SELINUS UNIVERSITY
OF SCIENCES AND LITERATURE

An evaluation of the drivers of Digital Transformation of the Banking Sector in South Africa

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A DISSERTATION

Presented to the Department of

Bank Management

Program at Selinus University

Faculty of Business and Media

In fulfilment of the Requirements

For the Degree of Doctor of Philosophy

in **Bank Management**

Year 2023

Acknowledgements

I wish to express my gratitude to my supervisor Professor Salvatore Fava for the guidance and advice throughout the iterative Thesis journey. My appreciation further goes to institutions that allowed me access to their staff as well as individuals who took time to participate in the research by completing questionnaires. Finally I wish to thank my family; wife Alice and children Tatenda, Kundai and Alex for all the encouragement.

Thank you all.

Abstract

This research evaluates the drivers of digital transformation of the banking sector in South Africa, an emerging market. The research objectives were set to identify factors driving digital transformation, to evaluate the impact of these factors considering various banking products, to determine the success of the digital transformation thus far and recommend ways to further improve delivery of digital banking services.

A quantitative approach (research method) was used in order to objectively research the factors which were driving digital transformation. In this study the quantitative approach was chosen because it is fast, scientific, focused and relatable. It was possible to use data computing equipment to process and analyse fairly quickly a large sample of data with efficiency and accuracy. Further, using the quantitative approach, it was feasible for relationships between the study's variables to be determined objectively and accurately.

The study made use of a structured questionnaire to collect data from the sampled individuals within the research target population of 31 banks which were operating in South Africa between 2021 and 2022. Due to the nature of the information required, the study targeted members of management who were considered to be well informed about their banks' digital transformation process.

The study managed to attain its objectives and concluded that the following factors were driving digital transformation of banks in South Africa:

a) Regulation,
b) Competition from Fintechs and digital banks,
c) Changing Customer Behaviours,
d) Availability of Digital technologies,
e) The Covid-19 pandemic, and
f) The desire by banks to grow and improve financial performance

Linking to the Perceived Characteristics of the Innovation Model (PCI) theoretical framework adapted in this study it was concluded that the findings supported the technological, social and psychological aspects of the PCI.

The impact of the drivers of Digital Transformation was assessed and the study concluded that branches, number of employees and cost of delivering service for South African banks reduced significantly. Meanwhile the range of services and number of active accounts increased pointing at increased business volumes consequent to the adoption of digital channels.

Success of the digital transformation was assessed and it was concluded that the number of products and services and volume of transactions on digital platforms was high pointing to acceptance of the digital banking technologies deployed. Reasons for the acceptance included transaction quick turnaround time and flexibility to transact anytime and from any place which gave customers financial freedom.

Recommendations were made to increase investment in digital technologies so that customers have ready access to digital banking products and services, to equip employees with relevant digital skills for efficient service delivery and to incentivise usage of digital platforms.

Something new and unique that was learnt in this study is that, change in the environment is a major factor which should be considered in the technology acceptance models. We learnt this from assessing the impact of covid-19 on technology acceptance which was a major driving factor in consumers' switch from classic (traditional) banking practices to digital channels. Covid-19 resulted in lockdowns which restricted people movement thereby making it imperative to rely on technology because people could not regularly visit their banks. We learnt that digital transformation of banks in South Africa moved faster during the pandemic period because customers did not have alternative ways to transact.

Contents

Chapter 1

1.1 Introduction

This study was conducted as an evaluation of the drivers of digital transformation of the banking sector in South Africa. In this chapter, the background of the study is established, and the statement of the research problem given. The significance of the study and its research objectives and questions are also covered together with the scope of the study. The study's limitations and assumptions are also provided.

1.2 Background to the study

Digital technology is transforming economies by introducing new modes of transacting, generating competitive advantage, and introducing new value propositions particularly in the financial services industry. As a result, South African banks are making significant investments in their digital transformation to stay ahead of competition, benefit from first mover advantage, and increase market share. Kitsios, Giatsidis, and Kamariotou (2021) define digital transformation as a process that integrates information, communication, and networking technologies to enhance a company's processes. Digital transformation has resulted in the development of digital banks that rely on technology-driven channels. On the flip side, digital transformation of the financial services industry has seen the demise of the Classic or Traditional Banking Model, which offered banking services within banking facilities (brick and mortar branch networks), sparking interest in the analysis of the factors driving the banking sector's digital transformation (Louw and Nieuwenhuizen, 2020).

Technology-driven structural changes affect many facets of the global economy, including banking. Banks must now undergo digital transformation if they want to be

competitive and continue to satisfy their consumers' changing needs (Harvey, 2016). The definition of "digital transformation" is not universally agreed upon. Yet, it comes across as a wide notion that covers business strategies, operational procedures, available resources, and the cultural shifts that technology adoption makes possible. One of the main considerations in the process is ensuring that banks effectively manage the risks associated with digital transformation and the long-term viability of their business models (Diener & Špaček, 2021). Banks can prosper as a result of the opportunities provided by digital transformation if they can successfully navigate the inherent risks that come with it, including operational, technological, and strategic risks as well as any new emergent threats (Tsindeliani, Sadovskaya, Popkova, Davydova, & Babayan, 2022). An understanding of the drivers would arguably make this transformation smooth and guaranteed to succeed.

1.2.1 Digital Banking Motivation

According to Broby (2021), the different degrees of technological integration in banking business models have led to the disappearance of pure classic banks (with a conventional banking feel). Depending on the product and banking institution, digital strategy is either being considered, has already been implemented, or is now being used. Process automation has changed the architecture of banking back office and front office systems, according to Bathula and Ghupta (2021). The current idea of digital banking is mostly driven by:

- Shifting client behaviour as they become acclimated to the convenience and flexibility of transacting from anywhere at any time (Nkoyi, Tait and Van Der Walt, 2019).

- Covid-19 and the lock downs that followed it, which are true disruptors that have succeeded in accelerating digital transformation across all industries (Rajesh and Webology, 2021).
- Modifications to regulations: In South Africa, a developing country, the expansion of digital banking was also made possible by the government's desire for residents of distant rural areas to have access to banking services (Chatimira and Ncube, 2020).
- The Covid -19 pandemic-era competition from non-banking digital enterprises that offered services similar to banks' (open point of banking) prompted banks to make significant investments in their own digital transformation (Nel and Boshoff, 2020)
- The desire of banks to increase client empowerment, lower operating costs (cost to income ratio), and enhance customer experience. Reduced labour expenses, service standardization, and better accessibility of the bank are true competitive differentiators (Lee et al, 2021). When using digital platforms for transactions, banks can generate revenue outside of regular business hours as long as there is some sort of economic activity going on and the cost of doing so is low (Nkoyi, Tait and Van Der Walt, 2019). In the virtual banking environment, banks have shown they can increase customer satisfaction while giving customers secure access to their account information in the way and sequence required (Bathula and Ghupta, 2021). One can, for instance, extract an e-statement with debits only if they want to view outflows, credits only for inflows, or both, as well as specify transaction dates and amounts, among other choices. The consumer incurs no additional costs as a result of any of this.

