). This design aims to understand the social world by examining questions related to a specific population, referred to as a social population (Allen, 2017). Quantitative data typically includes ratings, statistics, quantities, or frequencies and is collected through experiments, surveys, or structured observations (Kirstein, 2014). Unlike qualitative research, quantitative research requires larger sample sizes to ensure statistical significance and provide higher confidence levels (Hoover, 2021). Various sampling methods are commonly used, such as random sampling, which ensures every individual has an equal chance of being selected; stratified sampling, which divides the population into subgroups and samples from each stratum; and systematic sampling, where every nth individual from the sample is selected (Gill, 2020). According to Mohajan (2020), quantitative research often employs data analysis methods such as descriptive analysis, which summarises data using statistics like means, frequencies, or percentages; inferential analysis, which makes assumptions about a population based on sample data using techniques such as regression analysis, t-tests, and ANOVA; and correlation analysis, which determines the strength and direction of relationships between variables.

This study employed a quantitative research design, chosen to align with the study's positivist paradigm. Surveys were used to collect primary data from a sample of 368 respondents to address the research question effectively. The study will further explore the study research approach.

4.4 RESEARCH APPROACH

A study's research approach is established by how the researcher can move from theory to data or from data to theory, depending on how clear they are about the theory from the beginning of the research project (Mulisa, 2022). The approach chosen outlines the logical process that informs the research design and influences how the research question is addressed (Saigo and Roundy, 2023). The two main research approaches discussed in depth are deductive and inductive.

This study used a deductive research approach. A deductive research approach follows a logical process where the researcher begins with an existing theory, formulates a hypothesis, and then tests it through empirical observation. According to Robson (2002), deductive

research has five sequential stages, starting with deriving a hypothesis from the study's theoretical framework. A hypothesis is a specific prediction about the expected relationship between variables, indicating anticipated outcomes, while a theory is broader and provides a framework for understanding complex phenomena (Saunders, 2015). This study investigates Fintech literacy among Millennials and Gen Z. The second stage involves expressing the hypothesis in operational terms, clarifying the relationships between variables. (Monsen, Westra, Yu, Ramadoss and Kerr, 2009). The essential items that could influence the outcome of this study include each respondent's financial literacy level, digital literacy, mobile banking proficiency, knowledge of Fintech products, and usage.

The third stage is testing the operational hypothesis through data collection and analysis (Sik, 2015). The data collected in this study underwent quantitative analysis, providing measurable results regarding the relationship between the variables (Monsen et al., 2009). The final stage involves examining the results to determine whether the hypothesis is supported or rejected. If the hypothesis is rejected, it must be revised based on the findings (Azungah, 2018). Mulisa (2022) suggests that deductive approaches align well with positivist paradigms, as they emphasise objectivity, measurement, and testing.

In contrast, an inductive research approach starts with data collection and moves toward developing a theory (Saunders, 2015). The process typically unfolds in four stages, beginning with data collection through interviews, observations, or case studies (Soiferman, 2010). Data collection involves gathering information to answer research questions, test hypotheses, or evaluate results (Sik, 2015). The second stage involves identifying themes or patterns within the collected data (Mulisa, 2022). Patterns may include outliers, trends, or causal relationships (Soiferman, 2010). The third stage is developing a theory based on the identified patterns (Saunders, 2015). In the final stage, the newly developed theory is validated through analytical induction, an iterative process of refining and testing explanations for observed phenomena (Katz, 2001). Inductive approaches are more suitable for interpretivist paradigms, which emphasise understanding subjective experiences and social contexts (Mulisa, 2022).

In this research project, it has already been theorised that Millennials and Gen Z are digital natives with extensive exposure to technology and the internet. These theories were translated into a hypothesis, which was then tested and evaluated to determine its validity. This study is grounded in a positivist paradigm, so the deductive research approach is the most logical

choice for this project. The study explored various quantitative research designs, including non-experimental, experimental, quasi-experimental, causal-comparative, and correlational designs, providing an in-depth review of their applicability and relevance to the research.

4.5 QUANTITATIVE RESEARCH DESIGNS

There are various quantitative research designs, including non-experimental research design, experimental design, quasi-experimental research design, causal-comparative research design, and descriptive research design (Costantini, Massimo, Higginson, 2007). This section of the study will review each type of quantitative research design and adopt a suitable one to collect and analyse data.

Non-experimental research design refers to studies that do not involve manipulation of an independent variable or random assignment of participants (Kotronoulas & Papadopoulou, 2023; Lobmeier, 2010). In such designs, researchers observe and measure variables as they naturally occur, without attempting to influence the outcomes. Key characteristics include the absence of established causal links between variables, reliance on prior or naturally occurring events, and the fact that the research does not interfere with the phenomena being studied (Adam, 2024). This study employed a non-experimental approach because it aimed to describe and measure Fintech literacy among Millennials and Gen Z, focusing on observing existing knowledge, behaviours, and trends rather than testing interventions.

A quasi-experimental research design is a design that is like an experimental research design, where the main difference is that there is no control group, no random selection, and no active manipulation (Schweizer, Braun, Milestone, 2016). The quasi-experimental design also refers to an actual experiment that does not include a random assignment of subjects (Farnell and Kowalcyzk, 2023). The main characteristic of quasi-experimental design is that the research design cannot prove causation between variables (Farnell and Kowalcyzk, 2023). Due to the quasi-experimental research design not employing a random assignment of respondents into groups, this could result in biased results that would not accurately reflect the impact of varied factors.

Causal-comparative research design is used to identify cause-and-effect relationships between independent and dependent variables (Lawrence, 2023). Another definition of causal-comparative design by Costello (2023) states that it is a research design aimed at identifying

and analysing causal relationships between variables where the researcher does not have control over the active manipulation of variables. Costello (2023) further states that the main characteristics of causal comparatives are that there is non-manipulation of variables, researchers analyse the subjects as they present themselves, and the other characteristic is that researchers do a historical analysis to understand what causes differences between subjects.

Descriptive research design focuses on systematically describing the characteristics, behaviours, and trends within a population by addressing "what," "how," "where," and "why" questions (Bazaman, 2025). It involves methods that capture and summarize the essential attributes of the variables under study (Voxco, 2025). Key features of this design include the use of quantitative approaches to collect measurable data, allowing for statistical analysis and clear representation of population patterns (Singh, 2023). This design was appropriate for the study as it examined and explained the key characteristics of the target population, providing insights into demographic distributions, educational backgrounds, and employment statuses. Once the descriptive research design has been established, an appropriate sampling technique needs to be identified to test the theories produced by the study. Finally, it will be developed. The following section will review the sampling technique employed in this study.

4.6 SAMPLING

Sampling is the process through which individuals or sampling units are selected from the sample framework (Dermatol, 2016). Population refers to the entire group of individuals the researcher is interested in drawing conclusions about (Barreiro and Albandoz, 2001). The targeted population of this study are Millennials and Gen Z in the Eastern Cape. Millennials, also known as Generation Y, were born between 1981 and 1996 (Dimock, 2019). They are typically characterised as being tech-savvy growing up around the rise of the internet, cell phones, personal computers, and initial stages of social media and often tend to value experiences over materialism. At the same time, Gen Z refers to individuals who were born between 1997 and the early 2010s (Dimock, 2019). They are typically characterised as the first generation to grow up with widespread access to the internet, smartphones, and social media from their early youth. They are known for their adaptability to new technologies (Serbanescu, 2022).

Sampling is used when studying an entire population, which is impractical due to its size, time constraints, and the excessive cost of data collection (Sheppard, 2020). In many cases,

reaching the entire population is not feasible. Therefore, this study relied on a representative sample of the population. Before selecting the sample, it is essential to determine the most appropriate sampling techniques to ensure accuracy and relevance in the findings. Two types of sampling techniques could be used. The first is the probability sampling technique, and the other is non-probability sampling. Probability sampling refers to the selection of a sample from a population when this selection is based on the principle of randomisation (Fleetwood, 2023). Non-probability sampling refers to a randomised method instead of purposive sample selection where no method of probability is absent (Vehovar, Toepoel, Steinmetz, 2016).

Although non-probability sampling is more common in qualitative research, it can still be used in quantitative research under certain circumstances, such as limited population access, when time and resources are limited or when the population is assumed to be homogeneous (Saunders, 2015). Limited population access occurs when it becomes challenging to reach the population and there is no sampling frame. To help mitigate this issue, surveys were conducted online to help connect with the intended population. Due to the limited funding for this research project, travelling physically to the Eastern Cape would be impractical as time and resources are limited. Lastly, the study makes assumptions about the homogeneity of the Millennial and Gen Z populations, assuming similar characteristics and experiences shared across the different age groups. Therefore, this study employed a non-probability sampling technique to collect data.

The diverse ways to sample using non-probability sampling include quota, judgemental, snowball, self-selection, and convenience sampling (Fleetwood, 2023). This study employed judgmental and snowball sampling, both of which follow the positivistic paradigm. Judgemental sampling (also known as purposive sampling) selects only respondents who exhibit specific characteristics or traits that align with the purpose of the research (Sheppard, 2020). Snowball sampling refers to sampling that selects respondents who meet the study's objectives and then requires these respondents to refer to other respondents they would think meet the criteria, resulting in a snowball effect (Gill, 2020). The researcher would start with a small group called "seeds," and the indirect referrals that would make up the sample are referred to as part of the snowball (Gill, 2020).

This study employed snowball sampling as it can effectively access hard-to-reach respondents within the population, including respondents living in remote areas or villages (Gill, 2020).

Snowball sampling also has the potential of producing an increased response rate as individuals become more willing to participate when a post is shared by someone they know and can trust, which will result in the sample growing organically based on the participant's network (Fleetwood, 2023). Judgemental sampling was employed. This sampling method allows respondents to be selected based on specific characteristics important to the research objectives (Elfil, 2017). In this study, judgmental sampling targeted sub-groups within the Millennial and Gen-Z populations of the Eastern Cape, specifically respondents between 18 and 43. To participate in the questionnaire, respondents were required to own a mobile phone and use at least one mobile banking application; digital access was a key requirement for Fintech usage. Lastly, the respondents must reside within the Eastern Cape. These two sampling methods ensured a well-defined sample with a high degree of relevance to the study's primary objective.

The sample size measurement developed by Krejcie and Morgan (1970) was employed to determine the sample size for this study.

The equation is as follows:

$$S = \frac{X^2 NP(1-P)}{d^2(N-1)+X^2P(1-P)} \quad \text{.....(1)}$$

The inputs of the equation are as follows:

S = Sample of the study

X2 = Table value of chi-square for 1 degree of freedom at the desired confidence level (usually 3.841 for a 95% confidence level)

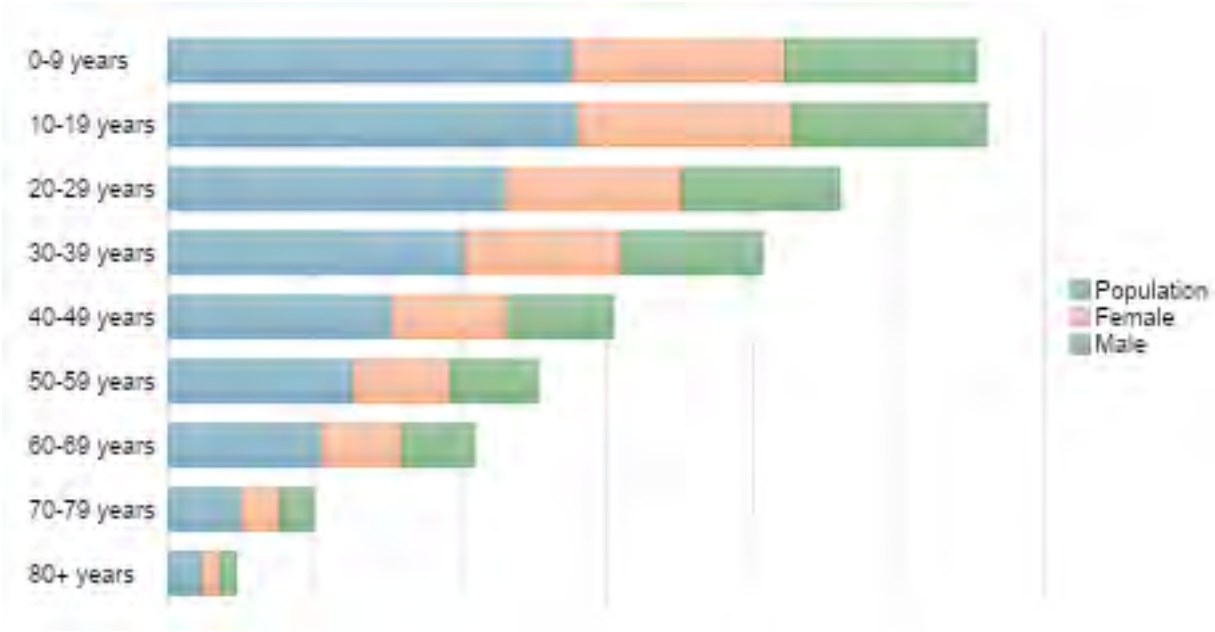
N = Population size

P = Population proportion (assumed to be 0.5, as this provides the maximum variability)

d = degree of accuracy (the margin of error, often set at 0.05)

Krejcie and Morgan (1970) state that there is no need to use the formula to calculate the sample size, as a table is available to determine it. **See Annexure C**

FIGURE 4.1 2022 AGE AND GENDER DISTRIBUTION OF THE EASTERN CAPE POPULATION



Source: City Population (2022)

This stacked chart is a source for the targeted population size for Millennials and Gen Z in the Eastern Cape. This information is sourced from City Population, a data platform that compiles demographic and statistical data on populations for cities, countries, and regions worldwide. The City Population database aggregates information from census bureaus. City Population (2024).

When analysing this stacked bar chart, it is important to note that the Gen Z population are between 14 and 27, and Millennials are between 28 and 43 (Kurz, Li, and Vine, 2019). City Population (2022) released a population development report across South Africa and various parts of the world. When filtering the report to the Eastern Cape, we derived the results in Figure 1. This study used the sum of the Gen Z and Millennial distributions for the population size. Based on the report, the population consisted of 2,927,791 Gen Z and Millennials. According to Krejcie and Morgan (1970), if the population size is more significant than 1,000,000, the required sample size is 384 respondents. Therefore, the targeted sample size for this study is 384 respondents.

4.7 DATA COLLECTION

This study used primary and secondary data to help achieve the research objectives. Primary data refers to data a researcher collects for the first time (Ajayi, 2023). In contrast, secondary

data refers to data collected or produced by others (Ajayi, 2023). Ajayi (2023) further states that primary data is collected through observations, experiments, questionnaires, and personal interviews. In contrast, secondary data typically includes websites, journal articles, government publications, and internal records. In terms of secondary data, this study used a combination of journal articles, websites, and government publications to develop a literature review and achieve the study's secondary objectives. The secondary data was collected from the Rhodes University library database, which is available online.

To delve deeper into primary research, this study used an online questionnaire. This method is widely regarded as one of the most popular, cost-effective, and efficient ways to gather data (Singh and Sagar, 2021). The questionnaire was developed using Google Forms, offering easy access and efficient data collection. Online questionnaires capture information about a population's behaviours and actions. The process involves several key steps: designing the questionnaire, selecting the appropriate platform for distribution, disseminating the questionnaire, and ensuring respondents are informed that their answers are secure, and their privacy is protected (Regmi, Waithaka, Paudyal, Simkhada, and Teijlingen, 2016).

Google Forms is the chosen platform for the study's data collection process as it allows sharing questionnaires with hundreds of people in real-time. Additionally, responses are stored in a Google sheet, enabling the data to be exported seamlessly into spreadsheets for further analysis (Edelmayer, 2020). Upon completion of the study, all online questionnaires were stored in an encrypted zip folder and transferred to a supervisor for review and safekeeping. Social media was used to distribute the link to the online questionnaire using platforms such as GMAIL, Facebook, LinkedIn, and X. According to Howard (2021), the advantages include increased response rates, lower costs, and greater convenience. These benefits are beneficial for researchers, as they make it easier to access the target sample. Since many individuals spend considerable time online, online questionnaires can be highly effective. Similarly, Ramalepe (2024) highlights the high dependency on smartphones in South Africa, where many users spend much time online. Howard (2021) also highlights some disadvantages, such as potential cooperation issues and the need for an interviewer to assist respondents with any queries. This study addresses these concerns by providing clear instructions within the online questionnaire on how respondents should answer the questions. Additionally, contact information for the researcher and supervisors was provided, ensuring respondents can reach out if they have any questions.

An online questionnaire can collect data through open-ended and closed-ended questions. According to Shukla (2023), open-ended questions probe respondents to provide more than a single-word answer; these questions usually begin with 'what,' 'how,' and 'why.' In contrast to close-ended questions, the respondents face a specific range of answers and are not required to answer more than what is asked (Taherdoost, 2022). This study used close-ended questions to collect its primary data. The study also used Lyons, Kass-Hanna, and Liu (2022) as a guide for asking questions based on demographic factors, financial literacy, and digital literacy.

4.8 QUESTIONNAIRE DESIGN

This study used close-ended questions to collect its primary data. The questionnaire involved a specific question that analysed the study's components (See Appendix A for Questionnaire). The Fintech Literacy components that comprise the framework of the study were used as a guide to formulate the online questionnaire for the study. Section A of the questionnaire consisted of questions related to the respondents' demographic factors, which were five questions in total. Section B consisted of six questions related to financial literacy concepts. Section C consisted of nine questions on digital literacy. Section D consisted of six questions related to mobile banking proficiency. Section E refers to knowledge of Fintech products, which are six in total. Lastly, Section F consists of four questions about Fintech proficiency. Each section was considered to address the study's main research question, ensuring a comprehensive evaluation of Fintech Literacy among respondents. The following section will look at the study's questionnaire design.

The questionnaire consisted of six sections: Section A: Demographic information, Section B: Financial literacy, Section C: Digital literacy, Section D: Mobile Banking proficiency, Section E: Knowledge of Fintech products and Section F: Fintech proficiency. Section A of the questionnaire consisted of questions related to the respondents' demographic factors, such as questions based on age groups, gender, employment, and income sources, were asked. These demographic questions uncovered trends, patterns, and variations in Fintech Literacy across diverse groups. These demographic questions were also included to ensure that the sample is represented by the Millennial and Gen Z populations. See Annexure A for a copy of the questionnaire.

Section A used a nominal and ordinal scale. A nominal scale is a measurement scale in which numbers serve as labels only to identify or classify a question. This measurement is usually for non-numeric quantitative variables (Bhat, 2024). An ordinal scale refers to a second level of measurement that reports the ranking and ordering of data without establishing the degree of variation between them (Bhat, 2024). The factors that used a nominal scale included gender and race. The ordinal scale factors included age, educational level, and employment status.

TABLE 4.2: FINANCIAL LITERACY QUESTIONS

1. Knowledge area: Interest Rates	Suppose you need to borrow an amount of R100. Which option would cost you less in terms of repayment amount? A. Borrowing R100 with no additional charges B. Borrowing R100 with an additional charge of 3% C. Borrowing R100 with an additional charge of 5% D. Do not know
2. Compound Interest 1	Suppose you deposit R5000 each year in the bank for two years, and the bank adds 10% of interest per year to the bank account. How much interest will you earn in the second year?
3. Compound Interest 2	If you have R100 in a savings account, and the bank adds 10% per year, how much money will you have after five years?
4. Inflation	If the prices of a basket of food double over the next 10 years, and your income doubles, will you be able to buy: If the prices of a basket of food double over the next 10 years, and your income doubles, will you be able to buy:

	A. The same basket of food B. More food in the basket C. Do not know D. Less food in the basket
5. Diversification	Is it safer to put your money into shares or investments?
6. Knowledge area: Financial Capability	I possess the necessary financial knowledge and skills to manage my finances well.

Source: Researchers construct

Table 4.2 shows all the questions related to financial literacy. Section B comprised six questions designed to assess critical financial literacy concepts. It evaluated respondents' knowledge of interest rates (1 item), compound interest (2 items), inflation (1 item), and diversification (1 item). Respondents who selected fewer than 50% of the correct answers were classified as having low financial literacy, those with precisely 50% correct were categorised as having moderate financial literacy, and respondents scoring above 50% were considered to have high financial literacy levels. All five items followed a nominal scale.

Table 4.2 shows an additional question on financial capability, measured by respondents' self-assessed ability to manage their finances effectively. This question used a Likert scale, a rating scale designed to measure respondents' attitudes or motivations (George, 2024). The Likert scale is commonly used in close-ended questionnaires to capture levels of agreement or disagreement. For this study, the Likert scale was employed to gauge respondents' confidence in their financial management skills, with responses ranging from Strongly Disagree to Strongly Agree. Specifically, the financial capability question utilised a 5-point Likert scale structured as follows: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), and Strongly Agree (5).