1.2.2 Digital Technologies and Channels in use

Today digital transformation of banks is more visible (Monaghan, 2022) and the digital technologies and delivery channels commonly used are:

- Internet banking (e-banking) which replaced cheques
- Mobile banking (m-banking on smart phones and Unstructured Supplementary Service Data, commonly referred to as USSD coding on feature phones)
- Different types of Automated Teller Machines (ATMs) replacing over the counter teller services
- EMV compliant Chip / tap cards also referred to as plastic money influencing the growth of a cashless society
- Point Of Sale (POS) machines which provide real time transactions for merchants and traders making the movement of money much faster and simplifying trade.

1.2.3 Products and Services

With customer preferences shifting to online a lot of banking products and services that used to be offered inside banking premises are now offered via digitally enabled platforms (Bhanda and Vitucci, 2022). These products and services include:

- Cash deposit completed on deposit taking machines
- Cash withdrawal in-store and on ATMs
- Account Statement and balance enquiry on the phone and internet banking
- Loan application and management completed on internet banking
- Bill payments on line
- Funds Transfers via mobile bank and internet payments platforms

- Web-based card management including ordering, blocking, increasing card limits and geographic application
- Mobile wallet Services
- whatsApp based Chatbots for answering routine and repetitive customer questions which kind of gives a 24 hour enquiries or help desk service

1.2.4 Global Digital banking Transformation

Before COVID-19 accelerated the transition from branch-based to online banking, digital transformation of the banking sector was already well under way, (Lee et al, 2021). Financial institutions were working to keep up with customer expectations and fend off competition from start-ups, internet goliaths, fintechs, neo banks, and new entrants from other industries. Due to quick turnaround times and 24/7 availability to retail consumers, digital platforms were already overtaking legacy banks' sluggish and painstaking manual transacting platforms (Malar, Arvidsson, & Holmstrom, 2022). New players relying on digital prowess were lowering the cost of operations and increasing customer acquisition by having an entirely online presence while utilising cutting-edge marketing strategies, (Lee et al, 2021).

In addition, today, traditional payment methods are getting disrupted by technological developments like crypto currencies, prompting traditional banks to expedite their digital transformation. Also, the use of technology results in cost saving as cumbersome middle and back-office procedures are automated (Filotto, Caratelli, & Fornezza, 2021). Data analytics and artificial intelligence (AI) tools are already being used more frequently reducing manual interventions relied on previously. AI and data analytics provide individualised client interaction, quicker KYC, broad lending choices, improved fraud protection and automated product (loan) pricing, (Xie & Wang, 2023).

Banks now have the ability to further reduce expenses by reducing the number of branches they have due to the growth of internet banking. Digital banking and virtual space consolidations led to a net shutdown of 29,271 bank branches in the US while UK closed 7362 bank locations over the last five years to 2022, (Xie & Wang, 2023). The global markets continue to place a strong emphasis on enhancing digital client experiences and automating middle and back-office procedures. As players develop their own digital banks (as a separate legal entity or brand) and get access to talent and digital capabilities through partnerships and acquisitions, banking leaders have come to the realization that digital transformation is necessary to improve performance (Bathula & Gupta, 2021). By extending the variety of available goods and services, partnerships and acquisitions in the fintech industry also offer more diversified revenue sources for traditional banks.

As much as a case study will be considered in detail in this research work, it suffices to note as part of this introduction that an Italian bank, Intesa Sanpaolo launched ISY Bank, a digital bank, as it aims to compete with new fintech players, cut costs, and expand its global retail market (Theiri & Alareeni, 2023). Far afield, in line with other digitally led banks, Standard Chartered invested in its digital banking services in Hong Kong and has similar intentions to spread this approach globally (Jameaba, 2023). Furthermore and as anticipated, corporate venture funds have been organised by some banks to finance investments in technological capabilities and compete in the fintech universe. Jenik, (2022) notes growing investor interest in large challenger banks, with these organizations raising sizable venture capital funds.

The COVID-19 epidemic served as an extraordinary push for the global adoption of digital banking. Retail bank customers had little choice but to embrace these self-

service channels like never before as a result of numerous branches being temporarily closed and the reduction in the amount of physical interactions. The use of digital banking increased significantly at almost all banks, both big and small. For instance, in 2020, an American bank, Wells Fargo observed a 35% increase in remote check deposits and a 50% increase in online wire transfers (De Venn, 2023). Even many clients were compelled by the epidemic to try mobile banking for the first time, particularly among the older cohorts. Bhanda & Vitucci (2022) show that customer preferences for digital banking vary significantly depending on the scenario. Branches are probably going to continue to be on the decline when considering banks' total revenue development and building stronger client relationships. As such banks should, probably, take advantage of the growing popularity of digital banking by fusing the digital and legacy banking worlds (Diener & Špaček, 2021).

While mobile banking has made it simple for customers to check their accounts' balances, pay bills, transfer money, or withdraw cash from ATMs, the new digital tools have also made it simple to access alternative financial options from competitor banks who only operate online and virtually, (Tsindeliani, Sadovskaya, Popkova, Davydova, & Babayan, 2022). As a result, primary bank loyalty is at stake, particularly among younger customers. De Venn (2023) also indicate that people who live in cities and have full-time employment are more likely to be receptive to starting new banking relationships. The need for customer relationship management (CRM) in the banking interactions is therefore crucial, regardless of whether customers choose to connect with their bank in-person at a branch or digitally with a chatbot when conducting online banking (Theiri & Alareeni, 2023). The process of digital transformation arguably

needs to be handled in a manner that helps the banks to retain existing customers apart from recruiting new ones.

1.2.5 The South African Banking Industry

In a market with 31 banking organizations in 2021, 5 banks dominate the South African banking sector (SARB, 2022). The SARB states that the 31 banking institutions are made up of 13 foreign bank branches and 18 local banks. 90% of the assets in South Africa's banking sector, valued at USD425 billion, were held by the five biggest banks. For the past ten years, these 5 institutions have constantly dominated the South African banking industry. Yet, according to the Prudential Annual Report for 2021 (SARB, 2022), two of the three digital-only banks that were recently registered between 2017 and 2019 have significantly increased their market share, to the point where they are challenging the status quo. The banking industry has made significant investments in digital channels in the years leading up to 2021 financial reporting as a response to competition (Jenik, 2022).

1.2.6 Digital transformation in the South African banking Industry

The banking industry in South Africa is quickly transitioning to a "marketplace without limits," driven by the rapidly approaching entry of new digital companies who are challenging the status quo and fostering previously unheard-of levels of innovation (Denecker, d'Estienne, Gompertz, & Sasia, 2023). As a result, the universal banks led by the big four namely; Absa, FirstRand, Nedbank and Standard Bank have kept up their large-scale transformation initiatives aimed at enhancing customer experience, embracing digital transformation, implementing new working methods, and slashing costs across the board, (Jenik, 2022). It is therefore contended that not all digital

banks have met the lofty expectations set at their introduction in South Africa due to cutthroat competition, but, those who could create a distinct segmentation model and set themselves apart succeeded (Diener & Špaček, 2021). Digital banks' business model is centred on monetising customer insights through carefully constructed ecosystems, and they have implemented an agile virtual systems development approach. According to April & Govender (2023), South African digital newcomers will need to follow this formula to produce the same results in the banking industry. The challenge provided by these new fintech competitors is nonetheless felt by the universal banks who have the primary advantage over their rivals in that they already serve a sizable portion of the retail and commercial consumer market in the country, (De Venn, 2023). On their part, the universal banks are not sitting back on their laurels opting to create distinct digital innovative strategies and operational models aimed at maintaining their competitive advantage and taking on the challenge offered by quick-moving fintech-led competitors. De Venn, (2023) further noted that universal banks must also establish a culture that encourages adaptability and responsible risk-taking.

South Africa's banking industry has a vibrant and promising future as noted by Thusi and Maduku, (2020).This is so because agile new tech-entrants have arguably modernised the banking sector in head-to-head competition with universal banks revitalised by a differentiated value proposition and a business strategy centred on the monetisation of customer information (Thusi & Maduku, 2020). In this new environment, not all banks will be successful, but those who adapt quickly will profit and win a disproportionate piece of the future banking industry, (De Venn, 2023). For the past ten years, the financial services sector in South Africa has prioritized digital more and more & digital platforms have been the primary channels for large volumes

of transactions, enabling innovation and healthy competition to flourish (Elnahass, Trinh, & Li, 2021).

Overall digital use has increased, with both established players and recent entrants making noteworthy innovative steps. Customers can now take advantage of benefits like quickly opening a bank account, carrying out basic transactions using WhatsApp, or conveniently completing cash handling services through their neighbourhood grocery stores thanks to emerging technology, increased competition, and raised customer expectations (April & Govender, 2023). With the rise of low/zero cost banking and new neo-banks working on lean cost models underpinned by superior next generation technology, digital transformation has also boosted financial inclusion by eliminating access barriers. The South African financial services sector has benefited greatly from digital transformation, (Diener & Špaček, 2021). To better harness the benefits, it is necessary for the banks to understand the drivers of this digital transformation.

On a different trajectory, the pace of digital transformation in the banking sector has arguably been accelerated by unforeseen events such as COVID-19, denying the sector time to slowly consummate the dynamics of substituting conventional banking practices with digital platforms, (Jenik, 2022). Despite the progress made this far, it is notable that there are so many factors which drive digital transformation without players being afforded an opportunity to acquire the basic understanding of their relative salience. To map out an effective business strategy, it is however important to understand the salience of the drivers of digital transformation as a guide to successfully navigate the desired change.

1.3 Statement Of The Problem

There is great potential for corporate digital transformation and the creation of new digital business models as a result of the development and greater acceptance of the Internet and online technologies over the past couple decades (Louw & Nieuwenhuizen 2019). As a result of the Fourth Industrial Revolution (4IR), businesses all over the world are being redesigned and reorganised, and banks are no exception. Consumer banking services, including those provided through digital channels like websites, Internet banking portals, and smartphone applications, are growing more and more dependent on technology. Banks run the risk of missing out on the value benefits provided by digital transformation, if they remain trapped in the conventional business models that require clients to visit a bank office (Kitsios, Giatsidis, & Kamariotoy, 2021).

Businesses in various industries are realising that the intangible parts of relationships that are facilitated by digital channels and services cannot be readily imitated by rivals, giving them a long-term competitive edge (De Venn, 2023). Service industries like the financial service sector are increasingly relying on digital value outcomes. Such value outcomes—both actual and perceived—become crucial pillars on which the firm ultimately builds customer journey maps critical for business retention and growth, (Kitsios, Giatsidis, & Kamariotoy, 2021). Today, customer experience is judged on the performance of a firm's digital platforms and this appraisal takes place involuntarily on social media platforms, (Kitsios, Giatsidis, & Kamariotoy, 2021). Based on this observation, it can be argued that digital technologies are fundamentally altering the global banking sector by obliterating the traditional distinctions between product, market, and customer experience (Denecker, d'Estienne, Gompertz, & Sasia, 2023).

As a result, when considering financial services, customers are enticed by digital accessibility, speed of transacting and amount of information at their disposal as opposed to product differentiation, consolidation, and diversification as solutions to their needs in a changing competitive environment (Broby, 2021).

By making services exclusively available through online channels or through smartphone apps, internet, digital-only banks provide alternatives to traditional banking business models by removing the need to establish and maintain physical bank branches (Kitsios, Giatsidis, & Kamariotoy, 2021). Digital banks are challenging traditional banking business models by creating convenience. Convenience and economic efficiency have already had a positive impact on consumers' adoption intention and continuance intention of digital banking services; demonstrating how technology has fundamentally changed the creation, delivery, reception, and use of these financial products (Broby, 2021). Due to this and the introduction of the 4IR, conventional banks may probably face greater pressure to expand and keep their clientele while also catering for the heterogeneity demanded by clients through the digital transformation of consumer services (Harunavamwe, Nel, & Van Zyl, 2020). Consequently, it is indisputable that all South African banks are going through an inevitable journey of digital transformation, including the conventional banks, though the models being followed maybe different. The only question is to understand the drivers and impediments and come up with an optimal strategy for implementing the digital transformation. This study thus sought to evaluate the drivers of digital transformation in South African Banks to bridge this gap.

1.4 Aim of the Research:

This research aims to achieve the following:

To evaluate the drivers of banking digital transformation in an emerging market, which is South Africa.

1.5 Objectives of the study:

1. To identify factors driving digital transformation in the banking sector in South Africa
2. To evaluate the impact of the drivers of Digital Transformation considering various banking products and delivery channels
3. To determine the success of digital transformation of the banking sector in South Africa from the evaluation undertaken
4. Recommend ways to further improve delivery of digital banking services in South Africa

1.6 Research Questions

1. What are the factors driving digital transformation in the banking sector in South Africa?
2. What is the impact of the drivers of Digital Transformation considering various banking products and delivery channels?
3. How successful has the digital transformation of the banking sector in South Africa been?
4. What are the options to further improve delivery of digital banking services in South Africa?

1.7 Motivation of the study

Making the right selection of digital platforms and tools to implement is essential to achieving extensive user adoption, acceptance, and overall success given the quick

speed of technology innovation (Louw & Nieuwenhuizen 2019). Nonetheless, there is an inherent risk when using new technology or tools, most notably from the perspective of cyber and information security. As early adopters minimise this risk, competitors may face more pressure to do the same (April & Govender, 2023). Trends may emerge as more important sector stakeholders adopt comparable technology-first efforts, ultimately establishing customer expectations. It is therefore important to obtain greater understanding of the dynamics of banks digital transformation to inform practitioners in a manner that helps them to select strategies which deliver the best results.

Due to lower operating costs obtained by eliminating premises, staff and other operating expenses affiliated with brick and mortar branch network infrastructure; digital-only banks are able to challenge the status quo in the traditional banking industry by lowering charges and offering affordable products, (Jenik, 2022). As an example, monthly maintenance fees can be eliminated. As such the emergence of digital banks in the financial services sector has led to the creation of a "marketplace without limits" (De Venn, 2023). This suggests that non-traditional financial services companies enjoy sizeable headroom on costs which enable them to compete with established universal banking firms and gain market share, (Jameaba, 2023). To remain relevant and survive the competition, universal South African banks need to beat digital banks at their own game. It is thus debatable whether there is still space for pure traditional banking business models, which primarily require customers to visit a physical branch. Simultaneously, the concept of digital-only banking was introduced recently in South Africa hence there is little to no research literature on the model of digital –only banking institutions from a South African perspective.