The following section will discuss the digital literacy component of the study. The next section of the questionnaire, Section C, consisted of 9 questions on digital literacy. Section C is divided into two content areas: access and usage. Mobile access was measured by ownership of a mobile device or a smartphone (2 items). Mobile access questions employed

a dichotomous scale. A dichotomous scale is a scale that can have two answers, either yes or no (Bhupalam, 2019). This scale is suitable as it helps uncover respondents' direct ownership of a mobile device or a smartphone. Table 4.3 shows the statements used to measure mobile access on a Dichotomous scale (yes/no).

TABLE 4.3 MOBILE ACCESS (OWNERSHIP) QUESTIONS

1. Smartphone Ownership	Do you own a smartphone?
2. Mobile phone ownership	Do you own a mobile phone?

Source: Researchers Construct

Table 4.4 shows that usage was measured using mobile phone proficiency. Mobile phone proficiency measured how well respondents could navigate and use a mobile phone. This section also employed a dichotomous scale (Yes/No). The questions are recorded in Table 4.4.

TABLE 4.4: MOBILE PHONE PROFICIENCY QUESTIONS

Question 1	Have you used a mobile phone in the past 90 days to call or receive calls?
Question 2	Have you used a mobile phone in the past 90 days to send or receive text messages?
Question 3	Have you used your mobile in the past 90 days to send or receive files in various formats (e.g., PDF, Word, or Excel)?
Question 4	Have you used a mobile phone in the past 90 days to browse or use the internet?
Question 5	Have you used a mobile phone in the past 90 days to download music, videos, or games?
Question 6	Have you used a mobile phone in the last 90 days to make a financial transaction, such as sending/receiving money, making a payment, or banking transaction?

Question 7	Have you used a mobile phone in the last 90 days to use Facebook, WhatsApp, Twitter, Instagram, TikTok, or any social media site?

Source: Researchers Construct

Section C utilised these questions to assess the digital literacy levels of respondents. Individuals who reported having access to a mobile device and frequently using their devices to complete the tasks outlined in the mobile phone proficiency section were classified as having high levels of digital literacy. Respondents who reported having access to a mobile device and answered more than 50% of the usage questions correctly were considered to have high levels of digital literacy. Conversely, respondents who reported not having access to a mobile device and answered 50% or fewer of the usage questions correctly were classified as having lower levels of digital literacy. Next, section D of the questionnaire will be reviewed.

Section D consisted of six questions on mobile banking usage, known as mobile banking proficiency. This section measures how respondents will use and navigate around various banking applications. The question design used dichotomous scales. As do most of the usage questions in this study. Table 4.5 shows the Dichotomous scale (Yes/No).

TABLE 4.5 MOBILE BANKING PROFICIENCY

Question 1	I can open a mobile banking application without help from anyone.
Question 2	I can find a menu item in my banking application without assistance from anyone.
Question 3	I can initiate a transaction in my mobile banking application without help from anyone.
Question 4	I can complete a transaction in my mobile banking application without assistance from anyone.
Question 5	I correct an error in the amount or phone number of a receipt in my mobile banking application without assistance from anyone.
Question 6	I can reverse or cancel a transaction in my mobile banking application without help from anyone.

Source: Researchers Construct

Table 4.5 outlines the structure of the questions designed to assess mobile banking usage. Respondents who select the Yes option demonstrate their ability to navigate and utilise mobile banking applications effectively. Respondents who answer more than 50% of the questions with Yes are considered to have a good understanding of how to utilise banking applications. In contrast, those who select the No option for more than 50% of their answers are considered to have a low understanding of how to utilise these applications effectively.

Section E consisted of 6 questions measuring knowledge of Fintech products. The questions measured awareness and knowledge of payment applications (items), cryptocurrency (items), financial robot-advisors (items), and peer-to-peer lending (items). The scale used in section E is nominal. This scale works best for Section E, as no ranking or order is necessary for the questions in this section.

TABLE 4.6: KNOWLEDGE OF FINTECH PRODUCTS QUESTIONS

Question 1	How familiar are you with automated financial advice tools such as robot advisors? 1. Very Familiar 2. Somewhat familiar 3. Somewhat unfamiliar 4. Not at all familiar
Question 2	Please select one or more payment applications that you are aware of in South Africa. 1. Snap Scan 2. Voda pay 3. Do not know. 4. Fast Pay
Question 3	What do you think is a key advantage of using financial robot-advisors compared to human advisors? 1. Lower fees and minimal human intervention 2. Greater need for in-person appointments 3. Less personalised advice interaction

	4. Do not Know
Question 4	What is the best way to describe peer-to-peer lending? 1. It allows consumers to borrow money from each other. 2. It allows institutions to borrow money from a group of consumers. 3. Do not know. 4. It allows institutions to borrow money to other institutions
Question 5	Select the most popular investment application in South Africa. 1. Do not know. 2. Easy Equities 3. Johannesburg Stock Exchange 4. Tyme Bank
Question 6	Select one benefit of using cryptocurrency. 1. It increased control over one's finances and direct transactions between users. 2. Do not know. 3. It increases dependence on intermediaries for transactions and slower processing times. 4. It offers a higher level of anonymity and can be less traceable compared to traditional transactions.

Source: Researchers Construct

Table 4.6 presents the questions in Section E. Respondents with higher levels of knowledge of Fintech products are more likely to select the correct answers to the knowledge-based questions. In contrast, those with higher awareness of Fintech products will choose the appropriate responses to the awareness-based questions. This distinction is a valuable tool for assessing and monitoring Fintech literacy levels. Respondents who answered 50% or more of the questions correctly in Section E are considered to have higher levels of Fintech knowledge than those who answered 50% or more of the questions incorrectly.

Section F consisted of four questions based on how well respondents can use Fintech products, known as Fintech proficiency. The questions included questions on payment applications (items), cryptocurrency (items), financial robot-advisors (items), and peer-to-peer lending (items). Table 4.8 shows the structure of the questions. This section used a dichotomous scale (YES/NO) to uncover the respondents' Fintech usage levels.

TABLE 4.7: FINTECH PROFICIENCY QUESTIONS

Question 1	Have you ever used a cryptocurrency application to buy, sell, or manage your investments?
Question 2	Have you ever used a personal finance application to track or manage your spending?
Question 3	Have you ever used a financial robot-advisor to buy, sell, or manage your investments?
Question 4	Have you ever used a peer-to-peer lending platform to lend or borrow money?

Source: Researchers Construct

Table 4.7 shows the questions in Section F. Respondents who selected No as their primary response for more than 50% of the questions in Section F indicate that they have low usage levels of Fintech products. In contrast, respondents who selected Yes for 50% or more of the questions suggested they had high usage levels of Fintech products. The following section will review the ethical considerations.

4.9 ETHICAL CONSIDERATIONS

Ethical considerations guide research designs (Bhandari, 2023) due to the nature of research probing human respondents on natural life phenomena. Therefore, ethical considerations need to be established in how these questions are asked. Ethical consideration is there to enhance research validity, maintain academic integrity, and protect the rights of the respondents (Bhandari, 2023).

Research study adhered to these principles in several ways. First, to maximise benefits and minimise risks, the study was designed to contribute valuable insights into Fintech literacy research in a South African context while ensuring that any potential risks to respondents,

such as misuse of data, are mitigated; once the online questionnaires had been collected, this data was secured within a password protected Zip file and kept by the supervisor of this study. Second, the rights and dignity of respondents were upheld by treating them with respect throughout the process and ensuring their privacy was protected. Respondents were not requested to submit any confidential information that could be deemed sensitive, such as personal identification numbers, home addresses, or financial account details. Third, voluntary participation was emphasised by informing respondents that they are not obligated to participate and may withdraw at any time.

This study obtained permission from the Rhodes University Ethics Committee to distribute questionnaires and collect data from the respondents. An application was sent through the Ethical Review System (ERAS), an online system, to obtain permission to conduct research studies. Ethical clearance was obtained, see Annexure B.

4.10 DATA ANALYSIS

Data analysis comes after data has been collected through the questionnaire. Data analysis involves analysing raw data to conclude information (Frankfield et al., 2023). Raw data, also known as primary data, has yet to be processed (Wright, 2023). Data analysis is also defined as converting gathered data into meaningful information (Taherdoost, 2020). When analysing quantitative data, it is essential to consider the type of data, the format in which data will be input to the analysis software, the impact of data coding on subsequent analyses, the need to weight cases, and methods used to check data for errors (Saunders, 2015).

4.10.1 DATA CAPTURING

The first important consideration is the data input format (Hale and Wakefield, 2012)—respondents who were invited to participate filled in an online questionnaire hosted on Google Forms. From a researcher's perspective, a new form needed to be created for this questionnaire by creating a new form; the researcher then was responsible for customising the form to have titles, descriptions, questions, and sections; choose an appropriate design and theme; review the form for any corrections; and save the form in a Google Drive. The form was then ready for distribution via the various social media platforms. In the summary tab, Google Forms showed aggregate data and charts based on the sample's responses. Individual responses can also be accessed to help create subgroups within the sample. Lastly, all the

responses were downloaded in CSV format. This CSV. The format was converted to a Microsoft Excel Workbook.

The second important consideration is the impact of data coding on subsequent analyses (Fisher and Schneider, 2016). Coding is assigned according to the data types: categorical data and quantifiable data (Phakiti, 2010). Coding categorical data involves identifying the distinct categories within each categorical variable, assigning numerical codes, documenting the coding scheme, and implementing the code (Saunders, 2015). According to Spencer (2015), steps include checking for data accuracy, handling missing values, transforming data, and creating derived variables. However, the study's questionnaire employs a categorical data type with elements from both nominal and ordinal data across various sections of the questionnaire. The results from the survey required a data check for accuracy and a strategy for handling missing values (unless all fields are made mandatory).

The third important consideration is applying methods which can be used to check data for errors (Scherbaum and Shockley, 2015). According to Scherbaum and Shockley (2015), once feedback from the online questionnaire is complete, the data must be cleaned to ensure valid and reliable results. Data cleaning is a process used to detect and correct errors and inconsistencies. Standard methods for data cleaning include missing data handling, outlier detection, logical checks, checking for duplicates, and reviewing the data with consistency checks (Spencer, 2015). Handling missing data involves identifying any missing values and deciding whether to delete incomplete records or impute the data by substituting in values to allow for complete analysis; for example, where fields are blank, a "Null" value can be substituted in its absence (Chu, Ilyas, Krishnan, Wang, 2016). According to Spencer (2015), outlier detection also plays an essential role in checking data for errors in the context of the study we are sampling from Gen Z and Millennial populations. According to Kurz, Li, and Vine (2019), the oldest Gen Zs were born in 1997, meaning that in 2024, they will turn 27, whereas the youngest Gen Z members were born in the early 2010s, making them approximately 14 years old.

Similarly, the oldest Millennials were born in 1981, meaning that in 2024, they will turn 43, whereas the youngest Millennials were born in 1996, meaning that in 2024, they will turn 28 years old (Kurz *et al.*, 2019). An outlier in this data would be a participant who is 43 years old turning 44. Still, they are unaware that they technically are not considered a Millennial,

or a Gen Z born in 1997, assuming they are part of the Millennial population due to their personal life experiences when technically they belong to the Gen Z population. The next step is conducting logical checks. According to Saunders (2015), logical checks ensure that data adheres to predetermined rules and constraints, for example, verifying that age values for Millennials and Gen Z fall within their expected boundaries. The next step involves looking for duplicate records. Duplicate records can skew the data, leading to biased results; this can be addressed by identifying any exact matches across all the rows or finding any fuzzy matching where row records are similar enough to warrant review (Chu *et al.*, 2016). According to Chu *et al.* (2016), if any duplicates have been identified, the duplicated records could be merged, fuzzy records concatenated or deleted depending on the data cleaning needs. The last step for checking data for errors is reviewing the data with consistency checks. Consistency should be reviewed in the data formatting where the formats for dates, currency, or numerical values are uniform according to their data types (Hellerstein, 2013). Consistency in terminology should also be reviewed. For example, categorical data types for gender should either use the terminology "M and F" or consistently use "Female" or "Male."

4.10.2 VALIDITY

This study tested the validity of the questionnaire by using content validity. Firstly, validity is defined as how accurate a measure is (Middleton, 2019). As described by (Heath, 2023), validity in research is the ability to conduct a precise study with the right tools and conditions to yield acceptable and reliable data that can be reproduced. There are several types of validity; these include content validity, face validity, construct validity, internal validity, external validity, criterion validity (concurrent), criterion validity (predictive), statistical validity, grouping validity, and experiential validity (Andersson, Boateng and Abos, 2024). This study used content validity. Content validity is defined as how well an instrument covers all relevant parts of the construct it aims to measure Nikolopoulou (2023). Another definition of Content Validity Ratio (CVR) refers to the extent to which a test measures the construct and the relevancy of the test to the aspects measured (Thorndike and Thorndike-Christ, 2014). A panel of 12 subject matter experts reviewed the questionnaire items to determine whether each item was important for measuring the intended construct.

The following formula was used:

$$CVR = \frac{N_e - \frac{N}{2}}{\frac{N}{2}} \quad \text{.....(2)}$$

Source: Lawshe (1975).

This formula was developed by Lawshe (1975). The following components of the formula mean the following.

CVR = Content validity ratio

N_e = Number of experts indicating essential

N = Total number of experts

A value close to + one (1) indicates a strong agreement among the experts on the importance of the item, while a value of minus one (-1) indicates a strong disagreement (Roebianto, Savitri, Suciyana, and Mubarokah, 2023). The next section will review item analysis.

4.10.2 ITEM ANALYSIS

Item analysis examines and evaluates individual test items to determine their effectiveness and contribution to an overall assessment (Rezigalla, 2022). Another study by Matazu and Julius (2021), defined item analysis as a procedure that is performed after an examination or test is constructed and administered that provides feedback on information on the reliability and validity of the examination or test items. There are three primary analyses to conduct within item analysis: the Difficulty analysis, the discrimination analysis, and the distractor analysis (Rezigalla, 2022) ;(Moses, 2017). Difficulty analysis measures the percentage of people who answered an item correctly (Serpil, Nejdet, Dogan, 2016). In this study, difficulty analysis was calculated to determine the proportion of respondents who correctly answered each knowledge-based question using the formula (Serpil, Nejdet, Dogan, 2016). The formula below shows how to calculate the difficult index

$$P = \frac{Number\ of\ correct\ responses}{Total\ responses} \quad \text{.....(2)}$$

Items with a difficulty index of 40% - 60% were considered appropriately challenging, while values below 0.40 indicated difficult items and values above 0.60 indicated easy items (Quaigrain and Arhin, 2017; Pande, Parate, Nikam, Agrekar, 2013). Difficulty items were applied to both financial literacy and Fintech knowledge questions using Microsoft Excel to determine the P-value scores, and which items should be removed, used for further data analysis. Thereafter, a discrimination analysis will be conducted on the questions.

Discrimination analysis compares the number of high and low scorers who correctly answer an item (Quaigrain and Arhin, 2017). Respondents were divided into high and low groups based on the overall knowledge score. The following formula was used to conduct the discrimination analysis (Lahza, Smith, Khosravi, 2022):

Discrimination Index (DI): $\frac{UG-LG}{N}$ ..... (3)

UG = Upper Group
LG = Lower Group
N = Number of respondents in the larger two groups

The two groups were divided by the upper 27 % (Upper Group) and lower 27% (lower Group) based on the total knowledge scores (Yoon, Bo Hyun, Joonki, Bokyoung, Sangyoung, 2024). Items with a DI $\geq$ 0.40 were functioning satisfactorily. Items with a DI between 0.30 and 0.39 required slight revision. DI scores below 0.30 were marked for revision or removal (Quaigrain and Arhin, 2017). A similar study by Izah, Odubo, Ajumobi, Torru (2021), conducted an item analysis on a 60-MCQ test for first-year microbiology students using the upper and lower 27% method. The study used DI classifications threshold as Quaigrain and Arhin (2017) the classifications where that Items with a DI between 0.30 and 0.39 required slight revision. DI scores below 0.30 were marked for revision or removal The next section will review the studies reliability.

4.10.3 RELIABILITY

This study used Kuder-Richardson formula 20 to measure the studies reliability. Kuder-Richardson formula 20 refers to a statical method specifically designed to assess the internal consistency reliability of instruments with binary response options, such as yes/no (Yun,

Ulang, Husain, 2023). Another study defines the Kuder-Richardson Formula 20, often abbreviated as KR-20, is a measure of internal consistency for measures that feature dichotomous items. As these are measures of internal consistency, they measure the extent to which all the items measure the same characteristic (Ntumi, Agbenyo, Bulala, 2023). The following formula was used to determine KR-20 (Setyaedhi, 2024):

$$KR-20 = \frac{K}{K-1}(1-\frac{\Sigma piqi}{\sigma^2}) \quad \text{..... (4)}$$

Where:

K = total number of test items
pi = proportion of students who answered item *i* correctly
qi = 1-pi (i.e., proportion who answered incorrectly)
Σpiqi = sum of the products of correct and incorrect proportions for each item
σ^2= variance of the total test scores.

The study by Setyaedhi (2024) stated that 0.70 is the minimum requirement for acceptance for the reliability coefficient. Table 4.8 shows the reliability coefficient acceptance levels.
Table 4.8 shows the reliability coefficient acceptance levels.

TABLE 4.8: RELIABILITY COEFFICIENT

Test Reliability Coefficient	**Category**
> 0.90	Very high reliability
0.75 – 0.90	Good reliability
0.50 – 0.75	Medium reliability
< 0.50	Poor reliability

Source: Setyaedhi (2024)

Another study stated that the acceptable reliability coefficient is 0.70 for a short test (Ntumi, Agbenyo, Bulala, 2023). Therefore, in this study, items with a KR-20 reliability coefficient of 0.70 and above will be accepted as reliable. Items with coefficients below this threshold will be reviewed for potential revision or removal to ensure the overall reliability of the instrument. Next, the study will review how descriptive statistics were conducted.

4.10.4 DESCRIPTIVE STATISTICS

Descriptive statistics was employed to encapsulate the primary data. Descriptive statistics refers to brief informational coefficients that summarise a given data set as a sample of the entire population (Hayes et al., 2023). According to Fulk (2023), descriptive statistics describe and summarise the data by providing an overview of the essential characteristics of the sample. Descriptive statistics such as frequency and percentages were used to summarise the respondents' demographic information and mean, and standard deviation for the components of Fintech literacy.

Frequency refers to the number of times a data value occurs (Australian Bureau of Statistics, 2024). Frequency counts were used to determine how many respondents fall into each category of variables, such as gender, race, age, education level, and employment status. For example, this study counted how many respondents identified as “Men,” “Women,” or “non-binary,” which can help illustrate the gender distribution of the targeted sample. Frequency counts were also used for determining how many respondents fall into each category of demographic variables such as gender, race, age, education level, and employment status. Frequency counts were also used for assessing respondents’ financial literacy levels by recording how many answered each question correctly, incorrectly or were uncertain.

Frequency counts were also used to assess digital literacy, including mobile ownership and usage. Frequency counts were also used to measure awareness of Fintech products and lastly frequency counts were used to assess fintech proficiency.

After that, the Mean was used, which is the mathematical average of a set of two or more numbers (Hayes, Kindness, and Perez, 2024). In this study, the mean was used to summarise the mean age for demographic variables. The mean was also used to calculate the average score for Fintech literacy, and the mean was used to determine the Z-score normalisation.

Standard deviation refers to the average amount of variability in a dataset. It shows, on average, how far each score lies from the mean (Bhandari, 2020). Standard deviation was employed to assess how widely responses were spread around the average for the various index scores, such as the Fintech literacy composite index. All descriptive statistical analyses were conducted using Microsoft Excel and Python (Google Colab IDE). The following section will discuss how the studies Z-scores were determined.

4.10.5 Z-SCORES

Z-scores is a statistical measurement describing a value relationship to the mean group of values (Nevil, Kindness, Velasquez, 2025). Z-scores are also defined as a standardised value that quantifies how many standard deviations an individual raw score deviates from the mean of its distribution (Andrade, 2021). The Z-scores were calculated to standardise the different components of Fintech literacy—specifically, financial literacy and digital literacy—which were measured on different scales. Standardisation assisted in combining these components into a comparable Fintech Literacy Index.

The Z-score was determined using the following formula as suggested by Lyons and Kass-Hanna (2022):

$$x = \frac{\mu}{\sigma} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

Where:
X is the raw score of the component
μ is the mean score of the component

This process was necessary because financial literacy and digital literacy were scored on different scales (e.g. 6 points vs. 15 points). By converting raw scores into Z-scores, each variable was placed on a standard scale, allowing the components to be combined into a single Fintech Literacy Composite Index. This index was then used to classify respondents' overall Fintech literacy levels as low, moderate, or high. Using Z-scores also allowed for meaningful comparisons across subgroups, such as between Millennials and Gen Z, by accounting for scale differences and distributional characteristics. The following section provides a summary of this chapter.

4.11 SUMMARY

This chapter presented the research design and methodology used in the study. A quantitative research approach was adopted to assess Fintech literacy levels among Millennials and Gen

Z in the Eastern Cape. The chapter began by explaining the research paradigm, followed by a detailed discussion of the research design and the approach that guided the study.