This study therefore explores the South African banking ecosystem and examine the digital transformation taking place across the market to address gaps in the literature on South African bank digital transformation. As acknowledged, the idea of digital transformation in the banking sector is still fairly new in South Africa, making this research unique in its field. The research has value because early trend analysis and identification in a South African context, supported by technological development, will undoubtedly liberate the digital banking landscape to a greater extent, offering guidance and supporting the development of additional digital banking services and initiatives not only within South Africa, but potentially also on a global scale. This could advance and contribute to the South African perspective on the creation of digital banking models.

1.8 Rationale for the Study

This study is novel in that it is conducted at a time when South Africa is experiencing:

- Growth in the use of smart phones and feature phones that provide the platform for digital banking: - there is high mobile access penetration of 95% according to Mccrocklin (2021).
- Increased availability of the internet across the country through Wi-Fi and mobile data services: - 36.45 million South Africans had access to the internet in 2021 which gives a ratio of 60.71% of the population (Ceci, 2021)
- Huge infrastructure investment across the banking sector in POS machines and ATM equipment: - South Africa is ranked 46th in the world distribution of ATMs and POS machines with 60 ATMs per 100 000 population and the number of ATMs continue to grow, (Altron, 2021)

- Cloud computing and improved network strength: - Following the Covid-19 pandemic there has been a sharp increase in the number of institutions migrating to cloud in order to provide reliable network to facilitate remote working conditions, (Rohal, 2021)

All the above are considered to be enablers of the digital transformation taking place in South Africa.

The research will provide information on the factors driving this digital transformation including the impact these factors are having on the banking customer journey maps. The study will further help banks understand behaviours, choices and preferences of digital customers.

South Africa has a significant rural population which is unbanked (32.65% in 2018 according to the World Bank, 2018) and digital transformation is anticipated to bring about financial inclusion at a low cost since banking halls and other related front-loaded infrastructure is eliminated. Hence by helping banks to understand the drivers of digital transformation this study will also assist to accelerate the noble objective of financial inclusion.

Last but not least, this study will contribute to the growing list of literature on the digital transformation of banking institutions in the emerging markets of Africa.

1.9 Assumptions of the study

The study makes the following assumptions:

1. South African banks operate in a homogeneous environment and therefore experience the same challenges and opportunities in the process of digitalisation

2. The sample which will be drawn will be truly representative of the target population
3. Contributions which will be obtained from respondents will accurately capture their perceptions
4. The characteristics of the research phenomena will remain stable and no disruptive innovations will occur during the course of the study

1.10 Organisation of the dissertation

The study's introduction is presented in chapter one and the literature review (materials used) is covered in chapter two. The research methodology (research methods) is detailed in chapter three, and the study's findings (contents and results) are presented in chapter four. The discussion of the research findings is covered in chapter five and the study's summary, conclusions, and suggestions are covered in chapter six.

1.11 Conclusion

In this chapter, the background of the study was established, and the statement of the research problem given. The significance of the study and its research objectives and questions were also covered together with the scope of the study. The study's limitations and assumptions were also provided.The next section provides the literature review covering the research objectives set on digital transformation.

Chapter 2

2.0 Literature Review

The banking industry, like all other sectors of the economy, in South Africa is going through a digital transformation phase. Monaghan (2021) identified elements of the digital transformation that include information, information technology, connectivity and communications. Further, Kitsios, Giatsidis and Kamariotou (2021) noted that these elements combine in the digital transformation process to improve customer experience.

2.1 Classic versus Digital Banking Models

Classic banks are banking firms that continue to follow strong traditional banking models that rely heavily on the branch net-work as the major channel to reach out to the customers, (DBI, 2016). Branches as a distribution channel promote human interface in the provision of products and services to the customers. Quite often, classic banking models have many manual processes and are often criticised for the high cost of operating, long turnaround time for transactions and being prone to human errors (Maiya, 2017). A good example of manual processes in a classic bank is illustrated by the operation of a cheque book in the old days which had to be manually presented and processed often taking more than a day for payments to reflect in the payee account, (Expatica, 2022). Overtime the cheque product was eventually phased out by the majority of issuers. Nonetheless many other manual processes in the classic banking model have remained intact, especially back-end legacy systems. According to Saji & Paul (2019) in the first stages of digitalisation, the digital services are complementary to the traditional services rather than replacing them. Gypsy

(2020) made the same observation as Saji & Paul (2019) and argued that traditional channels were useful as a backup for digital banking systems and should be maintaned despite the introduction of digital banking. However, Tayibnapis, Wuryaningsih, & Gora, (2018) argue that introduction of digitalisation should not result in increased costs and hence it should come with a reduction in expenditure on traditional systems and human resources.

Digital banks offer a different suite of products and services using digital channels to access the customer (Bathula & Gupta, 2021). Morden consumers prefer to do digital banking because of accessibility and flexibility of service provision. Eurostat data show that 59% of internet consumers in Europe banked online and when choosing a bank 66% of the consumers preferred banking partners with a digital presence (Expatica, 2022). The digital banking model also provide high mobile banking functionality and by 2016 it was considered that 47% of global banking consumers were doing mobile banking, (Laukkanen, 2016).

It is argued that the pure classic banking model is on the decline as different banking institutions are at different levels of their digital transformation, (Baxter and Vater, 2014). Gypsy (2020) posited that the rise of digital banking has resulted in a drift of customers away from traditional banking to using digital channels which enable them to conduct their banking transactions remotely. Whist the digital channels and traditional banking channels are currently coexisting, the digital channels are becoming the dominate ones, with the expectation of traditional banking ceasing to exist. It is therefore an ongoing process whereby digital banking is replacing traditional banking. According to Gomber, Koch, & Siering, (2017) in the next 20 years digital

banking will be the only banking channel having completely replaced traditional banking channels.

Table 2.1 below shows a comparison of a classic and digital bank.

Classic / Traditional Bank	Digital Bank
Legacy Systems Challenges	Uses internet banking platforms
Brick and Mortar Branch Network	Mobile application and sms notifications
Manual Process	Use Automated processes
Customers Visiting a branch	Customers access the bank online 24/7
Long Queues at banking Halls	Few or no banking halls
Employs many staff members	Few support staff members
Takes long to resolve queries	Queries are resolved instantly online
High operating costs	Low operating costs
Use of cheque books and cash withdrawal slips	Uses cards, POS, ATMs and in-store facilities
Manual account opening forms	Web based account opening
Manual Loan approval processes	Automated deposit based loan approvals

2.2 The Transition to a Cashless Society in a Digital Environment

According to Dimitrova, Öhman and Yazdanfar (2022), digital transformation of financial services takes place simultaneously with the transition to a cashless society. In South Africa total cash usage continues to go down from 58% in 2015 to 41% in 2021 as a result of the emerging digital solutions which are eliminating barriers to the digital transformation according to the PYMNTS Global Cash Index, (PYMNTS, 2021). Low-income earners were the least adopters of the banking digital channels preferring

cash instead. Consumers receiving salaries in cash were also among the low takers of digital banking solutions. The informal sector dominated by the informal food market was another segment cited as slow in the uptake of cashless digital solutions. Trust, cultural behaviours and access to digital technology was cited as some of the reasons for the slow penetration of digital banking services (Altron, 2021). Notably when compared to the size of the South African economy these sectors remain negligible estimated below 1% by the PYMNTS Global Cash Index.