The sample consisted of respondents aged between 18 and 43 who reside in the Eastern Cape and use at least one mobile banking application. A non-probability sampling method was used, combining judgmental and snowball sampling techniques. Data was collected using an online questionnaire created on Google Forms and distributed electronically.

The questionnaire comprised six sections: demographic information, financial literacy, digital literacy, mobile banking proficiency, Fintech product knowledge, and Fintech proficiency. Ethical considerations were strictly followed, and participation in the study was voluntary. Informed consent was obtained from all respondents, and confidentiality was maintained throughout the research process.

The data collected will be cleansed and analysed using statistical software. Descriptive statistics will be used to describe the sample and the literacy levels, while inferential statistics will be employed to draw conclusions. The validity of the instrument will be established through the Content Validity Ratio (CVR), and reliability will be tested through item difficulty and discrimination index. Items that fall outside the acceptable range will be revised or removed. The next chapter will discuss the results of the study.

CHAPTER 5
RESULTS OF THE STUDY

5.1 INTRODUCTION

The primary objective of this study is to investigate the level of Fintech literacy among Millennials and Gen Z in the Eastern Cape and to develop a measurement instrument to assess Fintech Literacy. To achieve this objective, Chapter 4 identifies the research design and methodology required to collect primary data from the targeted demographic groups, specifically Millennials and Gen Z in the Eastern Cape. This study used quantitative research, and data was analysed using statistical techniques. This Chapter will report on the empirical results. It will assist in assessing the level of Fintech literacy among these groups and develop a context-specific instrument to measure their knowledge and usage of Fintech products.

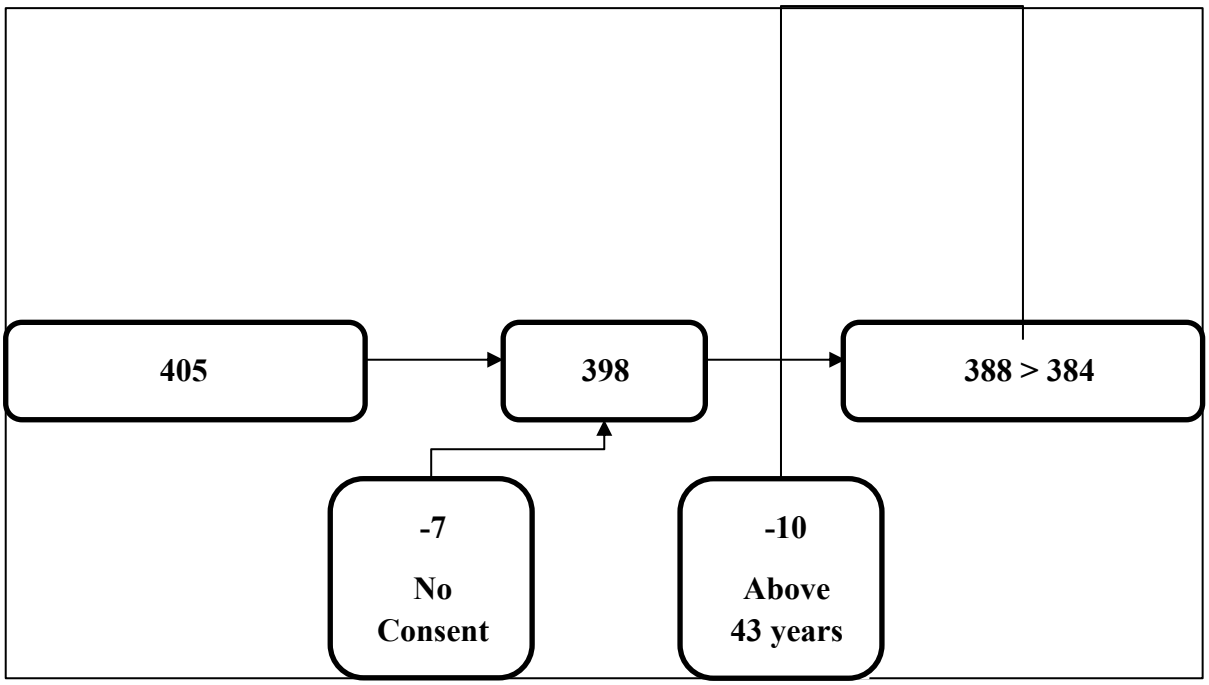
This chapter aims to analyse the data collected and interpret the demographic and the two components that makeup Fintech literacy, which is financial literacy and digital literacy. This chapter will first report the descriptive information of the respondents, such as gender, race, age, education, and employment status. Secondly, the mean for each demographic group is calculated to determine the central tendency of each group. Lastly, the standard deviation measures the extent of data dispersion relative to the mean. The inferential analysis examines potential relationships between demographic factors and the study's key areas of interest: financial literacy, digital literacy, mobile banking proficiency, knowledge of fintech products, and overall fintech proficiency. Lastly, the chapter will end with a summary.

5.2 DATA CLEANING AND RESPONSE RATE

This study data was collected using Google Forms for each respondent. The responses were then compiled into a Google Sheet and transferred to Microsoft Excel for further analysis. Additionally, the data was analysed using Python within the Google Colab Integrated Development Environment, which used the Matplotlib library to represent the results visually. The corresponding code is provided alongside the output. Refer to Section 5.3 for the results. In Microsoft Excel, the dataset was cleaned by removing respondents who did not fit the criteria for the study. A total of 405 respondents answered the online questionnaire. At the beginning of the questionnaire, a consent form was administered, and only 398 respondents provided their full consent for using their responses in this study. This was discovered by applying filters on the consent columns in Excel. Thereafter, of the 398 respondents, 10 were

over 43. Therefore, 10 questionnaires were disregarded because they did not fit the criteria of the sample. This was discovered by applying filters on the age columns. Based on the lack of consent from the respondents and the respondents being over 43. The responses were deleted by selecting Go to Special in Excel and deleting the visible cells. The remaining responses were 388. The response rate is then (388/405) *100 = 95.75%. Therefore, the response rate for this study is 95.75%.

FIGURE 5.1: FLOW DIAGRAM ILLUSTRATING THE ELIGIBILITY CRITERIA FOR RESPONDENTS



Source: Researchers Construct

Figure 5.1 illustrates the number of respondents who met the study's criteria. This diagram shows how respondents were funnelled from 405 respondents to 384 respondents based on individuals who gave consent, which amounted to only seven respondents, and respondents who were over 43, which amounted to 10. This study has a minimum response criterion for 384 respondents. The final responses were 388, more than the initial requirement of 384. The following section will review the Millennials and Gen Z demographics.

5.3 DEMOGRAPHICS FOR RESPONDENTS

Section A of the questionnaire focused on the demographics of the sample. This section collected data on each respondent's gender, racial group, age category, education level, and

employment status. Table 5.1 below provides an overview of the respondents' demographic characteristics.

TABLE 5.1: DEMOGRAPHICS OF THE RESPONDENTS

Categories	**Frequency**	**Percentage (%)**
Gender		
Man	162	41.75
Woman	220	56.70
Non-Binary	6	1.55
Total	**388**	**100**
Racial Group		
African	329	84.79
White	15	3.87
Asian/Indian	11	2.84
Coloured	33	8.50
Other	0	0
Total	**388**	**100**
Age Category		
18 - 23 years	209	52.51
24 - 28 years	91	22.86
29 - 33 years	45	11.31
34 - 38 years	24	6.03
39 - 43 years	19	4.77
Total	**388**	**100**

Education Level		
Less than Matric/Grade 12	18	4.64
Matric/Grade 12 certificate	184	47.42
Undergraduate degree	106	27.32
Postgraduate Degree (Honours or masters)	78	20.10
PhD	2	0.52
Total	**388**	**100**
Employment Status		
Student only	198	51.03
Student and employed full-time	10	2.58
Student and employed part-time	45	11.60
Employed full-time	93	23.97
Employed part-time	8	2.06
Unemployed	31	7.99
Other	3	0.77
Total	**388**	**100**

Source: Researchers Construct

Table 5.1 shows that most respondents identified as women, 56.70%, while 41.75% identified as men. A small percentage (1.55%) of respondents identified as non-binary. This indicates that women formed the most significant proportion of the sample. Most respondents, 84.79%, identified as African, followed by Coloured respondents, 8.50%. White respondents accounted for 3.87%, while Asian/Indian respondents comprised 2.84%. No respondents identified as belonging to another racial category. The most significant proportion of respondents, 52.51%, fell within the 18 to 23 age group, followed by 22.86% in the 24 to 28 age category. Respondents aged 29 to 33 accounted for 11.31%, while 6.03% were in the 34 to 38 age range. Only 4.77% of respondents were aged 39 to 43, and 2.51% were above 43.

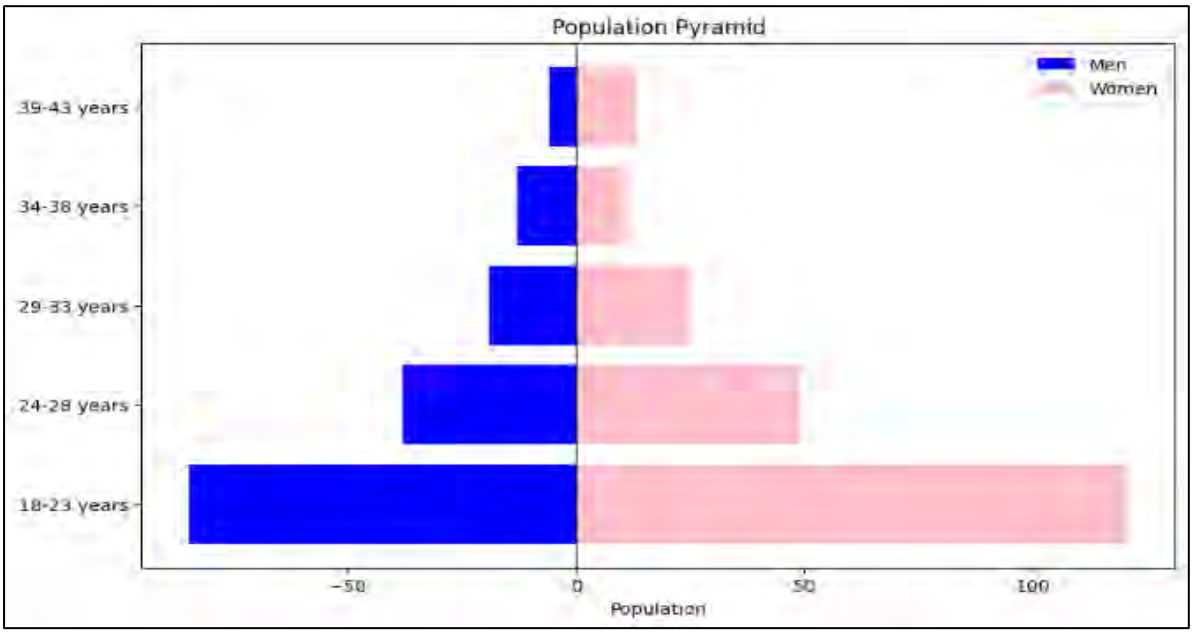
Most respondents had completed their Matric/Grade 12 certificate, 47.42%. A significant proportion held an undergraduate degree, 27.32%, while 20.10% had obtained a postgraduate degree (Honours or Masters). A small percentage (0.52%) held a PhD, and 4.64% had an education below Matric.

Lastly, the majority (51.03%) were students who were not employed, while 11.60% were students employed part-time, and 2.58% were students employed full-time. A significant portion (23.97%) reported being employed full-time, while 2.06% were employed part-time. Unemployed respondents comprised 7.99%, and a small proportion (0.77%) identified their employment status as "Other."

5.4 DEMOGRAPHICS FOR GEN Z AND MILLENNIALS

This section presents a detailed breakdown of the demographic characteristics of the respondents. It includes multiple figures that illustrate the distribution of respondents across various demographic categories, providing a clear overview of the sample composition. Figure 5.2 shows the age and gender distribution of the respondents. The X-axis represents the population count, while the Y-axis represents different age groups. Pink bars show the distribution by women, while blue bars show the distribution by men.

FIGURE 5.2: POPULATION PYRAMID CONTRASTING THE MALE AND FEMALE SAMPLE

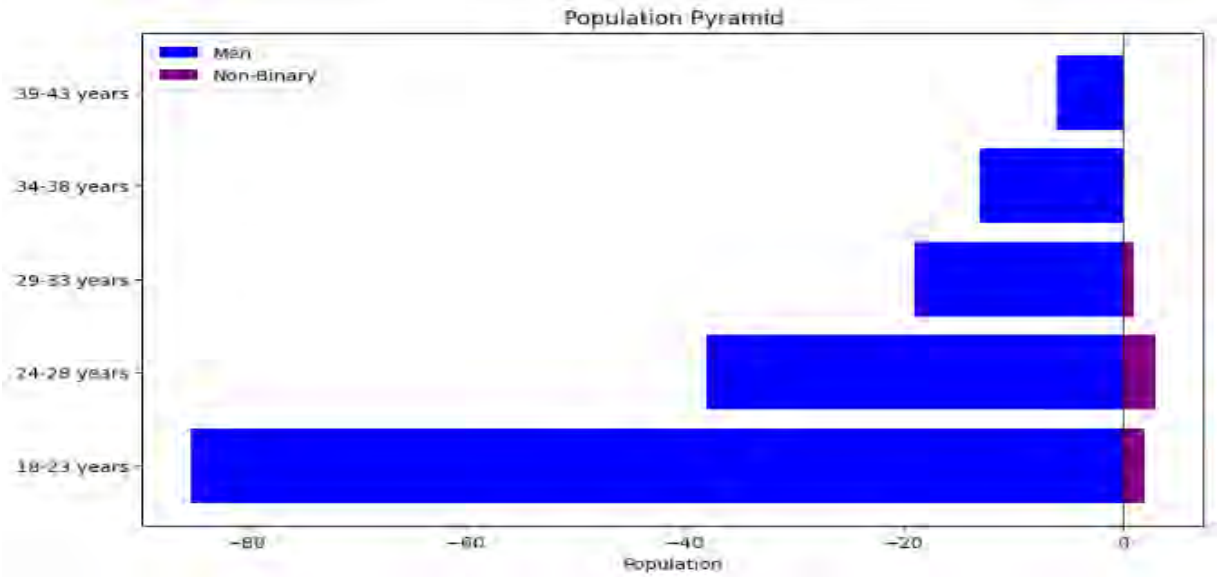


Source: Researchers Construct

The first figure, Figure 5.2, shows that the largest age group, 18 to 23 and 24 to 28 years, is dominated by the women respondents. This diagram highlights the gender differences in each age group, showing that women outnumber men in most age groups. As the age groups increase, the number of responses also decreases. The next section will discuss the diagram illustrating the population pyramid, contrasting the male and non-binary samples.

Figure 5.3 shows the distribution of respondents across men and non-binary individuals by age group. The X-axis represents the population counts, while the Y-axis represents the different age groups of the respondents.

FIGURE 5.3: POPULATION PYRAMID CONTRASTING THE MALE AND NON-BINARY SAMPLE.

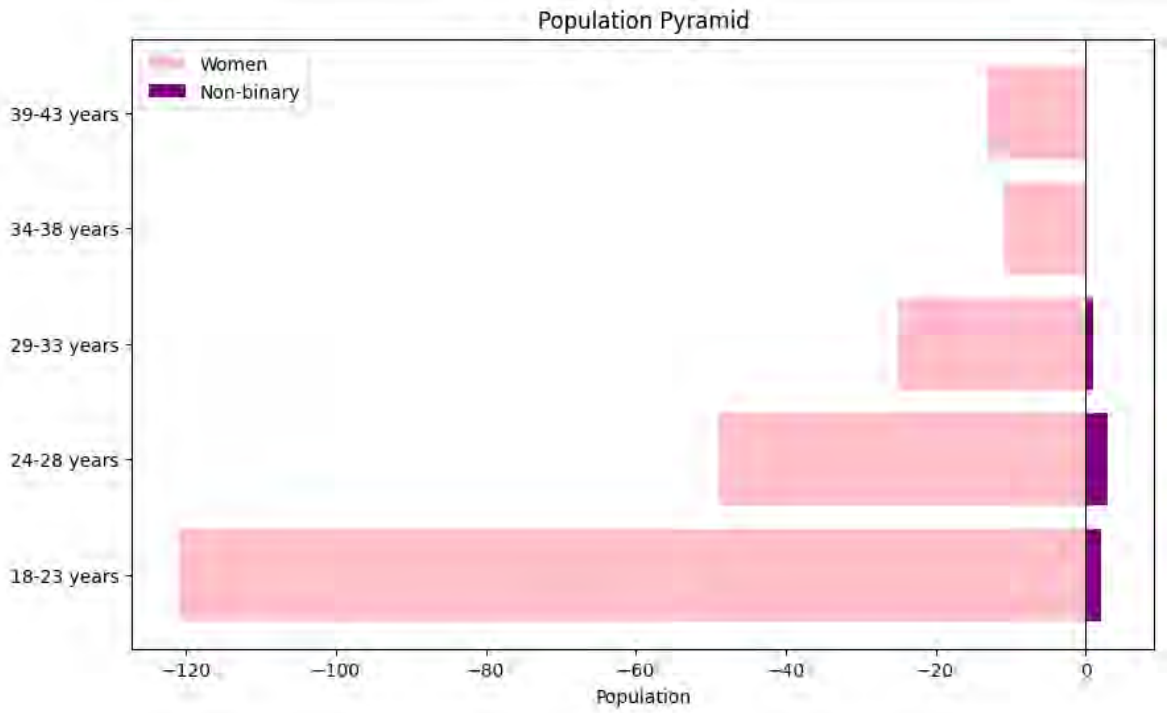


Source: Researchers Construct

Figure 5.3 illustrates that the age groups 18 to 23 and 24-28 have the highest population counts by men. Non-binary individuals are relatively small compared to men. As the age increases in the diagram, the population declines. The following section will discuss the diagram illustrating the population pyramid contrasting the female vs non-binary.

Figure 5.4 shows the distribution of respondents across different age groups and two distinct genders, women, and non-binary individuals. The X-axis represents the population count. The y-axis shows the different age groups relevant to the study.

FIGURE 5.4: FEMALES VS NON-BINARY



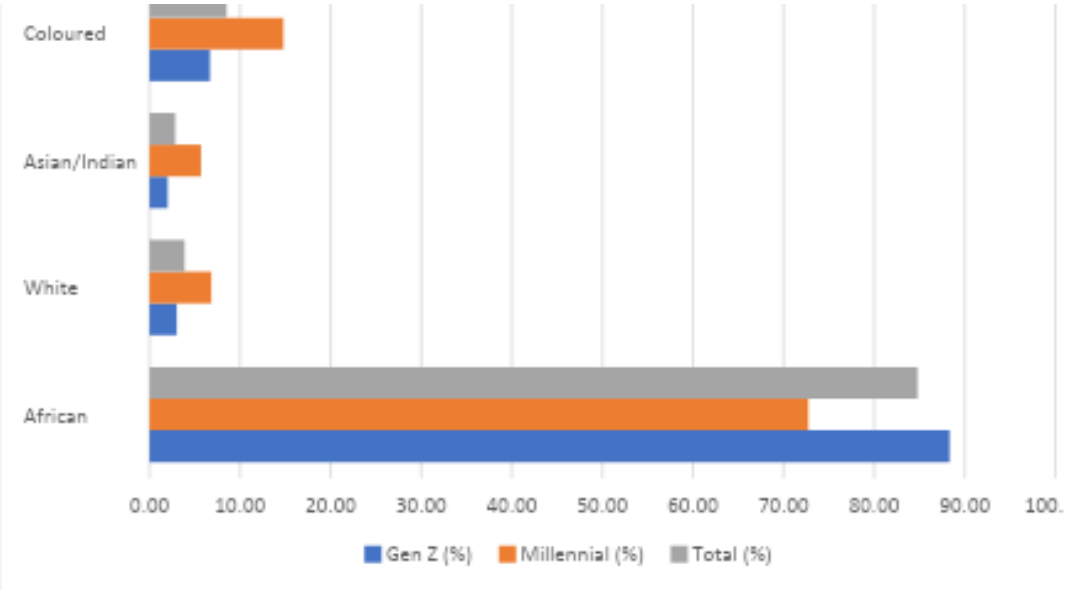
Source: Researchers Construction

Lastly, Figure 5.4 shows the distribution between women and non-binary respondents. Women constitute most of the population count in most age groups. Non-binary individuals have a smaller but consistent presence across multiple groups.

In summary, all the charts highlighted the distribution across different age groups and gender classifications. Figure 5.2 highlights the distribution of men and women, showing that women dominate the younger age groups (18-23 and 24-28 years). Figure 5.3 shows the distribution between men and non-binary respondents; the same trend is noticeable as the age groups increase, and the population counts decrease. Men are larger than those representing non-binary respondents. Lastly, Figure 5.4 shows that women represent a larger population count than non-binary respondents, who represent a much smaller population count. The following section will review the Gen Z and millennial racial groups.

Figure 5.5 is a bar chart showing the breakdown of the respondents by different racial groups and the percentage of the population counts.

FIGURE 5.5: GEN Z AND MILLENNIAL RACIAL GROUP

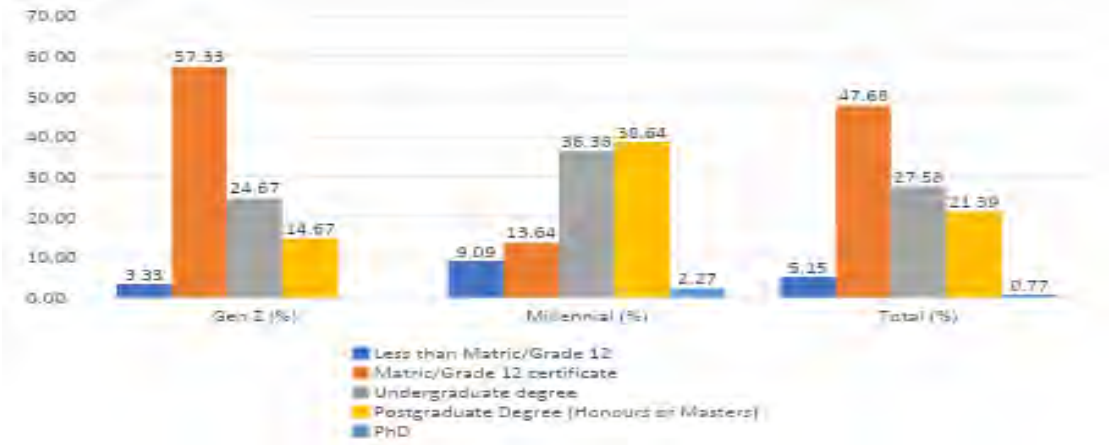


Source: Researchers Construction

Figure 5.5 shows that Millennials comprise 73% African, 13% Coloured, 8% White, and 6% Asian/Indian. Gen Z is 87% African, 7% Coloured, 4% White, and 2% Asian/Indian. The bar chart shows that African respondent groups consistently make up most of the respondents for the different generational groups, Millennials and Gen Z. This contrasts the white, coloured, and Asian/Indian groups, represented much smaller within the Millennials and Gen Z. The next section will review the Education levels for Gen Z and Millennials.

In Figure 5.6, The levels of education are categorised into the following groups: "Less than Matric/Grade 12." "Matric/Grade 12 certificate." "Undergraduate degree." "Postgraduate degree (Honours or Master's)" and "PhD".

FIGURE 5.6: EDUCATION LEVELS FOR GEN Z AND MILLENNIAL GROUPS.



Source: Researchers Construction

Figure 5.6 shows that among Gen Z respondents, the majority (57.33%) have completed a matric/Grade 12 certificate, followed by 24.67% holding an undergraduate degree and 14.67% possessing a postgraduate degree. A small percentage (3.33%) have less than a matric, while none reported having a PhD. At the same time, millennials have a higher portion of tertiary education, with 38.64% holding an undergraduate degree and 36.36% having a matric/Grade 12 certificate. In addition, 13.64% have a postgraduate degree, 9.09% have less than matric, and 2.27% hold a PhD.

Overall, the total respondent population reflects a higher concentration of individuals with a Matric certificate (47.68%), followed by undergraduate (27.58%) and postgraduate (21.39%) degrees, with lower percentages for those with less than Matric (5.15%) and PhDs (0.77%). These findings indicate that Millennials tend to pursue higher education at a greater rate than Gen Z, suggesting potential shifts in educational attainment trends across generations.

5.5 FINANCIAL LITERACY

Section B of the questionnaire collected information on the financial literacy levels of the respondents. Questions were asked about financial literacy, namely, knowledge of interest rates (1 item), Compound interest (2 items), Inflation (1 item) and diversification (1 item).

5.5.1 FINANCIAL LITERACY SCORE PER QUESTION.

The first question related to the impact of interest rates on borrowing costs. The question asked respondents to borrow R100 with or without interest charges. This question was

designed to test the respondent's ability to recognise that borrowing without interest results in a lower repayment amount, which is option A. Respondents who selected options B and C or expressed uncertainty in option D showed low levels of financial literacy in this area. Table 5.2 shows the results of the interest rate question.

TABLE 5.2: SIMPLE INTEREST RATES QUESTION

	Options:	**Answers**	**Frequency**	**Percentage**
A.	Borrowing R100 with no additional charges.	Correct	279	71.91%
B.	Borrowing R100 with an additional charge of 3%.	Incorrect	43	11.08%
C.	Borrowing R100 with an additional charge of 5%.	Incorrect	46	11.86%
D.	Do not know	Uncertain	20	5.15%

Source: Researchers Construct

Table 5.2 shows that most respondents, namely 71.9 % of the respondents, selected the correct option. At the same time, 23% selected incorrect options and an uncertain option. This shows that most respondents understand interest-free borrowing, while a minority do not.

The second question asked respondents: If they invested R5000 in a fixed deposit account earning 10% per annum for two years. How much interest would they expect to receive in the second year? This question was designed to assess respondents' proficiency in understanding how compound interest 1 works. Table 5.3 shows the results of the respondents.

TABLE 5.3: COMPOUND INTEREST 1 RATE QUESTION

Options:		Answers	Frequency	Percentage
A.	I will earn more than R500 as interest in the 2nd year.	Correct	207	53.35%

B.	I will earn R500 as interest in the first and second year	Incorrect	114	29.38%
C.	Do not know	Uncertain	50	12.89%
D.	None of the above	Incorrect	17	4.38%

Source: Researchers Construct

Table 5.3 shows the results of the question assessing respondents' understanding of compound interest. Table 5.3 shows that 53.35% of respondents correctly identified that they would earn more than R500 as interest in the second year; this shows that the respondents understand interest compounding. However, 42.27% of respondents selected the incorrect option. Further, 4.38% of respondents were uncertain. These results vary as almost half of the respondents understand interest compounding, while the other half are incorrect or uncertain.

The third question asked respondents: If they saved R100 in a savings account that adds 10% interest per annum on the principal amount, and no withdrawals are made. How much interest in monetary terms would be earned after five years? This question was designed to test respondents' proficiency in understanding how compound interest works. Table 5.4 shows the results of the respondents.

TABLE 5.4: FINANCIAL RETURN QUESTION

Options:		Answers	Frequency	Percentage
A.	Do not know	Uncertain	33	8.51%
B.	Less than R150	Incorrect	67	17.27%
C.	More than R150	Correct	187	48.19%
D.	Exactly 150	Incorrect	101	26.03%

Source: Researchers Construct

Table 5.4 shows the results of the respondents' understanding of financial returns. Most of the respondents (48.19%) selected the correct option, followed by 43.3% who selected the

incorrect option, followed by 8.51% who selected the uncertain option. These results show that half of the respondents clearly understand financial returns. In contrast, the other half are uncertain or lack the knowledge to select the correct response.

The fourth question asked respondents if the price of a basket of food doubled over the next 10 years, and their income doubled as well. Would you be able to buy the same basket of food, more food in the basket, or less food in the basket? This question was used to test respondents' proficiency in understanding inflation. Table 5.4 shows the results of the respondents.

TABLE 5.5: INFLATION QUESTION

Options:		Answers	Frequency	Percentage
A.	The same basket of food	Correct	237	61.08%
B.	More food in the basket	Incorrect	74	19.07%
C.	Do not know	Uncertain	42	10.82%
D.	Less food in the basket	Incorrect	35	9.02%

Source: Researchers Construct

Table 5.5 shows the results of what respondents understand about inflation. Of the total respondents, 61.08% correctly identified that the same food basket would cost more due to inflation, indicating a good understanding of the concept. However, 28.09% of respondents selected incorrect answers. The respondents who selected the incorrect responses were split into two groups: The first respondents, 9.07%, believed that inflation allowed them to buy more food, and 9.02% thought they would get less food, suggesting misconceptions about purchasing power. Additionally, 10.82% of respondents were uncertain about the effects of inflation. These results highlight that while most respondents grasp the concept of inflation, a significant portion either misunderstands its impact or lacks confidence in their knowledge.

The fifth question asked respondents how they would safely invest their hard-earned money should they choose to invest—this question aimed to assess respondents' understanding of

diversification. Table 5.6 shows the results of the respondents regarding the diversification question.

TABLE 5.6: DIVERSIFICATION QUESTION

Options:		Answers	Frequency	Percentage
A.	Multiple shares or investments	Correct	161	41.49%
B.	One share or investment	Incorrect	60	15.46%
C.	Do not know	Uncertain	42	10.83%
D.	It depends on the level of risk the investor is willing to accept.	Incorrect	125	32.22%

Source: Researchers Construct

Lastly, Table 5.6 shows the results of the respondents and how the respondents understand diversification. The table shows that 41.49% of respondents correctly identified that diversification means having multiple shares or investments, showing a basic understanding of risk management. However, a significant number of respondents, 47.68%, chose the incorrect answers, with 15.46% believing that diversification means having only one investment. In comparison, 32.22% of respondents thought it depends only on an investor's risk tolerance. In addition, 10.83% of respondents were unsure. The following section will review the total financial literacy scores of the respondents.

5.5.2 FINANCIAL LITERACY TOTAL SCORES

This section presents the overall financial literacy levels of the respondents, based on their performance in the financial literacy component of the study. The total scores are categorised into percentage ranges to illustrate the distribution of respondents across different levels of financial knowledge. Table 5.7 provides a summary of these results, highlighting both areas of strength and gaps in financial literacy among the sample.

TABLE 5.7: TOTAL FINANCIAL LITERACY SCORES.

Financial Literacy Percentage	Frequency	Percent (%)
0	26	6.701
0 - 20%	52	13.402
21% - 40%	70	18.041

41% - 60%	66	17.010
61% - 80%	63	16.237
81% - 100%	111	28.608

Source: Researchers Construct

Table 5.7 shows the financial literacy levels of the respondents. The results indicate that the highest number of 111 respondents scored between 81% to 100% in the financial literacy test. This suggests that many respondents have a high level of understanding of financial concepts. This is favourable as it means that a large portion of the sample is financially literate.

However, it is concerning that 26 respondents scored 0%, showing that they have no financial literacy at all. In addition, 52 respondents scored between 0% and 20%, and 70 respondents scored between 21% and 40%. These groups comprise a third of the sample, showing that many still lack basic financial literacy.

A smaller group of respondents scored at an average level. About 66 respondents scored 41% to 60%, and 63 scored 61% to 80%. These respondents show some understanding of financial literacy concepts but may still need support to make informed financial decisions. The next section will review financial capability.

5.5.3 FINANCIAL CAPABILITY

This section will review the responses to the question on financial capability. Respondents were asked to what extent they believed they had the financial knowledge and skills to manage their finances adequately. Table 5.8 shows the breakdown of the responses for financial capability.

TABLE 5.8: FINANCIAL CAPABILITY QUESTION.

Item	Category	Frequency	Percentage
Financial Capability	Strongly Disagree	16	4.12%
	Disagree	37	9.54%
	Neutral	135	34.79%

	Agree	144	37.11%
	Strongly Agree	56	14.43%

Source: Researchers Construct

Table 5.8 shows that the most frequent response was Agree, with 144 respondents. This was followed by Neutral agreement by the respondents, with 135 respondents selecting this response at 34.79%. This was followed by 56 (14.43%) respondents selecting strongly agree. Lastly, 37 (9.54%) respondents selected disagree, and 16 respondents (4.12%) selected strongly disagree. The respondents who selected "Strongly Agree" can be interpreted as having a high level of financial literacy and confidence in their ability to manage their personal finances effectively. The following section will discuss the validity and reliability of the results.

5.6 VALIDITY AND RELIABILITY FOR FINANCIAL LITERACY QUESTIONS

This section focuses on determining the validity and reliability of the financial literacy questions. This section will first discuss content validity and item analysis to assess the reliability of the questions.

5.6.1 CONTENT VALIDITY

The Content Validity Ratio (CVR) was used to assess the validity of the items used to measure financial literacy. The study collected expert survey responses from 12 respondents to assess content validity. Each of the 12 respondents was treated as an expert panellist and asked to judge whether each item was essential and relevant for the financial literacy measure. Responses marked as “1” were considered to indicate that the item was relevant. The CVR for each item was calculated using the formula: CVR = (Ne - N/2)/(N/2). Below, the inputs of the equation are explained:

Ne is the number of respondents indicating the item is relevant, and N is the total number of respondents (12 in this case). The results showed that four items (Questions 2, 3, 4, and 5) exceeded the CVR threshold of 0.56 and were therefore retained. Two items (Questions 1 and 6) fell below the acceptable limit and are recommended for significant revision. Table 5.9 is included to show a breakdown of financial literacy items, indicating whether each item is considered relevant by the panel of experts.

TABLE 5.9: CONTENT VALIDITY

Financial literacy	Questions	Responses from Experts (Relevant)	Responses from Experts (Not Relevant)	CVR
Compound Interest 1	Question 2	10	2	0.667
Compound Interest 2	Question 3	10	2	0.667
Inflation	Question 4	11	1	0.883
Diversification	Question 5	10	2	0.667
Financial Capability	Question 6	8	4	0.333

Source: Researchers construct

Table 5.9 shows the different content validity ratios (CVRs) for the five questions that were designed to measure financial literacy. Question 4 received the highest CVR score of 0.883, which shows that most of the experts strongly agreed that this question is relevant and clearly linked to the concept of financial literacy.

As one expert stated, it is a strong item because it helps assess whether respondents understand how rising prices affect their purchasing power and income, which is important for financial decision-making. Other items, such as simple interest, compound interest and diversification, achieved an acceptable CVR of 0.667. This suggests that they are a relevant measure of financial literacy. In contrast, Question 1, which measures knowledge of simple interest and Question 6, which measures financial capability, received significantly lower CVR scores of 0.167 and 0.333, respectively. These scores reflect limited agreement among the experts on whether these items are relevant. Some of the comments from the experts provide insights into these low CVR scores. One expert with a background in Fintech noted that Question 1 primarily focuses on arithmetic ability rather than financial literacy. The item asks respondents to identify the borrowing option with the lowest repayment amount; this question focuses on numerical comparison rather than conceptual knowledge of interest.

This feedback shows a misalignment between what the question is supposed to test and what it measures in terms of financial literacy. One economist also pointed out that the question's wording is unclear, especially the phrase "cost you less in terms of repayment amount." This might be confusing to people who are not familiar with financial terms. The question does not clearly mention interest, which makes it harder to test whether someone truly understands the concept. Based on these comments, Question 1 needs to be reworded so that it is easier to understand and better reflects financial literacy. Question 1 was excluded from further analysis as it received a low content validity ratio of 0.617. Question 6 was removed because it received a low CVR score of 0.333, indicating weak relevance to financial literacy. Experts noted that the item was too broad and focused more on general financial behaviour rather than knowledge. They further highlighted that the question did not test a specific concept such as interest, inflation, or diversification, making it less effective in measuring literacy. Some experts also mentioned that its wording created ambiguity, which could confuse respondents and reduce the accuracy of the results. The next section will review the Item difficulty index (p-value).

5.6.2 ITEM ANALYSIS

Item analysis was conducted using the item difficulty index and discrimination index. The item difficulty index measures the proportion of respondents who answered the questions correctly. The following formula was used to determine the p-value: Number of respondents who answered the item correctly/total number of respondents who attempted the item.

The p-value was calculated using the following formula:

Item difficulty (p) = $\frac{R}{T}$ …… (5)

P = Item difficulty Index

R = Number of respondents who answered the item correctly

T = total number of respondents who attempted an item.

The value of p ranges between 0 and 1: $[0 \leq p \leq 1]$

TABLE 5.10 THE P RANGES AND THE INTERPRETATIONS.

P ranges	Interpretation
< 0.20	Means the question is Difficult

p = 0.20 – 0.39	Means the question is Difficult
p = 0.40 – 0.60	Means the question is Ideal
p = 0.61 – 0.89	Means the question is Easy
p ≥ 0.90:	means the question is Easy

Source: Quaigrain and Arhin (2017)

Table 5.10 shows the P-values for the item difficulty and interpretation. Table 5.11 shows the financial literacy questions, item difficulty index and the outcome of the questions

TABLE 5.11: ITEM DIFFICULTY

Questions	Item difficulty index (p-value)	Outcome
Compound Interest 1	0.533	Ideal
Compound Interest 2	0.482	Ideal
Inflation	0.610	Easy
Diversification	0.414	Ideal

Source: Researchers Construct

Table 5.11 reveals that Inflation items were easy for most respondents, where the p-value exceeded 0.60. Three items two on Compound Interest and one on Diversification—fell within the ideal difficulty range, suggesting they were appropriately challenging for the sample and were likely to be effective in distinguishing between higher- and lower-performing respondents. One Compound Interest item, with a p-value of 0.260, was classified as difficult and may require revision. The next section will review the discrimination index.

5.6.3 DISCRIMINATION INDEX

The discrimination index was used to determine how well the financial literacy questions distinguished the best-performing respondents and the lowest-performing respondents in answering the questions. This discrimination index was determined by ranking the respondents' choices on financial literacy questions. The top 27% (Upper Group) and the bottom 27% (Lower Group) were identified. For each item of financial literacy, the upper and lower groups were counted. The discrimination index for each item was determined by using this formula:

Discrimination Index (DI): $\frac{UG-LG}{N}$ ..... (6)

UG = Upper Group

LG = Lower Group

N = Number of respondents in the larger two groups

Where UG refers to the Upper Group, LG refers to the Lower Group, and n is the number of respondents in the larger two groups. Table 5.12 shows the (DI) scores and interpretation for a question.

TABLE 5.12: DISCRIMINATION INDEX INTERPRETATION

Discrimination index (DI) score	**Interpretation**
DI >=0.40	Means the question is functioning satisfactorily.
0.30<=DI<=0.39	Means the questions need little revision.
0.20<=DI<=0.29	Means the question needs Marginal revision.
DI<=0.19	Means the question is poor and should be eliminated or completely revised.

Source: Quaigrain and Arhin (2017)

Table 5.13 shows the financial literacy questions, discrimination index and the outcomes.

TABLE 5.13: DISCRIMINATION INDEX

Questions	**Discrimination index**	**Outcome**
Compound Interest 1	0.914	Functioning Satisfactorily
Compound Interest 2	0.762	Functioning Satisfactorily
Inflation	0.876	Functioning Satisfactorily
Diversification	0.781	Functioning Satisfactorily

Source: Researchers Construct

Table 5.13 shows that all four financial literacy questions had high discrimination index scores, which means they did a good job of indicating the difference between respondents who scored high and those who scored low. Compound Interest 1 question had the highest

score (DI = 0.914), showing that it effectively identifies respondents who have strong financial knowledge. Compound Interest 2, Inflation, and Diversification also performed well, all above the acceptable level. However, the question on simple interest was too easy to answer and had low content validity. Therefore, this question will be deleted from further analysis. The next section review's reliability.

5.6.4 RELIABILITY

The Kuder-Richardson Formula 20 (KR-20) was used to assess the internal consistency reliability of the financial literacy knowledge items. This method is specifically suited for binary items, where responses are scored as either correct (1) or incorrect (0). In this study, each respondent's answers to the financial literacy questions were first coded using this binary system to ensure that the data were suitable for KR-20 analysis.

Following the coding process, a total score was calculated for each respondent by summing the number of correct answers across the four financial literacy questions. The variance of these total scores was then calculated using Excel's sample variance function. This variance represents the variability in financial knowledge scores among all participants and forms a critical part of the KR-20 formula.

For each item, the proportion of respondents who answered correctly (denoted as p) was determined using the AVERAGE function in Excel. The proportion of incorrect responses (q) was then obtained by subtracting p from 1. The product of p and q was calculated for each item and summed across all four questions to give the total item variance component (Setyaedhi, 2024).

These values were then applied to the KR-20 formula:

$$\frac{K}{K-1}\left(1-\frac{\Sigma piqi}{\sigma^2}\right) \quad \text{..... (4)}$$

Where:

K = total number of test items
pi = proportion of students who answered item *i* correctly
qi = 1-pi (i.e., proportion who answered incorrectly)

Σpiqi = sum of the products of correct and incorrect proportions for each item
σ^2= variance of the total test scores.

The resulting KR-20 value for the financial literacy scale was 0.64, indicating moderate internal consistency. Although this value is slightly below the ideal benchmark of 0.70, it is better than the reliability score (Alpha of 0.54) received for the financial literacy scale of Lyons and Kass-Hanna (2021). Therefore, this score is considered acceptable for exploratory research. The next section reviews digital literacy.

5.7 DIGITAL LITERACY

Section C of the questionnaire collected information on the digital literacy levels of the respondents. Digital literacy refers to the ownership and use of a mobile phone, therefore, mobile phone proficiency.