According to Mhlanga (2020) the adoption of digital banking services is growing at a slow but increasing pace as internet availability and accessibility increase. The uptake of digital banking is also viewed by Sabine & Carsana (2017) as a function of several factors among them, the level to which the market feels confident about their ability to use the digital channels. Mhlanga (2020) however argues that a cashless society is an invevitable eventuality and as such it is a matter of when rather than if it will be achieved. The drift towards the cashless society will therefore continue to gain momentum.

2.3 Factors driving digital transformation of the banking Sector in South Africa

There are 6 trends that have been identified as leading the digital transformation of the South African banking sector in various literature reviewed. These can be grouped as follows:

- Changing Consumer Behaviours
- Competition from Fintechs and entry of Digital only banks
- Changes in the Regulation
- Availability and accessibility of digital technologies

- The Impact of the Covid-19 Pandemic
- Desire to grow & improve financial performance

2.3.1 Changing Consumer Behaviours

Hinton (2020) noted that consumer behaviour and expectations are changing forcing banks to redefine banking models. With social media influence many bank customers spend long hours on the internet and get influenced by social media players who in themselves are arguably the biggest advocates of digital channels. Digital channels provide instant gratification through high speed of transacting at low cost. Free services are quite common on digital channels where the cost of transacting is zero (Dubey, 2019). Other premium services are on a pay-as-you-consume which is favoured by consumers who are aware of their product usage. Hinton (2020) further states that flexibility on digital channels to transact wherever and whenever add to the empowerment of the consumer in a digital world with choices regarding time and money investment. Further, the free choice of information a consumer accesses and choice of the format in which this information is accessed help digital channels to enable the servicing of personalised customer profiles with flexibility (Laukkanen, 2016).

Changing customer behaviours influence the uptake of digital banking and both are impacted by three factors namely perceived ease of use, perceived usefulness and trust, (Alnemer, 2022). Perceived ease of use and perceived usefulness are constructs of the Technology Acceptance Model (TAM) propounded by Davis (1989). Tan et al (2010) studied banking customers in Estonia using the Technology Acceptance Model and concluded that perceived ease of use was the most critical determinant of

customer behaviour in the assumption of digital banking products. To the contrary an earlier study in Malaysia by Amin (2009) had identified perceived usefulness as the more dominant factor. In a recently published paper, Alnemer (2022) modified the Technology Acceptance model by adding trust arguing that trust was equally an important factor.

Regarding consumer behaviour and customer centricity, Torkzadeh, Zadeh and Zolfagharian (2021) made an interesting argument that consumer behaviours continue to change and being customer centric requires a realisation that no one owns a customer in the virtual service space. A banking customer is a telecommunications customer, retail store customer, among many other sectors where the same customer transacts. Torkzadeh, Zadeh and Zolfagharian (2021) added that the change in consumer behaviour is often driven by experiences outside an industry. Consequently, the banking intermediation role in virtual service spaces requires a realization of this external influence and changing customer preferences to enable banking access in various facets of the customers' world (Alt, Beck, & Smits, 2018). Flaming and Jenik (2020) contributed that this way banking digital transformation assists create deeper relationships with customers by going beyond financial advisory to address customers' changing preferences. Consequently banks are seeking to be where their customers are and enable financial transacting without exiting a platform (Alt, Beck, & Smits, 2018). For example, with bill payment, digital brings banking convenience to retail business (Khanboubi, Boulmakoul, & Tabaa, 2019). This demonstrates the amount of influence that changing customer behaviours have on the digital transformation of the banking sector.

2.3.2 Competition from Fintechs and entry of Digital only banks

Fintechs combine financial services and information technology offerings to meet specific customer needs, (Thakor, 2020). Fintechs have introduced disruptive technologies in the banking sector and brought about intense competition firstly in the processing of payments but increasingly Fintechs are encroaching into core banking activities, PWC (2016). Banks have had to make a choice either to compete exclusively with Fintechs or to collaborate, (Gomber, Koch and Siering, 2017). Valvedere and Fernandez (2020) considered competition between classic banking models and Fintech offerings and concluded that the space for classic banking activities continues to shrink as more banks realise the power of collaboration with Fintechs to address the changing needs of consumers influenced by demographics led by the new generation Z who are tech-savvy.

Nel and Boshoff (2020) argued that digital only banks are fast bringing competition to the banking sector establishment in South Africa inspired by the achievements of Fintechs. Three such banks were registered between 2017 and 2019. Digital only banks do not have branches in their distribution channels and they access customers on digital channels that include internet banking, mobile banking, card services, ATMs and POS machines, (Agarwal and Varghese, 2018). In South Africa these banks have partnered retail shops for a physical presence Kruger (2019). Market shares of digital only banks in South Africa has been increasing at a fast pace to the agony of the established players. Certainly competition from both Fintech and Digital only banks has influenced the amount of money being invested in digital transformation projects of the established classic banks. Rather than being a threat to traditional banks Agarwal & Varghese (2018) views digital only banks as a route for the growth of

traditional banks. This view is shared by Yanagawa & Yamaoka (2019) who argue that digital transformation is essential for the long term survival of banks.

2.3.3 Changes in the Regulation

Chitimira and Ncube (2020) argue that South African bank regulation which was known for being risk averse and rules based changed to become more open, inclusive and progressive in a big way in recent times in a bid to increase financial inclusion through Fintechs and digital systems. There are high financial compliance standards in South Africa through regulatory bodies such as The South African Reserve Bank (SARB), The National Credit Regulator (NCR), the Johannesburg Stock Exchange (JSE) and the Financial Services Board (FSB). These regulatory bodies have established principles-based systems that support innovation brought about by digital technologies (Dagada, 2013). The banking sector is today more receptive of competition from non-banking formations especially Fintechs. This trend allows growth of digitally-driven products and services and access to financial services by South Africa's unbanked population under the financial inclusion objectives of the government (Maumbe, 2018). There are monetary and persuasive incentives to promote financial inclusion which indirectly but positively support the digital transformation agenda of banks.

2.3.4 Availability and accessibility of digital technologies

The banking channel landscape is fast changing because of a multitude of digital technologies that are currently available and accessible to banks, (Dutta, 2015). These digital technologies cut across social media and business bringing about an interface that has evolved financial transactions on the back of seamless iteration between

human and artificial intelligence. Bora and Romny (2022) carried out research in Cambodia and commented that the extent of digital technology integration in the banking sector has led the argument that banks are gradually becoming technology firms that provide financial services. These technologies address specific preferences (choices) of the consumers while eliminating identified pain points. Commonly used technologies are found in areas such as:

2.3.4.1 Open Banking technologies

These enable internet as well as mobile banking for products such as bill payments and online transactions, (Derin, 2022). The open banking technologies use Application Program Interface (APIs) that access data from the operating system through procedures and functions that enable high speed access, agility and personalization of the information. APIs and the resultant open banking platforms have given the customers accelerated transaction processing time, improved decision making, empowerment to transact from any place of their choice and ownership of their banking activities (financial independence) (Agarwal & Varghese, 2018).

2.3.4.2 Cognitive analytics

Dubey (2019) noted that cognitive analytics help banks achieve customer centricity by generating valuable insights from data in the core banking system and external sources to enable personalized customer experience, a bank that knows its customer preferences. Armelia et al (2022) added that technologies such as augmented reality (AR), virtual reality (VR), machine learning and deep learning use a mixture of predictive and cognitive analytics to bridge the physical bank and the digital bank creating new value propositions for the customer. Provision of services such as bank

statements, transaction notifications and financial advisory especial on customer spending patterns have been revolutionised by digital technologies that use cognitive and predictive analytics (Dutta, 2015).

2.3.4.3 Blockchain Technologies

Blockchain technologies have been credited for providing accurate safe and secure real time money transfer services, (KKozyra, 2020). According to Patel, Migliavaccaa and Oriania the banking sector space has ledgers and information sitting as a core element of transaction generation as such blockchain technologies with distributed and decentralized ledgers provide the digital technology necessary for information storage, access and transmission on the press of a button giving customers that owe feeling.

2.3.4.4 Cloud computing

In the banking sector, large computer rooms with many pieces of IT hardware were first replaced by small servers that did not consume a lot of space and eventually the journey to Cloud began (Agarwal & Varghese, 2018). Cloud computing uses remote servers which are networked and hosted on the internet, (Stefanini, 2022). They have revolutionised the personal computer and servers by providing huge storage space, high data security, quick data processing and efficient (low cost) systems management. With cloud computing the bank can be accessed from anywhere in the world at any time (day and night) giving customers unparalleled convenience to transact globally (Jenik, 2022).

2.3.4.5 Artificial Intelligence (AI) based technologies

According to Digalaki (2022) over the years banks have been known to sit on huge volumes of data accumulated from customers' transactions history. However, banks have also been criticised for not using information at their disposal to improve their customer experience. AI is key to the digital transformation of the banking sector as it gives the banks that capability to securely tap into the data in the operating system to create the desired customer journey maps. Security and compliance are keys in the operation of AI based technologies. Murinde, Rizopoulos and Zachariadis (2022) added that, to that effect, there has been increased use of multi-factor authentication by banks in customer login to access accounts and their banking information. Rita et al (2022) stated that AI based technologies are also increasing their presence in fraud detection when banks offer credit facilities to customers and risk flagging processes. Further, banking risk is mitigated through AI based technologies that have advanced features that bind devices to a user through biometrics, password authentication and simultaneous email and (short messaging service) SMS notifications on the customer's phone (Alt, Beck, & Smits, 2018). This has helped build trust between the bank and its customers in the digital transformation journey.

2.3.4.6 RPA technologies and Chatbots

Pooja (2021) stated that Robotic Process Automation (RPA) software assist banks to build and deploy systems that automate manual back-office processes and enable effective communication and information provision to customers. This information can be availed to customers through chatbots as opposed to an enquiries desk in a brick-and-mortar bank branch. Parikh (2021) commented that generally chatbots are computer programs that are designed to simulate people conversations within certain

controls. Banks use chatbots to communicate to their customers reminders and giving notifications of banking transactions (Flaming & Jenik, 2020). Common reminders include bill payments and running banking promotions. More advanced use of chatbots address customer queries especially on routine and repetitive frequently asked questions. As a result, in a digital bank customers are quickly moved towards self-service (Agarwal & Varghese, 2018).

It is often said that the number of customers accepting self-service is generally seen as an indicator of the digital journey that a bank has travelled, (Pooja, 2021). Digital maturity is when a bank has the majority of its customers using their digital channels (Baxter & Vater, 2014). For this to happen the digital systems have to be stable, reliable and predictable. Customers know what they want and the digital journey has demonstrated that banking is a service that should be accessible in the place where customers are trading (Harvey, 2016).

2.3.5 The Impact of the Covid-19 Pandemic

Tyson (2021) stated that banks in South Africa were at different stages of their digital transformation when the Covid-19 pandemic broke out in 2019. In essence, what Covid-19 did was to accelerate implementation of institutions' different digitization programs (Maharaj & Pooe, 2021). The Covid-19 pandemic containment measures implemented across the world restricted people movement with regional lockdowns becoming a common feature, (Machasio, 2020). Lockdowns meant people could not freely visit banks to conduct their financial transactions. In an effort to further limit the spread of the virus the South African government encouraged cashless transactions and contactless modes of payments and banks responded in various ways including:

2.3.5.1 Increased use of open banking platforms:

According to the Banking Association of South Africa (2020), banks have traditionally been conservative, managing the risk of fraud by maintaining closed databases. However, following the onset of the pandemic an increased number of banks demonstrated the desire to collaborate with Fintechs, literally allowing third parties to access data in their systems for the purpose of developing applications that could assist them serve customers better. To enable Fintech analytics, information such as financial capabilities of clients, spending patterns and lifestyle choices has been shared, albeit, with the consent of clients (Altron, 2021). Palframan (2020) argued that by opening their data platforms to authorised third parties, banks were able to build capabilities to adapt effectively to Covid-19 induced banking constraints and Fintechs took over the digital transformation of the whole banking industry doing away with competition and protectionist policies to implement bank to mobile integration and interbank switch operations required for effective real time money transfers (Louw & Nieuwenhuizen, 2020). As a result customers could do instant payments and automated bulk payments much quicker on both mobile and internet platforms.

2.3.5.2 Tap chip cards

According to Sholom and McKeever (2021) chip cards which used to be inserted in the slot at the bottom of the card reader and required the customer to punch in their security pin when doing payments were deemed high Covid-19 risk because of the amount of contact that is required. Visser (2020) observed that banks migrated to tap chip cards as a reaction to Covid-19 and this technology has since been adopted globally. Contactless tap cards do not require customers to use a security pin when

configured appropriately, hence have a quick turnaround time in addition to them being deemed safe in the covid-19 protocols.

2.3.5.3 Mobile banking

Bergera and Asli (2021) studied banking trends and noted that as part of their marketing in the Covid-19 pandemic period most banks promoted the use of their mobile banking applications and mobile wallets. Mckinsey & Company (2020) commented that mobile banking applications were simplified and financial education on their operation was advertised on social media, newspapers, the radio and television among other media.

2.3.5.4 Internet banking

Initially, before Covid-19 internet banking was popular with corporate clients, however by 2021 most retail bank customers had been on-boarded onto internet banking through easy steps required to create one's profile (Maharaj & Pooe, 2021). Banks realised the need to simplify the on-boarding processes to ensure the platforms are user friendly, (Mckinsey & Company, 2020). Internet banking along with mobile banking is encouraged under the South African government's recommended Covid-19 protocols.

2.3.5.5 e-KYC and Risk Management

Know Your Customer (KYC) requirements are generally onerous and used to require the completion of a long questionnaire, sign and provide documentary support of information provided in the questionnaire (Louw & Nieuwenhuizen, 2020). However, with the Covid-19 pandemic upon us the South Africa Reserve Bank (SARB) and banking institutions agreed to accept the use of digital technology generally known as

e-KYC and risk management techniques to address some of the demands brought about by the onset of the Covid-19 pandemic. Ever since we have seen an increase in the use of e-KYC applications across the African continent including TrueID in South Africa, VerifyMe in Nigeria and Pngme in Kenya, (Machasio, 2020).