5.7.1 OWNERSHIP OF A MOBILE PHONE

The question about mobile phone ownership checks if respondents own a smartphone or a mobile phone. It helps to see how many people have access to mobile devices. If respondents answer "Yes," it shows they can access these devices. If they answer "No," they have limited access to digital technologies, which could affect their ability to use digital services like mobile banking and Fintech apps. Table 5.13 shows the ownership of mobile phones by the respondents.

TABLE 5.14: QUESTION ON OWNERSHIP OF A MOBILE PHONE (YES)

Options:		Frequency (Yes)	Percentage (Yes)
1.	Do you own a smartphone?	381	98.19%
2.	Do you own a mobile phone?	366	94.32%

Source: Researchers Construct

Table 5.14 shows that most respondents (98.19%) have access to mobile devices, which suggests that they are able to use digital platforms and services, such as mobile banking and other fintech applications. Table 5.15 shows the respondents who did not own a mobile phone.

TABLE 5.15 QUESTIONS ON OWNERSHIP OF A MOBILE PHONE (NO)

Options:		Frequency (No)	Percentage (No)
1.	Do you own a smartphone?	7	1.80%
2.	Do you own a mobile phone?	22	5.67%

Source: Researchers Construct

Table 5.15. indicate that a small percentage of respondents have limited or no access to smartphones (1.80%) and mobile devices (5.67%), which could affect their ability to engage with digital services, such as mobile banking and Fintech applications. The next section will review mobile phone proficiency.

5.7.2 MOBILE PHONE PROFICIENCY

This section measures the use of mobile phones by respondents. The questions ask about tasks they have done on their phone in the past 90 days, such as making calls, sending text messages, managing files, browsing the internet, downloading media, making payments, and using social media. Respondents who answer "Yes" to more questions have higher mobile phone proficiency. Those who answer "No" to several questions may have limited experience or use of their mobile phones. Table 5.16 shows the mobile phone usage by the respondents.

TABLE 5.16 MOBILE PHONE PROFICIENCY (YES) RESPONSES

Options:		Frequency (Yes)	Percentage (Yes)
1.	Have you used a mobile phone in the past 90 days to call or receive calls?	375	96.65%
2.	Have you used a mobile phone in the past 90 days to send or receive text messages?	378	97.42%

3.	Have you used your mobile phone in the past 90 days to send or receive files in various formats (e.g., PDF, Word, Excel)?	365	94.07%
4.	Have you used a mobile phone in the past 90 days to browse or use the internet?	374	96.39%
5.	Have you used a mobile phone in the past 90 days to download music, videos, or games?	363	93.56%
6.	Have you used a mobile phone in the last 90 days to make a financial transaction such as send/receive money or make a payment or banking transaction.	367	94.59%
7.	Have you used a mobile phone in the last 90 days to use Facebook, WhatsApp, Twitter, Instagram, TikTok, or any social media site?	371	95.62%

Source: Researchers Construct

Table 5.16 shows that respondents reported high levels of mobile phone use across various activities over the past 90 days. A large majority, 97.42%, indicated that they had used their mobile phones to send or receive text messages, while 96.65% had used their phones to make or receive calls. Similarly, 96.39% had browsed or used the internet, and 95.62% had accessed social media platforms such as Facebook, WhatsApp, Twitter, Instagram, or TikTok. Regarding more advanced tasks, 94.59% had made financial transactions using mobile phones, 94.07% had sent or received files such as PDFs or Word documents, and 93.56% had downloaded music, videos, or games. These findings suggest that respondents are confident

and experienced in using their mobile phones for various digital activities. Table 5.14 shows the respondents who do not use mobile phones.

TABLE 5.17: MOBILE PHONE PROFICIENCY (NO) RESPONSES

Options:		Frequency (No)	Percentage (No)
1.	Have you used a mobile phone in the past 90 days to call or receive calls?	13	3.35
2.	Have you used a mobile phone in the past 90 days to send or receive text messages?	10	2.58%
3.	Have you used your mobile phone in the past 90 days to send or receive files in various formats (e.g., PDF, Word, Excel)?	23	5.93%
4.	Have you used a mobile phone in the past 90 days to browse or use the internet?	14	3.61%
5.	Have you used a mobile phone in the past 90 days to download music, videos, or games?	25	6.44%
6.	Have you used a mobile phone in the last 90 days to make a financial transaction such as send/receive money or make a payment or banking transaction.	21	5.41%
7.	Have you used a mobile phone in the last 90 days to use Facebook, WhatsApp, Twitter, Instagram, TikTok, or any social media site?	17	4.38%

Source: Researchers Construct

Table 5.17 shows the number of respondents who reported not using their mobile phones for various activities in the past 90 days. A small percentage, 3.35%, had not used their mobile phones to make or receive calls, while 2.58% had not sent or received text messages. A slightly higher percentage, 5.93%, indicated they had not sent or received files like PDFs or Word documents. Regarding internet use, 3.61% had not browsed or used the internet on their mobile phones, and 6.44% had not downloaded music, videos, or games. Regarding financial activities, 5.41% had not used their phones for transactions such as sending or receiving money. Lastly, 4.38% had not accessed social media platforms like Facebook, WhatsApp, Twitter, Instagram, or TikTok. These findings suggest that while most respondents are active mobile users, a small group still shows limited engagement with specific mobile phone functions. The next section will review mobile banking proficiency. Table 5.18 shows the total digital literacy scores. Digital literacy scores were calculated based on the cumulative responses to the relevant questions, representing the percentage of digital activities completed by each respondent.

TABLE 5.18: TOTAL DIGITAL LITERACY SCORES.

Digital literacy scores	Frequency	Percent
0-20%	4	1.031
21%-40%	10	2.577
41%-60%	11	2.835
61%-80%	78	20.103
81%-100%	285	73.453

Source: Researchers Construct

The total digital literacy scores. Table 5.18 shows the percentage of digital literacy levels. Most people (73.45%) scored between 81% and 100%, which means they have a high level of digital literacy. About 20.10% scored between 61% and 80%, showing a moderate level of digital literacy. This means they use some but not all mobile phone features. Only 3.61% (15 people) scored below 40%, which shows very low digital literacy. Overall, the results show that most respondents in the study have strong digital literacy skills.

5.8 MOBILE BANKING

This section of the questionnaire collected information on the use of mobile banking applications. The questions asked about whether respondents can open the applications, find menu items, start and finish transactions, fix mistakes, and cancel or reverse a payment without help. These questions help to show how confident and skilled respondents are when using mobile banking applications. Table 5.19 reports information on Mobile Banking Applications.

TABLE 5.19: MOBILE BANKING APPLICATIONS RESPONSES

Options:		Frequency (Yes)	Percentage (Yes)
1.	I can open a mobile banking application without anyone helping me.	375	96.65%
2.	I can find a menu item in my banking application without assistance from anyone.	379	97.68%
3.	I can initiate a transaction in my mobile banking application without help from anyone.	376	96.91%
4.	I can complete a transaction in my mobile banking application without assistance from anyone.	369	95.10%
5.	I can correct an error in the amount or phone number of a receipt in my mobile banking application without assistance from anyone.	355	91.49%
6.	I can reverse or cancel a transaction with my mobile banking application without anyone's help.	314	80.93%

Source: Researchers Construct

Table 5.19 presents data on respondents' ability to use mobile banking applications independently. The results indicate a high level of mobile banking proficiency among the respondents. Of the respondents, 96.65% reported being able to open a mobile banking application without help or assistance. Similarly, 97.68% could locate menu items independently, and 96.91% could initiate transactions independently.

Furthermore, 95.10% indicated that they could complete a transaction without assistance. When correcting errors, such as fixing an incorrect amount or phone number, 91.49% felt confident doing so without help. However, fewer respondents (80.93%) said they could reverse or cancel a transaction alone. These results show that while most respondents are good at using mobile banking applications, some still find more complex tasks like reversing transactions difficult. Table 5.20 reports information on mobile banking responses.

TABLE 5.20: MOBILE BANKING APPLICATIONS RESPONSES

Options:		Frequency (No)	Percentage (No)
1.	I can open a mobile banking application without anyone helping me.	13	3.35%
2.	I can find a menu item in my banking application without assistance from anyone.	9	2.32%
3.	I can initiate a transaction in my mobile banking application without help from anyone.	12	3.09%
4.	I can complete a transaction in my mobile banking application without assistance from anyone.	19	4.90%
5.	I can correct an error in the amount or phone number of a receipt in my mobile banking application without assistance from anyone.	33	8.51%

6.	I can reverse or cancel a transaction with my mobile banking application without anyone's help.	74	19.07%

Source: Researchers Construct

Table 5.20 presents data on respondents who reported that they could not perform specific tasks on a mobile banking application without assistance. A small percentage, 3.35%, indicated that they could not open a mobile banking application independently, while 2.32% reported difficulty finding a menu item without help. Additionally, 3.09% of respondents stated they could not initiate a transaction independently.

Regarding completing a transaction, 4.90% of respondents needed assistance. A higher percentage, 8.51%, indicated they could not correct errors, such as mistakes in the amount or phone number, without help. The most significant challenge reported was reversing or cancelling a transaction, with 19.07% of respondents stating they could not perform this task independently. The following section will review the knowledge of Fintech products.

5.9 KNOWLEDGE OF FINTECH PRODUCTS

This section questionnaire collected information on the respondents' knowledge of different fintech products, like payment apps, cryptocurrency, financial robot advisors, and peer-to-peer lending. The questions ask if they know these tools and understand their main benefits. This section reports the results on knowledge of different fintech products per question.

The first question asked respondents how well they knew about robot advisors. It was used to check how aware respondents are of these digital tools. Respondents who chose option A (very familiar) showed they knew much about robot advisors. Those who chose options B or C know a little bit. Respondents who picked option D (unfamiliar) showed low awareness of robot advisors. Table 5.21 reports the results of financial Robot Advisors.

TABLE 5.21: FINANCIAL ROBOT ADVISORS

	Options:	Frequency	Percentage
A.	Very familiar	58	14.95%

B.	Somewhat familiar	58	14.95%
C.	Somewhat unfamiliar	212	54.64%
D.	Not at all familiar	60	15.46%

Source: Researchers Construct

Table 5.21 shows that only 58 respondents (14.95%) said they were very familiar with robot advisors. Another 58 respondents (14.95%) were somewhat familiar, while 212 respondents (54.64%) said they were somewhat unfamiliar, showing limited knowledge. Of the respondents, 60 (15.46%) said they were unfamiliar, indicating low awareness. These findings suggest that most respondents have low to moderate awareness of financial robot advisors. Next, the payment application question results will be reviewed.

The second question asked respondents to choose one or more payment apps they know in South Africa. This question was used to check their awareness of local digital payment tools. Respondents who selected real applications like Snap Scan (A) or Voda pay (B) showed they were familiar with payment applications. Table 5.22 reports information on payment application responses.

TABLE 5.22: PAYMENT APPLICATIONS IN SOUTH AFRICA (RESPONSES)

	Options:	Answers	Frequency	Percentage
A.	Snaps can	Correct	212	54.64%
B.	Voda pay	Correct	102	26.29%
C.	Do not know	Incorrect	39	10.05%
D.	Fast Pay	Incorrect	35	9.02%

Source: Researchers Construct

Table 5.22 shows that A total of 212 respondents (54.64%) selected Snap Scan (option A), and 102 respondents (26.29%) selected Voda pay (option B), both of which are correct options. This shows that more than half of the respondents know at least one commonly used payment application. On the other hand, 39 respondents (10.05%) selected Do not Know

(option C), and 35 respondents (9.02%) selected Fast Pay (option D). These are incorrect answers and show that some respondents are unfamiliar with common payment apps used in South Africa. Overall, the results suggest that while many respondents are familiar with at least one payment application. Next, the results on the benefits of using financial robot advisors are reviewed.

The third question asked respondents to choose the main advantage of using financial robot advisors compared to human advisors. The question checks if respondents understand that robot advisors usually cost less and do not need much human help. Respondents who chose option A (Lower fees and minimal human intervention) showed good understanding. Those who chose options B, C, or D showed they did not fully understand the benefits of using robot advisors. Table 5.23 reports information on the benefits of financial robot advisors.

TABLE 5.23: BENEFITS OF FINANCIAL ROBOT ADVISORS

	Options:	**Answers**	**Frequency**	**Percentage**
A.	Lower fees and minimal human intervention	Correct	278	71.65%
B.	Greater need for in-person appointments	Incorrect	17	4.38%
C.	Less personalised advice interaction	Incorrect	37	9.54%
D.	Do not know	Uncertain	56	14.43%

Source: Researchers Construct

Table 5.23 shows that most respondents, 278, correctly chose option A (71.65%), (Lower fees and minimal human intervention), showing a good understanding of the main benefit of using robot advisors. However, some respondents did not choose the correct answer. Some of the respondents (4.38%) chose option B (Greater need for in-person appointments), while 37 respondents (9.54%) chose option C (Less personalised advice interaction), and 56 respondents (14.43%) selected option D (Uncertain). These answers show that some respondents still lack a clear understanding of what makes robot advisors valuable. Next, the results on the definition of peer-to-peer lending are reviewed.

This fourth question measures the respondent's understanding of peer-to-peer (P2P) lending. Respondents who select option A ("It allows consumers to borrow money from each other") show a correct understanding of peer-to-peer lending, as this accurately describes how P2P lending works. Respondents who choose options B, C, or D either do not fully understand the concept or lack awareness of how P2P lending functions, as these options do not accurately describe the process. Table 5.24 shows information on the responses for the peer-to-peer lending question.

TABLE 5.24: DEFINITION OF P2P LENDING (RESPONSES)

	Options:	**Answers**	**Frequency**	**Percentage**
A.	It allows consumers to borrow money from each other	Correct	303	78.09%
B.	It allows institutions to borrow money to a group of consumers	Incorrect	25	6.44%
C.	Do not know	Uncertain	44	11.34%
D.	It allows institutions to borrow money to other institutions	Incorrect	16	4.12%

Source: Researchers Construct

Table 5.24 shows that most respondents correctly identified that P2P (78.09%), lending allows consumers to borrow money from each other (Option A). This shows a strong understanding of the concept. However, some respondents chose incorrect options. A total of 25 respondents (6.44%) selected option B, stating that "it allows institutions to borrow money from a group of consumers," while 44 respondents (11.34%) chose option C, indicating "do not know." Additionally, 16 respondents (4.12%) selected option D, which stated that "it allows institutions to borrow money from other institutions." These answers suggest that some respondents either misunderstood the concept or were unsure about P2P lending. Next, the results on the most popular investment application in South Africa are reviewed.

This question measures how well respondents know popular investment applications in South Africa. It checks if they are familiar with platforms like Easy Equities. Respondents who

chose Easy Equities (Option B) showed they know a popular app for investing. Those who picked Johannesburg Stock Exchange (Option C) or Tyme Bank (Option D) may not fully understand the question, as these are not investment applications. Respondents who selected Do Not Know (Option A) showed they were not familiar with investment applications in South Africa. Table 5.25 shows the respondents' familiarity with investment applications in South Africa.

TABLE 5.25: FAMILIARITY WITH INVESTMENT APPLICATIONS IN SOUTH AFRICA

	Options:	**Answers**	**Frequency**	**Percentage**
A.	Do not know	Uncertain	38	9.79%
B.	Easy equities	Correct	186	47.94%
C.	Johannesburg Stock Exchange	Incorrect	130	33.51%
D.	Tyme Bank	Incorrect	34	8.76%

Source: Researchers Construct

Table 5.25 show that most respondents correctly identified Easy Equities (47.94%), (Option B) as the popular investment application, showing good awareness of the platform. Of the respondents, 130 respondents (33.51%) chose Johannesburg Stock Exchange (Option C), which is not an investment application but rather a stock exchange. A total of 34 respondents (8.76%) identified Tyme Bank (Option D), which is, in fact, a bank and not an investment application. Furthermore, 38 respondents (9.79%) selected Option A ("Do not know"), indicating a level of unfamiliarity with the investment application presented. Next, the results on the benefits of cryptocurrency are reviewed.

The last question measures whether respondents understand the benefits of using cryptocurrency applications. It looks at whether they know that cryptocurrency applications give people more control over their money and allow them to send money directly to others without using a bank or intermediary. Respondents who chose Option A showed that they clearly understood this important benefit. Those who chose Option D also showed some awareness, as anonymity is another common feature of cryptocurrencies. Respondents who

selected Option C showed a misunderstanding of how cryptocurrency works since it is designed to reduce dependence on intermediaries and speed up transactions. Choosing Option B (Do not know) indicates low awareness or knowledge of cryptocurrency applications. Table 5.26 shows information on the responses to the cryptocurrency question.

TABLE 5.26 BENEFITS OF CRYPTOCURRENCY APPLICATIONS

	Options:	**Answers**	**Frequency**	**Percentage**
A.	It increased control over one's finances and direct transactions between users	correct	189	48.71%
B.	Do not know	Uncertain	105	27.06%
C.	It increases dependence on intermediaries for transactions and slower processing times	Incorrect	10	2.58%
D.	It offers a higher level of anonymity and can be less traceable than traditional transactions.	Incorrect	84	21.65%

Source: Researchers Construct

Table 5.26 responses from the results table show that 189 respondents selected Option A, which is the correct answer. This shows that half of the respondents understood a key benefit of cryptocurrency use.

However, 84 respondents (21.65%) chose Option D, which mentions anonymity, a common feature of cryptocurrency applications but not the primary focus of the question. 105 respondents (27.06%) selected Do not know (Option B), showing uncertainty or low awareness. Only 10 respondents (2.58%) selected Option C, which is incorrect and shows a misunderstanding of cryptocurrency applications. The next section will review the validity and reliability of the Fintech knowledge questions.

5.10 VALIDITY OF FINTECH KNOWLEDGE QUESTIONS

This section focuses on determining the validity and reliability of the Fintech knowledge questions.

5.10.1 CONTENT VALIDITY

Table 5.23 has been included to show a breakdown of Fintech Knowledge items, indicating whether each item is considered relevant. The Content Validity Ratio (CVR) was used to assess the validity of the items. Like section 5.5, the study collected expert survey responses from 12 respondents. Each of the 12 respondents was treated as an expert panellist and asked to judge whether each item was essential. Responses marked as "1" were considered to indicate that the item was relevant. The CVR for each item was calculated using the equation:

$$CVR = \frac{N_e - \frac{N}{2}}{\frac{N}{2}} \quad (1)$$

The equation is explained below:

Ne: Is the number of respondents indicating the item is relevant, and N is the total number of respondents (12 in this case). The results showed that five items (Questions 1, 2, 3, 4, 5, and 6) exceeded the CVR threshold of 0.56 and were therefore retained. Two items (Questions 1 and 6) fell below the acceptable limit and are recommended for significant revision.

TABLE 5.27 CONTENT VALIDITY

Fintech Knowledge Questions	Questions	Responses from Experts (Relevant)	Responses from Experts (Not Relevant)	CVR
Robot-Advisors	Question 1	9	3	0.50
Payment Applications	Question 2	8	4	0.33
Robot Advisors	Question 3	9	3	0.50
Peer-to-peer lending	Question 4	8	4	0.33
Investment Application	Question 5	10	2	0.67

Cryptocurrency Application	Question 6	11	1	0.83

Source: Researchers construct

Table 5.27 shows how experts rated the relevance of questions that test knowledge of different Fintech products. Twelve experts reviewed six items. The cryptocurrency application question received the highest support, with a CVR value of 0.83, showing that most experts believed this item was important. The investment application item also received strong agreement, with a CVR of 0.67. The two robot-advisor items were each rated with a CVR of 0.50, meaning half of the experts thought these items were relevant. The peer-to-peer lending and payment application items received the lowest ratings, with CVR values of 0.33. This suggests that fewer experts agreed that these items were highly relevant. Peer-to-peer and payment applications were excluded from further analysis. Most items helped test Fintech knowledge, but a few may need improvement to reflect the topic better. The next section will review the item analysis (p-value) for the Fintech Knowledge questions.

5.10.2 ITEM ANALYSIS

Item analysis was conducted using the item difficulty index and discrimination index. The item difficulty index measures the proportion of respondents who answered the questions correctly. The following formula was used to determine the p-value: Number of respondents who answered the item correctly/total number of respondents who attempted the item.

TABLE 5.28 ITEM DIFFICULTY (FINTECH KNOWLEDGE QUESTION)

Questions	**Item difficulty index (p-value)**	**Outcome**
Robot-Advisors	0.716	Easy
Investment Application	0.479	Ideal
Cryptocurrency Application	0.487	Ideal

Source: Researchers Construct

Table 5.28 reveals the p-values of three items: Robot-Advisors, Investment applications and cryptocurrency applications. Robot-advisors were easy for most respondents, with p-values above 0.60. These results indicate that many respondents were familiar with these Fintech

concepts. Two items. Investment Application and Cryptocurrency Application, fell within the ideal difficulty range, suggesting they were appropriately challenging for the sample and were likely to be effective in differentiating between higher and lower-performing individuals. No item was classified as difficult, indicating that all questions were accessible to respondents. The following section will review the discrimination index of the Fintech knowledge questions.