2.3.5.6 E-lending

According to Manceron (2021) prior to Covid-19 most bank advances required customers to visit their branches to arrange lending facilities. Ozlem and Schandlbauer (2022) noticed the changing trend and stated that subsequent to the pandemic the market saw a shift towards loan applications and processing on e-platforms leveraging customer data, public available information about a customer, credit scores and e-form solicited information. Bergera and Asli (2021) added that paperwork was reduced and turnaround times became shorter after dispensing the need to visit bank branches. Concern was initially raised around the quality of loan performance however experience thus far has supported e-lending.

2.3.5.7 Email instructions

Makina (2021) observed that there has been greater use of emails during the pandemic and banking instructions sent via email were accepted by most banks who waived the requirement for wet-ink customer signatures following covid-19 travel restrictions. Armelia et al (2022) argued that this trend increased risk of fraud in the banking environment. As part of mitigation, Alnemer (2022) noted that the instructions required to be sent from a registered email and bank officials would always phone contact numbers in their database to verify and authenticate the instructions before processing. Jenik (2022) added that as part of the verification process banks took the

opportunity to create awareness of safer platforms such as internet and mobile banking and that assisted migrate customers to self-service on e-channels promoted by the digital transformation.

2.3.5.8 Deployment of Chatbots

McPherson (2020) acknowledged that Covid-19 brought about remote working arrangements and a significant number of bank employees were working from home. Reddy (2020) added that for non-transactional services such as enquiries, chatbots replaced employees at the office and provided accurate information especially on frequently asked questions and gave contact details for specialized services. At first what was used as an experiment to address the Covid-19 crisis became a permanent feature and chatbots are increasing their roles with the introduction of new functions in the bank (Gypsy, 2020). When linked to a 24 hours manned contact centre, a chatbot seamlessly links human interface for complex responses including banking transactions that have to do with money transfer, Reddy (2020).

According to Adamson (2021), the Covid-19 pandemic has changed the banking architecture introducing more technology, self-help for customers and with it banking operating models have gone through a radical digital transformation.

2.3.6 Desire to Grow & Improve Financial Performance

Scott, Van Reenen and Zachariadis (2017) conducted an empirical study of SWIFT's digital innovation and found the impact to be huge on the performance of banks. They concluded that bankers' motivation to spend more in their digital transformation is

underpinned by the desire to grow market share and improve financial performance. In a later study, Flaming and Jenik (2020) agreed with the findings of Scott, Van Reenen and Zachariadis (2017). It is noted by Flaming and Jenik (2020) that digital transformation improves financial performance of banks by availing financial products and services to the social media platform which is a modern primary medium connecting and engaging communities hence the major driver of economic activities. This is where banks are reviewed and compared and on-boarding customers in the social media drives growth of digital banks.

Bulbulia (2022) pointed out that the digital transformation of the physical branch network reduce costs such as printing, postage, travel, stationery and human resources hence bank margins increase making a strong case for massive investment in the digital transformation. Cheng-Xiawa et al (2022) added that the addition of good customer experience on digital channels further bolsters the strong financial performance of digital channels dominated by self-service. Maharaj & Pooe, (2021) concluded that as a result of the deployment of digital technology South African banks' cost to income ratios have been on the decrease between 2019 and 2022.

2.4 Success of digital transformation in banks

The other objective of this study is to determine the success of digital transformation of the banking sector in South Africa. From the literature reviewed, the first notable impact of digital transformation of banks is seen in the improved access to services by its customers even when a physical branch is not available, and also in the turnaround time for transactions (Harvey, 2016). The impact on the employees is the second notable effect that comes with digital transformation. E-branches, m-banking and e-

banking are some of the most common offshoots of digital transformation and their success can be conceptualised in terms of the opportunities they create for employees and customers alike (Naimi-Sadigh et al., 2022). The acceptance of the new technologies which come with digital transformation and extent to which they are actually used is a measure of its success among customers and employees, (Ortakoy and Ozsurunc, 2019)

According to Harvey (2016) the introduction of new technology often brings fear among employees that there might be loss of jobs as a result. The successful handling of this fear and the effectiveness of managing the change process therefore determines whether digital transformation is done successfully. The very first steps taken towards digital transformation with the introduction of computers in the 70s easily obtained the support of bank employees since they could see personal benefits in the form of more leave days and shorter working hours (Dapp, 2017). Having obvious, discernible benefits for employees is therefore one of the most effective ways of ensuring the success of digital transformation.

Employees' skills, change management and strategy were major factors which had an influence on employees accepting digital transformation, (Giebe, 2019). Giebe further argues that change management is a major determinant of the acceptance and successful implementation of digital transformation in the financial services industry. It is the duty of the employers to ensure employees' buy-in and one way of achieving this is ensuring that a conducive culture prevails, (Al-Okaily et al., 2020). Regardless of whether they are acting as individuals or collectively, employees' attitudes are an important determinant of the success of organisational change (Naimi-Sadigh, Asgari, & Rabiei, 2022). When they consider that their employment status quo is at risk,

employees will not be very receptive to the introduction of change. The training of employees prior to introducing new technology is particularly important as it will ultimately determine their ability to implement it according to plan, (Khan, 2022). In some cases employees are receptive to the idea of change but fail to make it work because they do not have the requisite skills. Employees need to combine their practical knowledge with organised education and training initiatives in order to successfully work with the new technology (Baxter & Vater, 2014).

Perceived ease of use is also a significant measure for the success of digital transformation, (Bora and Romny, 2022). The degree to which an individual has the confidence that they are able to use information technology, the extent to which they find the experience enjoyable, and the extent to which the organisation is able to avail resources are important for the employees and customers alike (Agarwal & Varghese, 2018). This severely affects the embracing of online banking and other aspects of digital banking. In addition to perceived ease of use, the perceived usefulness also determines the success of digital banking products, (Kolade et al., 2022).

It is imperative that when new products and services are introduced, users get to believe that they are better off because of them, (Turker et al., 2022). The advantages coming out of the new developments need to be visible and significantly improve user experiences. According to, Harvey (2016), when it comes to employees, the relevance of the new technology to their tasks increases the user's perceived usefulness. Hence employees impact significantly the success of bank digital transformation.

2.5 Theoretical Framework

Gounaris and Koritos (2008) compared, using empirical evidence, The Technology Acceptance Model (TAM), the Diffusion of Innovation Model (DoI) and the Perceived Characteristics of the Innovation Model (PCI) and concluded that PCI predicted better than both the TAM and the DoI consumer adoption of internet banking. The DoI model by Rogers (1962) assumes that the decision to adopt new innovation depends on 5 attributes namely;

- Relative advantage
- Comparability
- Complexity
- Trialability
- Observability

The DoI was criticised by Taherdoost (2017) for being narrow and inconsistent noting that it is less practical.

Davis (1989) developed the Technology Acceptance Model (TAM), a research method to predict the usage and acceptance of information systems and technology among individuals. The TAM model hypothesizes that two critical variables; perceived benefit and ease of use, influence technology adoption (Granić & Marangunić, 2019). In this model, an individual's willingness to use digital banking technology is determined by his or her subjective probability of improvement in job or life performance as a result of using a given digital channel. Perceived ease of use is the amount of effort the user anticipates in the target system. According to TAM, ease of use and perceived

usefulness are the major determinants of whether an individual will adopt a certain technology (Al-Qaysi et al., 2020).