5.10.3 DISCRIMINATION INDEX

The discrimination index was used to determine how well the Fintech Knowledge questions distinguished the best-performing respondents and the lowest-performing respondents. This discrimination index was determined by ranking the respondents' choices on the Fintech Knowledge questions. The top 27% (Upper Group) and the bottom 27% (Lower Group) were identified. For each item of the Fintech Knowledge, the upper and the lower groups were counted. Table 5.29 provides the discrimination index for Fintech knowledge questions.

TABLE 5.29: DISCRIMINATION INDEX (FINTECH KNOWLEDGE QUESTION)

Questions	Discrimination index	Outcome
Payment Applications	0.477	Functioning Satisfactorily
Robot-Advisors	0.771	Functioning Satisfactorily
Peer-to-peer lending	0.657	Functioning Satisfactorily
Investment Application	0.667	Functioning Satisfactorily
Cryptocurrency Application	0.829	Functioning Satisfactorily

Source: Researchers Construct

As shown in Table 5.29, all five Fintech Knowledge questions demonstrated satisfactory discrimination indices (DI $\geq$ 0.40). This indicates that each item effectively distinguished between higher-performing and lower-performing respondents. The results show that the question on Cryptocurrency Applications had the highest discrimination index (0.829). This means it did an excellent job of separating the respondents who knew more from those who knew less. The question on Payment Applications had the lowest discrimination index (0.477) and content validity. Therefore, it will be deleted from further data analysis. The next section will review the reliability of the Fintech knowledge questions.

5.10.4 RELIABILITY

The Kuder-Richardson Formula 20 (KR-20) was used to assess the internal consistency reliability of the digital literacy knowledge items. This formula is specifically suited for dichotomous (binary) items, where responses are scored as either correct (1) or incorrect (0). In this study, each respondent's answers to the digital literacy questions were coded using this binary format to make the data suitable for KR-20 analysis.

Following the coding, a total score was calculated for each respondent by summing the number of correct responses across the four digital literacy items. The variance of these total scores was then calculated using Excel's sample variance function. This variance, which reflects the spread of digital literacy scores across the sample, is a critical component in the KR-20 formula. In this case, the variance of the total scores was 1.4948.

For each item, the proportion of respondents who answered correctly (denoted as p) was calculated using the AVERAGE function in Excel. The proportion of incorrect responses (q) was then determined by subtracting p from 1. The product of p and q was calculated for each item and then summed across all four items, yielding a total item variance component of 0.87 (Setyaedhi, 2024).

These values were then applied to the KR-20 formula:

$$\frac{K}{K-1}\left(1-\frac{\Sigma piqi}{\sigma^2}\right) \quad \text{..... (4)}$$

Where:

K = total number of test items

pi = proportion of students who answered item i correctly

qi = 1-pi (i.e., proportion who answered incorrectly)

Σpiqi = sum of the products of correct and incorrect proportions for each item

σ^2 = variance of the total test scores.

Using the values above, the resulting KR-20 value for the digital literacy scale was 0.56, indicating low to moderate internal consistency. However, this is above the financial literacy scale of Lyons and Kass-Hanna (2021). Furthermore, while this value falls below the commonly accepted threshold of 0.70, it is still considered acceptable in exploratory research (Prianka and Anima, 2020).

5.11 FINTECH PROFICIENCY

Section F of the questionnaire collected information on the Fintech Proficiency literacy. Fintech Proficiency refers to whether respondents have used various Fintech services and products, including cryptocurrency platforms, personal finance applications, robot-advisors, and peer-to-peer lending applications. Respondents who answer "Yes" have a higher Fintech proficiency. Those who answer "No" may have limited experience in using these Fintech products and services. Table 5.30 shows the information on Fintech proficiency.

TABLE 5.30 FINTECH PROFICIENCY (YES) RESPONSES

Options:		Frequency (Yes)	Percentage (Yes)
1.	Have you ever used a cryptocurrency application to buy, sell, or manage your investments?	89	23%
2.	Have you ever used a personal finance application to track or manage your spending?	262	68%
3.	Have you ever used a financial robot-advisor to buy, sell, or manage your investments?	164	42%
4.	Have you ever used a peer-to-peer lending platform to lend or borrow money?	196	51%

Source: Researchers Construct

Table 5.30 shows the level of Fintech proficiency among respondents based on their use of different Fintech products and services. The results show that many respondents use Fintech tools to manage their money. The most used service was personal finance applications, with 68% of respondents saying they had used these to track or manage their spending. This was followed by 51% who had used peer-to-peer lending platforms to borrow or lend money. In

addition, 42% reported using financial robot-advisors to buy, sell, or manage investments, which shows increasing interest in automated financial services. However, only 23% had used cryptocurrency applications for investment purposes, suggesting that this type of Fintech is not yet widely used among the group. Overall, the findings suggest that respondents are more likely to use Fintech tools that help with everyday money management, while more advanced services like robot-advisors and cryptocurrency applications are still becoming familiar. Table 5.31 shows the respondents who do not use Fintech products and services.

TABLE 5.31: FINTECH PROFICIENCY (NO) RESPONSES

Options:		Frequency (No)	Percentage (No)
1.	Have you ever used a cryptocurrency application to buy, sell, or manage your investments?	299	77%
2.	Have you ever used a personal finance application to track or manage your spending?	126	32%
3.	Have you ever used a financial robot-advisor to buy, sell, or manage your investments?	224	58%
4.	Have you ever used a peer-to-peer lending platform to lend or borrow money?	192	49%

Source: Researchers Construct

Table 5.31 shows the percentage of respondents who have not used various Fintech products and services. Many respondents, 77%, indicated that they have never used cryptocurrency applications to buy, sell, or manage investments. About 32% reported never using personal finance applications to track or manage spending. Over half of the respondents, 58%, said they have not used financial robot-advisors for investment management. Similarly, 49% have never used peer-to-peer lending platforms to lend or borrow money. These figures suggest that many respondents have yet to engage with more advanced or specialised Fintech services,

particularly cryptocurrency and robot-advisors. At the same time, a smaller but notable group remains unfamiliar with personal finance apps and peer-to-peer lending platforms.

5.12 FINTECH LITERACY INDEX

A Fintech literacy index was created by combining two key components: financial literacy and digital literacy. The Fintech literacy index was developed by combining 6 questions from financial literacy, including the question on financial capability, and 15 questions from digital literacy. A coding system was applied whereby each correctly answered question was coded as 1, and each incorrect answer was coded as 0. Based on their responses, participants could achieve a score ranging from 0 to 6 for the financial literacy component and 0 to 15 for the digital literacy component. Table 5.32 shows coding for the financial literacy and digital literacy questions

TABLE 5.32: CODING OF FINTECH LITERACY INDEX

Category	Correct answers (coded)	A different answer (coded)	Total questions
Financial literacy	1	0	6
Category	Yes answers (coded)	No answer (coded)	
Digital literacy	1	0	15

Source: Researchers Construct.

Table 5.32 shows how the financial literacy and digital literacy questions were dummy-coded into one and zero. The Fintech Literacy Index was calculated by summing each respondent's total score, which combined their financial literacy and digital literacy values. The maximum possible score a respondent could achieve was 21, representing the combined total of both components. The equation below shows that the Fintech literacy index consisted of 21 questions in total.

Fintech Literacy Index = $\sum(Fi)$ from i=1 to 6 + $\sum(Dj)$ from j=1 to 15

Where:

- Fi = each coded financial literacy response (1 for correct, 0 for incorrect)
- Dj = each coded digital literacy response (1 for yes/correct, 0 for no/incorrect)

Therefore: the maximum score within the Fintech literacy index was determined as follows:

Fintech Literacy Index = 6 (financial) + 15 (digital) = 21. The next section reviewed the Fintech literacy score.

5.12.1 FINTECH LITERACY SCORE

Table 5.33 shows the results of the Fintech literacy scores. The scores were categorised into five levels, and the results are displayed in terms of frequency and percentage.

TABLE 5.33 TOTAL FINTECH LITERACY SCORES.

Fintech literacy scores	Frequency	Percent
Between 0 and 20%	2	0.515
Between 21% and 40%	9	2.319
Between 41% and 60%	18	4.639
Between 61% and 80%	210	54.123
Between 81% and 100%	149	38.402

Source: Researchers Construct

Table 5.33 presents the distribution of total Fintech proficiency scores among respondents, highlighting overall proficiency levels. Most respondents, 210, scored between 61% and 80%, indicating a moderate to high level of Fintech literacy. A further 38.40% achieved scores within the 81% to 100% range, suggesting a firm grasp of Fintech concepts and tools among a significant portion of the sample. Only a small minority scored at the lower ends of the spectrum, with 4.64% falling within the 41% and 60 % range, 2.32% between 21% and 40 %, and just 0.52% scoring between 0% and 20 %. These results reflect a most respondents demonstrate above-average Fintech literacy levels. The next section will provide descriptive statistics for Fintech Literacy Index. Table 5.32 shows the descriptive statistics for the Fintech Literacy Index.

TABLE 5.34: DESCRIPTIVE STATISTICS ON THE FINTECH INDEX.

Descriptive Statistic	Score	Percentages
Mean score	7.08	33.7%
Standard deviation.	2.76	

Source: Researchers Construct

At first glance, the findings in Table 5.33 and Table 5.34 may appear contradictory, as most respondents (92.5%) scored between 61% and 80% or between 81% and 100% categories. However, the mean score reported in Table 5.34 was only 7.08 out of 21, which was interpreted as a low level of Fintech literacy. This difference is explained by the structure of the Fintech Literacy Index. The index combined six financial literacy questions (maximum score of 6) with fifteen digital literacy questions (maximum score of 15), resulting in more heavily weighted digital literacy. Respondents performed relatively well in the digital literacy component, which elevated their placement into higher percentage brackets in Table 5.33. However, their performance on the financial literacy component was much weaker, which lowered the absolute mean score in Table 5.34. Consequently, while the categorical distribution highlights relative proficiency, the mean score reveals that respondents only answered, on average, 7 out of 21 questions correctly (approximately 33.7%), confirming an overall low level of Fintech literacy. The two tables, therefore, complement rather than contradict each other, illustrating that although most respondents demonstrate moderate to high digital literacy, their limited financial literacy reduces their overall Fintech literacy to a low level when measured by the mean.

TABLE 5.35: FINTECH INDEX BY MILLENNIALS AND GEN Z

Generation	Average Fintech index	Number of respondents	Percentages
Gen Z	7.07	300	33.7%
Millennials	7.08	88	33.7%

Source: Researchers Construct

Table 5.35 presents the Fintech literacy scores of Gen Z and Millennials, showing both the average index and the proportion of respondents in each generation. Out of the total 388 respondents, 300 (77.32%) were Gen Z, while 88 (22.68%) were Millennials. The average Fintech literacy index for Gen Z was 7.07 out of 21, which represents approximately 33.7% of the maximum possible score. Millennials recorded an almost identical average score of 7.08, also about 33.7% of the maximum. These findings indicate that, despite Gen Z comprising the majority of the sample, both generational groups demonstrate comparable

levels of Fintech literacy, with neither group showing a significant advantage in overall knowledge and skills.

5.13 NORMALISATION OF THE FINTECH LITERACY INDEX

This section will normalise the fintech literacy index using z-scores. Since the two components were measured using different scales (financial literacy out of 6 and digital literacy out of 15), the values were normalised using z-scores. The following formula was used to determine the Z-score.

Combining the two components into one index provided a more complete measure of Fintech literacy. It also allowed for easier comparison across different age groups.

The Z-score was determined using the following formula as suggested by Lyons and Kass-Hanna (2022):

$x = \frac{\mu}{\sigma}$ ..... (1)

Where:

X is the raw score of the component

μ is the mean score of the component

σ is the standard deviation of the component scores.

This was done to ensure that both components contributed equally to the final index and to avoid bias caused by differences in scale. Normalisation also helped improve the results' reliability and supported the use of the index in statistical analysis. Table 5.34 shows the descriptive results of the financial literacy Z-scores and the digital literacy Z-scores.

TABLE 5.36 DESCRIPTIVE STATISTICS OF FINANCIAL LITERACY SCORE

Descriptive Statistics of Financial Literacy	Score
Mean score	1.53
Standard deviation.	1.87

Source: Researchers Construct

Table 5.36 summarises the financial literacy scores of the respondents. The average score was 1.53, with a standard deviation of 1.87. This indicates most respondents only answered a few

financial questions correctly, and there was a significant variation between individuals. The data suggest that financial literacy levels were low and quite uneven across the group. Table 5.37 shows the digital literacy scores.

TABLE 5.37: DESCRIPTIVE STATISTICS ON DIGITAL LITERACY SCORES.

Descriptive Statistics for Digital Literacy	Score
Mean score	5.56
Standard deviation.	1.83

Source: Researchers Construct

Table 5.37 shows the average was 5.56, with a standard deviation of 1.83. Respondents did better in digital literacy, and their scores were more grouped together. However, while these scores are not remarkably high, they suggest that respondents have better digital literacy than financial literacy. Table 5.38 has been included and shows the total Z-score.

TABLE 5.38: Z-SCORES OF FINANCIAL LITERACY AND DIGITAL LITERACY

Category	**Financial literacy**		**Digital literacy**	
Z-scores	Frequency	Percentage	Frequency	Percentage
0% - 20%	26	6.77	9	2.34
21 - 40%	52	13.54	4	1.04
41 – 60%	77	20.05	12	3.13
61 - 80%	82	21.35	18	4.69
81 – 100%	147	38.28	341	88.80

Source: Researchers Construct

Table 5.38 shows the distribution of respondents' financial and digital literacy z-scores, revealing an apparent disparity in Fintech Literacy levels. Financial literacy scores are pretty spread out, with only 38.28% of respondents achieving high scores (81%–100%), indicating a limited proportion with strong financial understanding. A further 41.4% fall within the moderate range (41%–80%), while 20.31% score below 40%, reflecting a notable segment with low financial literacy. In contrast, digital literacy is markedly stronger: 88.80% of

respondents scored within the top bracket (81%–100%), and only 6.51% fell below 60%. The next section will provide a summary of this chapter.

5.14 SUMMARY

The empirical results were presented in this chapter. The results showed that most respondents were female, Black African, and between 18 and 23. Most respondents held a Matric certificate, were students, and reported not being employed. The response rate for the study was 95.75%, with a final sample size of 388 respondents who met the eligibility criteria.

The results on financial literacy were provided. Most respondents scored highest on simple interest (71.91%) and inflation (61.08%), showing a strong understanding. However, compound interest and diversification scores were moderate, with only 48.2% understanding compound interest in long-term saving. The total financial literacy results showed that 28.6% of respondents scored between 81% and 100%, while approximately one-third scored below 40%, indicating substantial gaps in basic financial literacy. Validity and reliability tests, including content validity, item difficulty, and discrimination index, reliability tests were conducted. confirmed that four financial literacy questions were functioning satisfactorily. One item (simple interest) was excluded due to inferior performance. Reliability was measured using the Kuder-Richardson Formula 20 (KR-20), which is appropriate for binary data. Responses were coded as correct (1) or incorrect (0), and the internal consistency of the items was confirmed through this method, indicating that the financial literacy scale had acceptable internal reliability for this sample.

The results on digital literacy showed that most respondents owned a smartphone (98.19%) and used it to access the Internet, social media, and perform financial transactions. 285 scored between 81% and 100% on digital literacy, indicating strong mobile phone proficiency. Mobile banking proficiency was also high, with over 95% of respondents able to complete key banking functions independently, although 19.07% struggled to reverse or cancel transactions.

The results on Fintech product knowledge revealed mixed awareness. While most respondents correctly identified the purpose of peer-to-peer lending and the main benefits of financial robot-advisors, fewer were familiar with cryptocurrency benefits and investment platforms like Easy Equities. Only 14.95% were familiar with robot-advisors, and 48.71% correctly

identified cryptocurrency benefits. The validity and reliability of the Fintech knowledge questions were assessed through a series of tests. Content validity was evaluated using the Content Validity Ratio (CVR), with four out of six items exceeding the minimum threshold of 0.56 and retained for analysis. In comparison, two items—peer-to-peer lending and payment applications—were excluded due to low CVR scores. Item difficulty analysis revealed that most questions were easy, though the investment and cryptocurrency items fell within the ideal difficulty range. Discrimination index results showed that all five evaluated items functioned satisfactorily (DI $\geq$ 0.40), with the cryptocurrency question demonstrating the highest discriminatory power. Reliability was measured using the Kuder-Richardson Formula 20 (KR-20), yielding a coefficient of 0.50. While this score indicates moderate internal consistency and falls below the conventional benchmark of 0.70, it is considered acceptable within exploratory research, suggesting that the retained items are moderately consistent in measuring Fintech knowledge.

Four items were identified to measure Fintech proficiency, including the usage of cryptocurrency apps, personal finance apps, robot-advisors, and peer-to-peer lending. Usage rates varied: 68% of respondents had used personal finance apps, 51% had used peer-to-peer lending, 42% had used robot-advisors, and 23% had used cryptocurrency applications. These responses indicate that most respondents are comfortable with day-to-day Fintech tools, while using advanced products like crypto and robot-advisors remains limited.

The Fintech Literacy Composite Index was calculated using standardised z-scores from the financial and digital literacy components. The mean composite score was 7.08, with a minimum of -5.46 and a maximum of 10.54, reflecting a wide variation in literacy levels. The standard deviation of 2.76 indicates moderate variability among respondents. When broken down by generation, 300 Gen Z and 88 Millennials achieved identical average scores of 7.07 and 7.08, respectively, suggesting similar levels of Fintech literacy across both groups.
The next chapter will provide an overview of the study, a discussion of the results, and direct attention to the recommendations and limitations of the study.

CHAPTER 6
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

The previous chapter provided the results of the study. These results included detailed demographic information about the respondents and a detailed summary of their financial literacy and digital literacy levels. The chapter also assessed the validity and reliability of the measurement instrument, which is the questionnaire, through item analysis and the discrimination index. Furthermore, a composite index was developed to report Fintech literacy levels among millennials and Gen Z.

This last chapter revisits the research objectives outlined in Chapter 1 and summarises the main points from the theoretical and methodological chapters of the study. It draws together the study's significant findings, outlines its contributions to knowledge and offers recommendations to Fintech providers and educators to improve Fintech literacy in the Eastern Cape. In addition, the study's contributions, limitations are discussed, and suggestions for future research are provided. Lastly, the final remarks are provided. Table 6.1 presents the research objectives and highlights how they were addressed in the study.

6.2 RESEARCH OBJECTIVES

This section provides the research aim and objectives (see Chapter 1). Table 6.1 presents the research objectives of the study, together with the chapters in which the objectives were achieved.

TABLE 6.1: SUMMARY OF THE RESEARCH OBJECTIVES

PRIMARY RESEARCH OBJECTIVE	
The study aims to develop a context-specific measurement instrument of Fintech and to measure the level of Fintech literacy among Millennials and Gen Z in the Eastern Cape.	
SECONDARY OBJECTIVES	**CHAPTER**
To provide an overview of Fintech and adopt a theoretical framework for Fintech literacy.	2 and 3
To develop a valid and reliable Fintech literacy measurement instrument.	4 and 5
To measure the Fintech literacy of Millennials and Gen Z in the Eastern Cape.	5

To provide recommendations to Fintech providers and educators on how to improve the levels of Fintech literacy of Millennials and Gen Z.	6

Source: Researchers Construct

Table 6.1 shows that each of the secondary objectives was achieved in selected chapters in the study. These secondary objectives ensured that the primary objectives of the study were achieved. The next section will provide a summary of the literature review.

6.3 SUMMARY OF THE LITERATURE REVIEW.

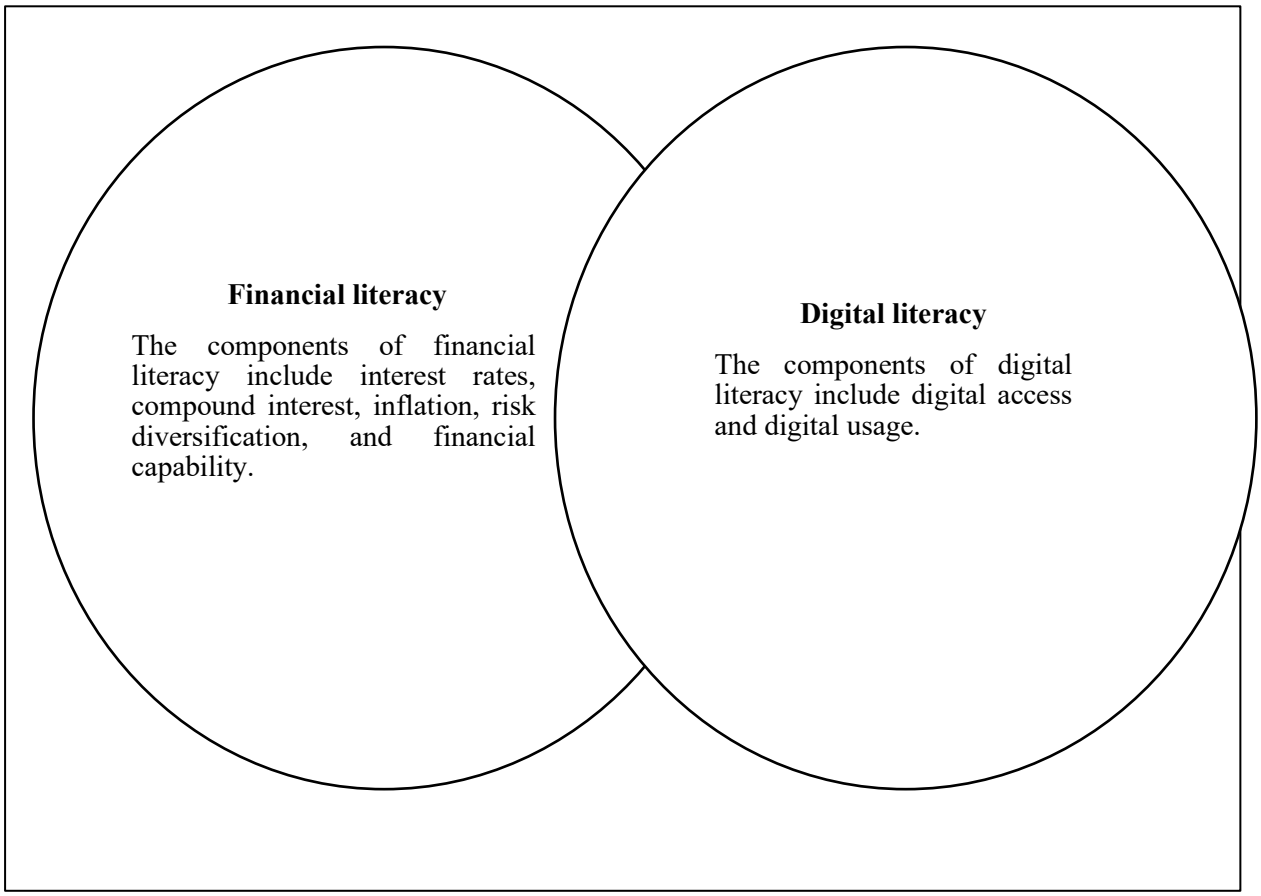
Chapter 2 addressed the first secondary objective, namely, to provide an overview of Fintech literacy. Chapter 2 discussed the concept of Fintech in depth. Fintech was defined as using innovative technology and applying technology solutions to improve financial services and products to meet consumer financial needs. The concept of Fintech was further contextualised by providing a global historical overview of the development of Fintech. It was found that Fintech was marked by three key periods, Arner *et al* (2016). Fintech 1.0 focused on the globalisation of financial services, Fintech 2.0 marked the digitisation of banking through ATMs and online platforms, and Fintech 3.0 was marked by a rise of Fintech start-ups and challenger banks that used new technologies to offer innovative customer-centric services. In the South African context, the literature found that the financial sector followed a similar path in South Africa later. South Africa had its first ATM installed in 1977 by the United Building Society now known as ABSA, Lipa Payments (2022), and in 2011 automated trading systems became popilat (SAHO, 2023) and local apps like ChainEX (Chamisa, 2020) made cryptocurrency easier to use. These changes show how South Africa keeps up with global Fintech trends while dealing with its challenges, like making banking more accessible to everyone. A key finding in Chapter 2 was how Fintech helps more people access financial services. Traditional banking often struggles with distance, lack of branches, and high fees, especially in rural areas. However, Fintech solutions, like mobile banking, easier account sign-ups, and digital payments, allow underserved communities to join the formal financial system Simatele and Maciko (2022); Singh and Singh Kondan (2011).

Thereafter, Chapter 3 also addresses the first secondary objective of the study, namely, to adopt a theoretical framework for the study. In Chapter 3, drawing on the definition by Lyons and Kass-Hanna (2021), Fintech literacy was conceptualised as the combination of financial and digital literacy required to use Fintech effectively while being aware of the associated

digital risks. This approach emphasises that Fintech users require both financial understanding and digital skills. Such combined competence is vital for protection against digital risks, including phishing, identity theft, and fraudulent transactions (Toni and Desai, 2020; Ravikumar et al., 2022).

Figure 6.1 provides the components that make up Fintech Literacy and thus the framework of the study:

FIGURE 6.1: FRAMEWORK OF FINTECH LITERACY



Source: Researchers Construct

Figure 6.1 shows the Fintech literacy framework of the study, which consists of financial literacy and digital literacy. Financial literacy was found to be a core component of Fintech literacy. The literature emphasised its critical role in enabling individuals to manage money, understand key financial concepts such as inflation, interest, and risk diversification, and make sound financial decisions (Fernando et al., 2023). However, existing studies consistently showed that financial literacy levels in South Africa remain low, particularly among Millennials and Gen Z in provinces like the Eastern Cape (Fatoki and Oni, 2014; Maduku

and Thusi, 2020). This gap creates obstacles to safe and inclusive participation in using Fintech solutions.

Similarly, digital literacy was identified as a second component of Fintech Literacy. It includes access to mobile devices, digital usage habits, and technical proficiency in navigating applications and platforms (Lyons et al., 2022). Studies by Oulasvirta et al. (2011) and Kass-Hanna and Lyons (2021) underscore that consumers need a baseline of mobile and internet competence to benefit from Fintech products and services. In South Africa, this remains a challenge in rural communities with limited connectivity and lower digital exposure (Mabeba, 2020). Finally, the literature review revealed a significant research gap. While numerous studies on Fintech literacy have emerged from Asian and European contexts (Mai, 2022; Wang, 2022), African perspectives remain underrepresented, with minimal focus on South Africa. Notably, no standardised or contextually validated instruments currently exist to assess Fintech literacy among South African youth. This study addresses this gap by developing a contextually appropriate Fintech literacy measurement instrument. Explicitly designed for Millennials and Generation Z in the Eastern Cape, the tool accounts for local socioeconomic conditions, varying levels of technological access, and diverse educational backgrounds that characterise this population group. The next section will provide a review of the research design and methodology.

6.4 RESEARCH DESIGN AND METHODOLOGY

Chapter 4 addresses the secondary objective of developing a valid and reliable Fintech literacy measurement instrument. To achieve this, the study employed a quantitative design. This design was associated with an inductive approach and descriptive research methodology. The target population included individuals aged 18 to 43 who identified as Millennials or Gen Z and were residents of the Eastern Cape province. Respondents were also required to own a mobile phone and use at least one mobile banking application, as digital access was a key requirement for Fintech usage and reside in the Eastern Cape. The study utilised non-probability sampling, combining judgemental and snowball sampling methods. The sample size was 388 respondents.

This enabled the targeted recruitment of participants to meet the study criteria while leveraging participant networks to extend the sample reach. Primary data were collected using a structured online questionnaire administered via Google Forms. The questionnaire consisted

of six sections: demographic information, financial literacy, digital literacy, mobile banking proficiency, Fintech product knowledge, and Fintech proficiency. These sections were designed based on previous studies and adapted to reflect the South African context. To ensure content validity, the questionnaire was reviewed by academic and industry experts, and items were adapted from validated instruments used in international Fintech and literacy studies (e.g., Lyons and Kass-Hanna, 2021; Ravikuma et al., 2022). However, before primary data was collected, Ethical clearance was obtained from the Rhodes University Ethics Committee. Participation in the study was voluntary, and informed consent was obtained from all respondents.

Primary data was captured in Microsoft Excel and scrutinised for missing data. Data analysis was conducted using Microsoft Excel and statistical software. Descriptive statistics such as frequencies, means, and standard deviations were used to summarise respondent demographics and financial and digital literacy. Several item analysis techniques were applied to evaluate the validity and reliability of the measurement instrument. Content validity was assessed using the Content Validity Ratio (CVR), where expert judgment determined the relevance and clarity of each item. Item analysis was tested through item difficulty and discrimination analysis. Items with ideal difficulty levels (p-values between 0.40 and 0.60) and strong discrimination indices (above 0.40) were retained. Items that did not meet these thresholds were either revised or removed. The next section will summarise the empirical results.

6.5 SUMMARY OF EMPIRICAL RESULTS

Chapter 5 addresses the secondary objective of measuring Fintech literacy among Millennials and Gen Z in the Eastern Cape. This section will discuss the empirical results for this study. It consists of demographics, financial literacy, digital literacy, mobile banking, and Fintech literacy.

6.5.1 RESULTS ON DEMOGRAPHICS OF RESPONDENTS

This section presents an empirical summary of the demographic characteristics of the 388 respondents who participated in the study, all of whom fell within the Millennial and Generation Z age ranges (18–43 years) and met the inclusion criteria of mobile phone ownership and use of at least one mobile banking application.

In terms of gender distribution, 220 respondents (56.70%) identified as female, while 162 (41.75%) identified as male. 6 respondents (1.55%) identified as non-binary. These gender proportions are illustrated in Table 5.1, which display the male, female, and non-binary composition of the sample.

Most respondents were between 18 and 23 years old, which falls into the Gen Z demographic and rather than the millennial age group. This shows that are entering the tertiary phase and completing their studies at a tertiary level. According to recent data, while overall tertiary attainment in South Africa remains low compared to global standards, the country has seen steady progress in tertiary enrolment and completion among younger populations (Department of Higher Education and Training, 2024). The demographic profile captured in this study, therefore, reflects a segment of youth transitioning into higher education and early career phases.

In the context of race, most of the respondents were Black Africans, reflecting the Eastern Cape's general population (City Population, 2022). A few respondents identified as Coloured, White, or Indian. This aligns with the local context and the target population of the study.
Regarding education levels, most respondents had a Matric/Grade 12 qualification, which aligns with the age range discussed earlier. A smaller number had only completed tertiary studies/Since the survey was online and required respondents to use mobile banking applications, it makes sense that the sample was skewed towards those with access to education and digital access.

Employment status also varied. Some respondents worked full-time or part-time, while majority were studying. Many Gen Z respondents were still students, while most Millennials were employed or job-seeking. This gives a better picture of their financial responsibilities and the need for Fintech knowledge in managing money or accessing financial services. Next the empirical results of financial literacy are discussed.

6.5.2 RESULTS OF FINANCIAL LITERACY

The results from the financial literacy section showed mixed levels of understanding of financial concepts among Millennials and Gen Z respondents in the Eastern Cape. Few of the respondents (28.61%) scored between 81% and 100%, which suggests that a small number of the respondents had high levels of financial literacy. Specifically, 6.70% of the respondents

scored 0% in financial literacy score, 13.40% of the respondents scored between 1% and 20% in the financial literacy score, and 18.04% of the respondents scored between 21% and 40% in the financial literacy. This means that more than one-third of the respondents had low levels of financial literacy among Millennials and Gen Z.

Interestingly, when respondents were asked about their financial capability, 51.54% agreed or strongly agreed that they had the knowledge and skills to manage their finances. This shows that over half of the respondents felt confident about their financial decisions. However, 34.79% were neutral, which means many respondents were unsure about their financial capability. Lastly, 13.66% disagreed with the statements, showing that some respondents felt they lacked the knowledge or confidence to manage their money. Furthermore, the results of the financial literacy content validity ratio showed that the inflation question received the highest CVR (0.883), indicating strong agreement among expert reviewers about its relevance. The compound interest and diversification items had acceptable CVR values of 0.667. However, the simple interest and financial capability questions received low CVRs (0.167 and 0.333, respectively) and were flagged for revision or exclusion due to concerns about clarity and conceptual accuracy in the questions.

The item difficulty index (p-values) showed that inflation was easy ($p = 0.610$). At the same time, the other questions, including compound interest and diversification, fell within the ideal difficulty range ($p = 0.414–0.533$). This indicates that most items were well-balanced in terms of complexity. The discrimination index confirmed that the retained financial literacy questions effectively distinguished between high- and low-performing respondents. All four retained questions scored well above the 0.40 threshold, with the first compound interest question scoring the highest (DI = 0.914), followed by inflation (DI = 0.876), diversification (DI = 0.781), and the second compound interest question (DI = 0.762). The next section presents the empirical results on digital literacy.

6.5.3 RESULTS OF DIGITAL LITERACY

The results from the digital literacy section showed that most Millennials and Gen Z respondents in the Eastern Cape had high levels of digital proficiency. The ownership to mobile devices was widespread. A sum of 98.19% of respondents owned smartphones, while 94.32% owned mobile phones. This high level of ownership in mobile devices supported the strong performance in digital literacy questions. In terms of mobile phone proficiency, it also

shows that most respondents felt confident completing everyday digital tasks such as adjusting settings, updating applications, and handling minor technical issues.

Most of the respondents showed strong digital skills. A total of 73.45% scored between 81% and 100%, meaning they were confident using digital tools and could handle everyday mobile tasks independently. Another 20.10% scored between 61% and 80%, showing decent digital skills but with some limitations. Only a few respondents scored below 60%, and just 1.03% fell in the lowest range. This shows that digital literacy among Millennials and Gen Z in the Eastern Cape is high, and most of them can use digital tools well enough to access things like Fintech platforms.

6.5.4 RESULTS OF MOBILE BANKING

The results show that most respondents had a high level of mobile banking proficiency. A total of 96.65% of respondents reported that they could open a mobile banking application without assistance, and 97.68% could find a menu item independently. In addition, 96.91% were able to initiate transactions, and 95.10% indicated they could complete a transaction without help. This shows that mobile banking is not only accessible to Millennials and Generation Z in the Eastern Cape but is also widely used.

Most respondents agreed that they were confident using mobile banking platforms. According to the results, 91.49% of respondents said they could correct an error in the amount or phone number without help, while 80.93% indicated they could reverse or cancel a transaction on their own. However, reversing or cancelling a transaction was the most difficult task, with 19.07% of respondents stating they could not perform this function independently.

These results show that respondents do not just have access to mobile banking applications—they are also confident using them. The high levels of reported independence in using these platforms also support the earlier findings on digital literacy. Together, these findings suggest that Millennials and Generation Z in the Eastern Cape actively use mobile banking and can navigate it on their own, although some still struggle with more advanced functions like reversing transactions. The next section will provide the empirical results of Fintech literacy.

6.5.5 RESULTS OF FINTECH LITERACY

The results from the Fintech literacy section showed that most Millennials and Gen Z respondents in the Eastern Cape demonstrated a moderate to high understanding of Fintech concepts. The respondents scored between 61% and 80% on Fintech literacy, while 38.40% of the respondents scores between 81% and 100% on Fintech literacy. This suggests that most of the respondents possessed high level of Fintech literacy. Only a small proportion of respondents scored in the lower ranges in Fintech literacy: for example, 4.64% of the respondents scored between 41% and 60%, 2.32% of the respondents scored between 21% and 40%, and 0.52% of the respondents scored between 0% and 20%.

Further analysis of the Fintech proficiency showed that the most used Fintech product was personal finance applications (68%), This was followed by 51% of the respondents using peer-to-peer lending platforms. Furthermore, 42% of the respondents had experience with financial robot-advisors, and only 23% of the respondents had used cryptocurrency applications. Many respondents had not used certain Fintech products. For example, 77% had never used cryptocurrency applications, and 58% had never used robot-advisors.

The content validity of the Fintech knowledge questions, assessed revealed that the cryptocurrency application item received the highest CVR value at 0.83, followed by investment applications at 0.67. Items related to robot-advisors received CVRs of 0.50. At the same time, peer-to-peer lending and payment applications scored lower (0.33). The item difficulty analysis indicated that most Fintech knowledge questions were easy for respondents. For instance, payment applications ($p = 0.809$), peer-to-peer lending ($p = 0.780$), and robot-advisors ($p = 0.716$) were all classified as easy. Two items—investment applications ($p = 0.479$) and cryptocurrency applications ($p = 0.487$)—fell within the ideal difficulty range, indicating appropriate complexity for the sample. Discrimination index results confirmed that all Fintech knowledge items functioned satisfactorily ($DI \geq 0.40$). The item on cryptocurrency application had the highest discrimination index (0.829), showing it effectively separated high- and low-performing respondents. This was followed by robot-advisors ($DI = 0.771$), investment applications ($DI = 0.667$), and peer-to-peer lending ($DI = 0.657$). The payment application item had the lowest discrimination value ($DI = 0.477$) and was removed from further analysis due to poor performance.

Lastly, the Fintech Literacy Index showed the respondents scored an average 7.08 out of 21, with a standard deviation of 2.76. This indicates moderate Fintech literacy levels overall, with some variation among individuals. When analysed by generation, Gen Z and Millennials had identical average scores of 7.07 and 7.08, respectively, highlighting no significant difference in Fintech literacy between the two groups. The next section will provide a discussion of the results.

6.6 DISCUSSION OF RESULTS AND CONCLUSION.

This section critically discusses and provides a discussion of results on financial literacy, digital literacy, and Fintech literacy.

6.6.1 FINANCIAL LITERACY

In terms of financial literacy, most of the respondents had high levels of financial literacy. These findings are inconsistent with the findings from Robert, Struwig, Gordon, and Zondi (2021) states that in the Eastern Cape, financial literacy is lowest among young adults (16 – 24), rises through middle age, and then declines among those aged 65 and older, with all age groups scoring below the national average. The difference in findings between the two studies could be due to the type of respondents and the methodology that was used. The national survey included a wider range of respondents, such as those with lower levels of education, limited access to financial information, and those from disadvantaged areas. In contrast, this study had higher individuals with at least a Matric certificate (47.68%), followed by undergraduate (27.58%) and postgraduate (21.39%) degrees. This means that more than half of the study's respondents had a formal education, which can be attributable to the study's higher financial literacy levels (Zhou, Yang, Gan, 2023).

The results show a significant portion of Millennials and Gen Z respondents lacking foundational knowledge in key areas such as compound interest and diversification. A study by Nanziri (2016) found that a low percentage (1.8%) of the sample in South Africa demonstrated understanding of how interest works, which includes concepts such as compound interest. This is a concern since access to financial products and services requires young South Africans to understand financial concepts such as compound interest.

The overconfidence observed among respondents—where financial capability tends to be high for respondents in this study —is a well-documented cognitive bias known as the Dunning–Kruger effect, particularly prevalent in financial behaviour research (Kruger and

Dunning, 1999; Fernandes, Lynch and Netemeyer, 2014). This mismatch can lead to poor financial choices, including under-saving, over-borrowing, and risky investing, especially in young consumers (Hastings, Madrian and Skimmyhorn, 2013).

The items assessing financial literacy showed acceptable psychometric properties in terms of item difficulty and discrimination, the low content validity ratios (CVRs) for certain questions suggest a need to recontextualise these items for local relevance. As Huston (2010) emphasises, financial literacy is context-dependent, and its measurement must reflect cultural and economic realities. Thus, improving clarity and conceptual accuracy in test instruments is important. The next section will review digital literacy results and the discussion.

6.6.2 DIGITAL LITERACY

The strong digital literacy scores observed in this study confirm South Africa's high mobile phone usage. This study's findings of strong digital literacy reflect earlier research showing that young people in South Africa use mobile phones extensively (ICASA, 2022). At the same time, the results reveal some difficulties with mobile device use. For example, most respondents handled basic phone functions with ease, a number faced challenges when it came to tasks like downloading content or troubleshooting technical issues. This supports the view of van Deursen and van Dijk (2014), who argue that digital inequality is not just about access to technology but also about how well people can use it in different situations.

Ng (2012) points out that digital literacy goes beyond just technical know-how; it also involves critical thinking and managing how we interact online. In this study, the fact that some young people struggled with more complex tasks suggests they might lack confidence in their digital skills. This could limit their use of important digital products and services like mobile banking applications. Prinsloo and Walton (2022) note that many young people are surrounded by technology but are not well prepared to use it in meaningful ways, especially when it comes to mobile banking or online transactions.

6.6.3 FINTECH LITERACY

Fintech literacy emerged as the least developed area despite moderate Fintech literacy levels. Low engagement with items like cryptocurrency, peer-to-peer lending, and robot-advisors mirrors global trends where people often adopt Fintech products faster than they fully understand them (Klapper, Lusardi and van Oudheusden, 2015; Ghosh and Vinod, 2017). This

gap is especially worrying in emerging economies, where regulations are weaker, and digital scams are more common (Bamia, 2025). Research shows that people with low Fintech literacy are more vulnerable to fraud, tend to overuse credit, and fall prey to hidden fees (OECD, 2022). Additionally, a lack of trust in Fintech—often caused by limited Fintech literacy and inconsistent digital financial education—holds back its potential to be truly inclusive (Demirgüç-Kunt et al., 2018).

Interestingly, the small difference in Fintech scores between Millennials and Gen Z suggests that age does not determine Fintech readiness. Instead, it depends on digital literacy, financial literacy, and trust in the system (Driva et al., 2020). The low content validity ratings for several Fintech items may suggest that the way these tools were presented might not have matched the everyday experiences of the respondents. This support calls for Fintech literacy programs that are designed locally, taking cultural and language differences into account (Aprea and Wuttke, 2016). The test's discrimination index showed it was effective; the overall average composite score (7.08 out of 21) is still relatively low. This highlights the urgent need for focused Fintech education that bridges finance and technology—an area often overlooked in traditional schooling. The next section provides the recommendations for this study.

6.7 RECOMMENDATIONS

This section will provide a review of the recommendations to Fintech providers and educators on how to improve financial literacy, digital literacy, and Fintech literacy. These recommendations are drawn from the key empirical findings presented in Chapter 5.

6.7.1 FINANCIAL LITERACY

The results showed that most respondents had a basic understanding of financial concepts such as simple interest and inflation. However, many respondents lacked financial literacy on more complex concepts like compound interest and risk diversification. It is recommended that financial education start at the high school level, especially covering concepts such as compound interest and inflation. At the tertiary level, modules should cover more advanced financial topics directly linked to financial literacy, such as interest calculations and investment-related risk understanding. To ensure accessibility, financial literacy content must also be available in isiXhosa, the dominant language in the Eastern Cape. In addition to curriculum changes, stakeholders such as provincial education departments and NGOs could run campaigns explaining these financial concepts through social media applications like

WhatsApp videos, SMS tips, and short community radio features tailored for the targeted population in this study.

Financial institutions such as banks should also take responsibility for making financial literacy more accessible through social media platforms and radio material campaigns. Materials must be simplified and context-based so that users of these Fintech products and services can apply what they learn. These materials must contain information on inflation, simple interest, compounded interest, and risk diversification.

6.7.2 DIGITAL LITERACY

The study showed that while all respondents owned a mobile phone, some had difficulty with basic mobile phone functions such as navigating phone settings. This indicates that although access to mobile devices is high, basic proficiency in using these devices remains inconsistent. To address this, the study recommends that practical digital literacy programmes be offered at community venues such as youth centres and libraries across the Eastern Cape. These sessions should focus on helping young people improve their basic mobile phone skills and learn to use their mobile phones more proficiently. At the school level, digital literacy should be included more intentionally in subjects such as Computer Applications Technology (CAT), with a focus on real-life scenarios like accessing online services or using mobile applications for communication and banking. Additionally, educational authorities and mobile service providers could collaborate to send out simple, easy-to-follow tutorials via SMS or WhatsApp that focus on everyday mobile usage.

6.7.3 FINTECH LITERACY

To improve Fintech literacy, targeted awareness initiatives should be introduced through higher education institutions, local NGOs, and Fintech companies. These initiatives must go beyond general exposure and instead focus on unpacking how specific Fintech products work and how they are relevant to users' financial lives. For example, when addressing peer-to-peer lending, training should cover what it means to borrow or lend directly to another individual without going through a bank, how interest rates are set, and what risks and protections exist in South Africa's context. Practical examples, such as Funding Circle or local informal equivalents, can help participants understand how this model applies to small businesses or individuals needing short-term finance.

Many respondents were unfamiliar with the concept of robot-advisors. Education programmes should explain that these are automated platforms that offer low-cost investment advice based on algorithms. With cryptocurrency, the study found a substantial lack of understanding about what crypto platforms are used for and what benefits or risks they carry. Therefore, awareness sessions should focus on defining basic blockchain principles in plain language, how cryptocurrencies like Bitcoin or Ethereum are accessed and stored, what wallets are, and the volatility and security risks involved. It is important to emphasise that cryptocurrency is not a guaranteed investment and is subject to legal and financial uncertainty in South Africa. Respondents should also be informed about scams and fraudulent schemes in this space.

Regarding investment applications, very few respondents were familiar with tools like robot-investing or investment applications. Educational interventions should show how these platforms work, for example, how users can begin investing with small amounts, how portfolios are automatically diversified, and what fees or risks are involved. Showing how to compare applications, read performance data, and understand investment timelines would be beneficial. Since many in the sample were students and not earning any income from any employment, content should also include warnings about overcommitting to risky platforms or being misled by marketing. Fintech providers should partner with educational institutions to roll out these sessions through seminars, video training, or social media tutorials. Content should be available in isiXhosa and English, and local examples should be included to increase relatability. In-app support should also be improved, including beginner modes, glossary popups. The next section provides the contribution and future research.

6.8 CONTRIBUTION AND FUTURE RESEARCH

This study makes several important contributions to the growing field of Fintech research, particularly in South Africa, where academic literature remains limited. Fintech adoption has accelerated across South Africa, but research on Fintech literacy, especially among Millennials and Generation Z, has not developed. Most existing studies are concentrated in developed countries or focus narrowly on financial inclusion or digital banking trends, often neglecting the combined effect of Fintech literacy. In South Africa, few studies have attempted to define or measurement of Fintech literacy, and even fewer have done so using localised data from underserved provinces such as the Eastern Cape.

This study responds to that gap by developing and testing a context-specific Fintech Literacy measurement. The instrument was tailored to the South African environment, drawing on global frameworks but adapted to local conditions and challenges. This study uses content validity and item analysis to develop a context-specific Fintech Literacy measurement which can be used in future studies. This study also adopts a theoretical framework that highlights the components used in the study and shows the questions used to measure the components in the study. This study may be the first to adopt the framework of Lyons and Kass-Hanna (2021), within the South African context. Therefore, this study makes an international contribution by showing how the framework works in a developing economy and thus provides information on Fintech in a different context.

This study also measures Fintech literacy. There is limited information on Fintech literacy in South Africa, especially focusing on youth in the Eastern Cape. The study also highlights the realities of digital and financial participation in a province often excluded from national research agendas. This study raises the alarm on fintech literacy among the youth and contributes to the literature on Fintech literacy in South Africa. The study results and questionnaire can be used as a baseline for future research in South Africa.

Practically, this study provides results and recommendations to financial institutions and Fintech providers. Financial institutions and Fintech providers may use the results to understand Millennials and Generation Z and better target millennials and Gen Z as clients. Fintech developers can also benefit from the measurement tool created in this study. The tool helps identify where users are struggling—whether it is understanding how mobile payments work, recognising online scams, or using more advanced tools like robot-advisors. Developers can use this data to design better interventions, such as simplified application interfaces, built-in guides, or even onboarding features that teach users how to use the application safely. This means they will not just be building products—they will be building products that match the users' actual skill levels and needs.

Educators can use the results to motivate and design Fintech content that aligns with the needs of Millennials and Generation Z. Policymakers can use the results for policymakers and regulators; the results are significant. They show that giving young people access to Fintech platforms is insufficient. Provinces like the Eastern Cape need Fintech policies focusing on helping people use Fintech safely and effectively. One example that can be adapted is the

Fintech regulatory sandbox model used in some U.S. states. Fintech companies can test new products in a controlled environment using these models while working closely with regulators. This makes it easier to try out tools aimed at people who may not usually be included in formal finance (Global Legal Insights, 2024).

The Eastern Cape government could introduce its provincial sandbox, where Fintech companies can test products like youth savings applications or small business credit tools, but it must also include an education or awareness element. This could include short tutorials, in-application safety tips, or live community sessions in rural towns to help people understand what they are using.

Future research should focus on extending this study to other provinces in South Africa and to other developing countries in order to test the reliability and applicability of the Fintech literacy measurement tool in different contexts. It will also be important to conduct longitudinal studies that trace how Fintech literacy evolves among Millennials and Generation Z as new technologies such as cryptocurrencies, blockchain and artificial intelligence become more integrated into financial services. Comparative studies across age groups, gender, income levels and urban and rural areas could provide deeper insight into the structural inequalities that shape Fintech access and use. Finally, future studies should investigate the role of policy interventions such as provincial Fintech sandboxes, educational campaigns and the inclusion of Fintech content in school and university curricula, as these could provide practical pathways for strengthening inclusion, trust and economic development in provinces such as the Eastern Cape. Next, the limitations of the study are provided.

6.9 LIMITATIONS OF THE STUDY

The study achieved its aim of developing and validating a Fintech literacy measurement instrument for Millennials and Generation Z in the Eastern Cape. However, there were some limitations like all studies.

Firstly, the use of non-probability sampling, specifically, judgemental and snowball techniques, limited the generalisability of the results. Future studies should use a probability sample to generalise the results to the broader population of Millennials and Generation Z across the Eastern Cape.

Secondly, this study used an online questionnaire, although necessary for a Fintech study, especially to measure digital literacy. However, future studies may consider using a paper-and-pen method in collecting primary data to obtain data from a large sample. This method may be better suited for students who have internet access, but for a larger sample, may use traditional methods of collecting primary data.

Finally, the Fintech Literacy Index was developed based on theory and tested through item analysis. More testing with larger and more diverse groups is needed to confirm the Fintech instrument in the future other provinces or on a national level.

This study also raises important considerations for future research. Firstly, testing the Fintech Literacy Index in other provinces and across more diverse socio-economic groups. Secondly, there is a need for longitudinal studies that track how Fintech literacy evolves over time, and comparative studies between underserved and urban areas or between provinces would help identify regional disparities and tailor solutions more effectively. The next section provides the closing remarks of the study.

6.10 CONCLUDING REMARKS

This study set out to develop a context-specific measurement instrument and measure the Fintech literacy level among Millennials and Generation Z in the Eastern Cape. The study argued that Fintech literacy, the combination of financial and digital literacy—is essential for enabling young people to engage meaningfully with Fintech products and services while managing associated risks. The study's implications are clear: improving financial literacy is critical to strengthening Fintech literacy. This study provides a foundation for understanding and improving Fintech literacy in the Eastern Cape. It shows that digital access alone is not enough without strong financial knowledge. If South Africa is to build a more financially inclusive future, Fintech literacy must become a national priority—starting with those who use it most.

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ANNEXURE A: QUESTIONNAIRE

RHODES UNIVERSITY
Where leaders learn

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Dec 2024 – Jan 2025

COVER LETTER

Dear valued participant,

I am a Master of Commerce student conducting a research project as part of the requirements for my degree. I am studying **the development and measurement of Fintech literacy in Millennials and GEN Z in the Eastern Cape**. The study aims to investigate the Fintech literacy level among Millennials and Gen Z in the Eastern Cape of South Africa and to develop a context-specific measuring instrument. **Your participation in this study will assist me in completing this study.** The questionnaire should take approximately 15 minutes to complete. Participation in this research project is voluntary, and you can withdraw from it anytime. All responses will be confidential, and your identity will remain anonymous. The results of this research will be used only for academic purposes. Completing this questionnaire will **contribute to developing a Fintech Literacy questionnaire within the Eastern Cape.** Please complete the following questionnaire.

If you need any more information about the research paper, please do not hesitate to contact me or my supervisor.

Yours sincerely,

Researcher
Tanya Ndlovu
Email: G17n9866@campus.ru.ac.za

Supervisor:
Dr Xolile Antoni
Email: x.antoni@ru.ac.za

SECTION A: DEMOGRAPHIC QUESTIONS

This section pertains to your demographic details. Please indicate your response by placing an "X" in the appropriate box.

1. Please indicate your gender (for statistical purposes only).

Gender		
Man		1
Woman		2
Non-Binary		3
Other:		4

2. Please select the racial group with which you identify (for statistical purposes only).

Race		
African		1
White		2
Asian/Indian		3
Coloured		4
Other: Please indicate…		5

3. Please indicate to which age category you belong (for statistical purposes only).

Age		
18 - 23 years		1
24 - 28 years		2
29 - 33 years		3
34 - 38 years		4
39 - 43 years		5
Above 43 years		6

4. Please indicate your highest completed educational level (for statistical purposes only).

Education		

Less than Matric/Grade 12		1
Matric/Grade 12 certificate		2
Undergraduate degree		3
Postgraduate Degree (Honours or masters)		4
PhD		5

5. Please indicate your current employment status (for statistical purposes only).

Employment		
Student only		1
Student and employed full-time		2
Student and employed part-time		3
Employed full-time		4
Employed part-time		5
Unemployed		6
Other: Please specify…		7

SECTION B: FINANCIAL LITERACY

This section measures your financial literacy levels. Please answer the questions on financial literacy about interest rates, compound interest, inflation, and diversification. Please respond to the following questions by selecting the appropriate correct option.

1. Suppose you need to borrow an amount of R100. Which option would cost you less in terms of repayment amount?

Options:		
A.	Borrowing R100 with no additional charges.	1
B.	Borrowing R100 with an additional charge of 3%.	2

C.	Borrowing R100 with an additional charge of 5%.	3
D.	Do not Know	4

2. Suppose you deposit R5000 each year in the bank for two years, and the bank adds 10% of interest per year in the bank account. How much interest will you earn in the second year?

Options:		
A.	I will earn more than R500 as interest in the 2nd year.	1
B.	I will earn R500 as interest in the first and second year	2
C.	Do not know	3
D.	None of the above	4

3. If you have R100 in a savings account, and the bank adds 10% per year, how much money will you have after five years:

Options:		
A.	Do not know	1
B.	Less than R150	2
C.	More than R150	3
D.	Exactly 150	4

4. If the prices of a basket of food double over the next 10 years, and your income doubles, will you be able to buy:

Options:		
A.	The same basket of food	1
B.	More food in the basket	2
C.	Do not know	3

D.	Less food in the basket	4

5. Is it safer to put your money into shares or investments?

Options:		
A.	Multiple shares or investments	1
B.	One share or investment	2
C.	Do not know	3
D.	It depends on the level of risk the investor is willing to accept.	4

6. Please read the statement on financial capability and respond by indicating your extent of agreement with the statement. Please select the most appropriate option.

Question	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
I possess the necessary financial knowledge and skills to manage my finances well	**1**	**2**	**3**	**4**	**5**

SECTION C: DIGITAL LITERACY

This section contains questions about digital device access, specifically the ownership of a mobile device or smartphone. Please answer the following questions by selecting the appropriate option.

Question Number	**Question**	**Yes**	**No**

1.	Do you own a smartphone?	Yes	No
2.	Do you own a mobile phone?	Yes	No

MOBILE PHONE PROFICIENCY

This section has questions related to mobile phone proficiency. Mobile phone proficiency will be measured on navigation and using a mobile phone. Please respond to the following questions by selecting the appropriate option.

Question Number	Question	Yes	No
1.	Have you used a mobile phone in the last 90 days to call or receive calls?	Yes	No
2.	Have you used a mobile phone in the last 90 days to send or receive text messages?	Yes	No
3.	Have you used your mobile phone in the last 90 days to send or receive files in various formats (e.g., PDF, Word, Excel)?	Yes	No
4.	Have you used a mobile phone in the past 90 days to browse or use the internet?	Yes	No
5.	Have you used a mobile phone in the past 90 days to download music, videos, or games?	Yes	No
6.	Have you used a mobile phone in the last 90 days to make a financial transaction, such as sending/receiving money, making a payment, or banking transaction?	Yes	No
7.	Have you used a mobile phone in the last 90 days to upload or share content (e.g., photos, videos, or posts) on Facebook, WhatsApp, Twitter, Instagram, TikTok, or any social media site?	Yes	No

SECTION D: MOBILE BANKING PROFICIENCY

This section presents questions assessing mobile banking proficiency, measured by your ability to use and navigate various banking applications. Please select the appropriate option for each question.

Question Number	Question	Yes	No
1.	I can open a mobile banking application without anyone helping me.	Yes	No
2.	I can find a menu item in my banking application without assistance from anyone.	Yes	No
3.	I can initiate a transaction in my mobile banking application without help from anyone.	Yes	No
4.	I can complete a transaction in my mobile banking application without assistance from anyone.	Yes	No
5.	I can correct an error in the amount or phone number of a receipt in my mobile banking application without assistance from anyone.	Yes	No
6.	I can reverse or cancel a transaction with my mobile banking application without anyone's help.	Yes	No

SECTION E: KNOWLEDGE OF FINTECH

This section has questions on Fintech products. These questions measure awareness and knowledge of payment applications, cryptocurrency, financial robot advisors, and peer-to-peer lending. Please answer to the best of your ability by selecting the appropriate response.

1. How familiar are you with automated financial advice tools such as robot advisors?

Options:		
A.	Very familiar	1

B.	Somewhat familiar	2
C.	Somewhat unfamiliar	3
D.	Not at all familiar	4

2. Please select one or more payment applications you know in South Africa.

Options:		
A.	Snap Scan	1
B.	Voda pay	2
C.	Do not know	3
D.	Fast Pay	4

3. What is a crucial advantage of using financial robot advisors compared to human advisors?

Options:		
A.	Lower fees and minimal human intervention	1
B.	Greater need for in-person appointments	2
C.	Less personalised advice interaction	3
D.	Do not know	4

4. What is the best way to describe peer-to-peer lending?

Options:		
A.	It allows consumers to borrow money from each other	1
B.	It allows institutions to borrow money to a group of consumers	2
C.	Do not know	3

D.	It allows institutions to borrow money to other institutions	4

5. Select the most popular investment application in South Africa.

Options:		
A.	Do not know	1
B.	Easy equities	2
C.	Johannesburg Stock Exchange	3
D.	Tyme Bank	4

6. Select one benefit of using cryptocurrency applications.

Options:		
A.	It increased control over one's finances and direct transactions between users	1
B.	Do not know	2
C.	It increases dependence on intermediaries for transactions and slower processing times	3
D.	It offers a higher level of anonymity and can be less traceable than traditional transactions.	4

SECTION F: FINTECH PROFICIENCY

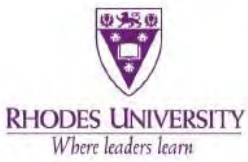
This section has questions on the use of Fintech products. The questions include cryptocurrency, peer-to-peer lending, and financial robot advisors. Please answer to the best of your ability by selecting the appropriate responses.

Question Number	**Question**	**Yes**	**No**

1.	Have you ever used a cryptocurrency application to buy, sell, or manage your investments?	Yes	No
2.	Have you ever used a personal finance application to track or manage your spending?	Yes	No
3.	Have you ever used a financial robot-advisor to buy, sell, or manage your investments?	Yes	No
4.	Have you ever used a peer-to-peer lending platform to lend or borrow money?	Yes	No

***** Thank you for your time!**

ANNEXURE B: ETHICS APPROVAL LETTER



Rhodes University Human Research Ethics Committee
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e: ethics-committee@ru.ac.za
https://www.ru.ac.za/researchgateway/ethics/
NHREC Registration number: RC-241114-045

5 December 2024

Miss Tanya Ndlovu,

Email: g17n9866@campus.ru.ac.za

Review Reference: 2024-8167-9302

Dear Miss Tanya Ndlovu

Re: The Measurement of Financial Technology Literacy for Millennials and Gen Z in the Eastern Cape.

Researcher: Miss Tanya Ndlovu

Supervisor(s): Dr. Xolile Antoni

This letter confirms that the above research proposal has been reviewed and **APPROVED** by the Rhodes University Human Research Ethics Committee (RU-

HREC). Your Approval number is: 2024-8167-9302

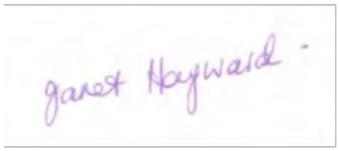
Approval has been granted for 1 year. An annual progress report will be required in order to renew approval for an additional period. You will receive an email notifying you when the annual report is due.

Please apply for a protocol amendment should any substantive change(s) be made, for whatever reason, during the research process. This includes changes in investigators. Email your request to ethics-committee@ru.ac.za.

Please submit a brief report to the ethics committee on the completion of the research. The purpose of this report is to indicate whether the research was conducted successfully, if any aspects could not be completed, or if any problems arose that the ethical standards committee should be aware of.

If a thesis or dissertation arising from this research is submitted to the library's electronic theses and dissertations (ETD) repository, please notify the committee of the date of submission and/or any reference or cataloguing number allocated.

Sincerely,



Dr Janet Hayward

Chair: Rhodes University Human Research Ethics Committee (RU-HREC)

ANNEXURE C: KREJCIE AND MORGAN TABLE FOR DETERMINING SAMPLE SIZE

N	S	N	S	N	S
10	10	220	140	1,200	291
15	14	230	144	1,300	297
20	19	240	148	1,400	302
25	24	250	152	1,500	306
30	28	260	155	1,600	310
35	32	270	159	1,700	313
40	36	280	162	1,800	317
45	40	290	165	1,900	320
50	44	300	169	2,000	322
55	48	320	175	2,200	327
60	52	340	181	2,400	331
65	56	360	186	2,600	335
70	59	380	191	2,800	338
75	63	400	196	3,000	341
80	66	420	201	3,500	346
85	70	440	205	4,000	351
90	73	460	210	4,500	354
95	76	480	214	5,000	357
100	80	500	217	6,000	361
110	86	550	226	7,000	364

N	S	N	S	N	S
120	92	600	234	8,000	367
130	97	650	242	9,000	368
140	103	700	248	10,000	370
150	108	750	254	15,000	375
160	113	800	260	20,000	377
170	118	850	265	30,000	379
180	123	900	269	40,000	380
190	127	950	274	50,000	381
200	132	1,000	278	75,000	382
210	136	1,100	285	100,000	384

(N = Population, S = Sample Size)

Source: Krejcie and Morgan (1970)