TAM was criticised by Gounaris and Koritos (2008) for being narrow in perspective because Davis (1989) focused on the innovation alone when researching on potential adopters of technology acceptance within organisational environments. As such TAM does not consider social and psychological factors which are active in open environments applicable to digital banking.

We noted that TAM was modified by Agarwal and Prasad (1998) to include playfulness as a variable in technology acceptance. Moon and Kim (2001) added playfulness factors to their study of the World Wide Web. The TAM model was later modified to include experience, self-efficacy, perceived risk, and social influence among other variables (Al-Emran et al. 2018). In their study, Kamal et al. (2020) included cognitive absorption, playfulness, and self-efficacy in addition to TAM. Rafique et al. (2020) reviewed TAM by including two forms of perceived usefulness: near-term and long-term. The acceptance of online banking in Finland is explained by Musyaffi et al. (2021) using two new TAM constructs: perceived entertainment value and presentation attractiveness. According to this model, perceived usefulness and information are critical in understanding online banking acceptance in Finland. Dönmez-Turan and Kir, (2018) suggested a model that specifies that the acceptance pattern and role of internet self-efficacy plays an important role in e-service adoption. Although widely used TAM remain hamstrung by the blinkered focus on the technology and the many variations discussed herein are an attempt to improve the model rather than replace it.

The PCI was developed by Moore and Benbasat (1991) building up from the DoI and TAM through the addition of more characteristics to address the short-comings of the two earlier models. Unlike TAM, PCI does not only focus on perceived benefit and ease of use (usability aspects) but also considers social and psychological factors which are considered important factors in the acceptance of technological innovation. In addition the PCI is much broader than the DoI as it consists of 8 parameters namely;

- Relative Advantage
- Ease of Use
- Compatibility
- Trialability
- Results Demonstrability
- Visibility
- Image
- Voluntariness

Research studies by Agarwal and Prasad (1997) and later by Venkatesh (2000) validated the PCI model noting that the framework goes beyond intrinsic technology factors (namely relative advantage, ease of use, and compatibility) to include social factors (namely image, visibility and results demonstrability) and psychological factors (namely Trialability and Voluntariness). Gounaris and Koritos (2008) noted that Volutariness can be affected by compulsory decisions made to adopt the usage of some technology in the workplace, for example, hence it is an important characteristic to consider.

In this study we adapt the PCI model with its 3 clusters of characteristics (technology, social and psychological) to evaluate the interaction between banking digital transformation in South Africa and the changing consumer behaviour, competition from Fintechs, the regulatory environment, and access to digital technologies, impact of the Covid-19 Pandemic and banks' quest for growth.

2.6 Case Study – Monzo Digital-Only Bank

In order to fully conceptualize digital transformation of the banking industry an analysis of a case study of Monzo digital-only bank is imperative. Monzo, a bank that exists on smart phones, started in 2015. The entity is a brain child of a consortium of banking and technology entrepreneurs, (Cloudentity, 2023)

Monzo is known for not rolling out a physical branch network for its banking products and services preferring to go virtual. It is a digital bank without brick and mortar physical operating presence, (Singh, 2023). According to Maiti et al (2022), Monzo's digital platforms have been acclaimed for being easy to use. Among other functions, the digital application has a smart budgeting system built with capabilities to empower customers to manage their transactions and control their expenditure. With Monzo's instant consumption notification the customer journey map has been enjoyable as evidenced by high online ratings, (Maiti et al, 2022).

According to Fischer (2019), Monzo sees security as a key factor in its service offering space given their pioneering role in digital banking. As such, the company's value proposition comes with access digital security controls that require the use of

usernames and passwords, two factor authentication, biometric access control, cyber security controls and safety options for losses that include lost card transactions.

Monzo has experienced relatively significant growth from start with banking market share estimated at 0.03% in the UK in 2021, (TheBanks.eu, 2022). Following its formation in 2015, the bank took just over two years to get to a million customers which they achieved in 2018. A year later in 2019, Monzo reported a 200% growth in customers to reach 3 million. By 2022 the bank reported a whopping 5.8 million active users with 72% of the customers aged 35 years or younger, (David, 2023).

Monzo's growth strategy uses value partners to create an ecosystem that makes its offering ever present despite the absence of a branch network and Monzo's own banking infrastructure in the market, (Tardieu et al, 2020). Monzo chooses leading brands for partnerships and this has assisted the entity to grow its customer base and market share. For instance Monzo works with AXA to provide travel insurance and Transfer Wise is their partner for transfers and international payments making them very competitive when compared to traditional banks. For Anti Money laundering and KYC requirements Monzo is in partnership with Jumio which makes e-KYC quick, (Thomas, 2023).

2.6.1 Factors driving the growth of Monzo Bank:

Key factors driving further development and growth of Monzo include a robust technology universe whereby efficient technological capabilities to transact are deployed and readily available, as noted by Ahmed and Sur (2021). The evolving economic and regulatory space, for example the promulgation of open banking

regulations in the UK under the Financial Conduct Authority (FCA) which created an enabling environment for Fintechs and the deployment of technology to thrive. Open banking and digitisation empowered Monzo to ride on the strength of artificial intelligence and data analytics to make superior trade choices and offer bespoke services to consumers, (Singh, 2023). The changing customer needs in financial mediation platforms is also a compelling driver for the growth of digital banks in general, (Cloudentity, 2023). It is noted by Alex (2023) that customers, especially younger generations, have high acceptance of digital banking services. They expect the same level of service from bank applications as they get from apps they use every other day. Alex (2023) added that Monzo's mobile app is considered to be friendly, easy to navigate and use. Response to customer queries is quick through sms and whatsapp. Customers can set up different notifications including alerts that are personalised. Monzo's digital banking experience get regular face uplifts and addition of features that appeal to users thereby making the offering exciting, (Alex, 2023)

The rapid expansion of Monzo, among other neobanks, has also been made possible by the recent increase of investment in technology wherein many investors have channelled funds into fintechs' and other technology firms, (Fischer, 2020). There has also been a rise in demand for digital solutions by tech-savvy clients in the banking sector. Certainly Monzo benefited from faster online account opening especially in low KYC products. Clients also prefer faster transactions and lower costs associated with digital banking provided by Monzo, a factor that has been key to the entity's recent increase in customer base. Generally Monzo has operated without account service charges for both retail and corporate clients. Foreign currency accounts attract a small fee which represents basic cost recovery for expenses associated with international

transaction. Cross currency rates are quite low on foreign exchange, bench marked on Mastercard, (Gnevko, 2020)

It has also been argued by Katarzyna (2022) that the Covid-19 outbreak strengthened the business case of Monzo by accelerating the rate of digital transformation of the financial services industry. The Covid-19 induced lockdowns which were global in nature, intermittent business closures and home isolation increased the demand for digital banking solutions at a time when Monzo was already a step ahead on virtual channels. There was also a general shift in banking tradition, increased awareness of the available digital platforms and acceptance of branchless bank services. It is further argued that most of the customers that moved to Monzo in the Covid-19 pandemic hit period have stayed with the bank post Covid-19 though a huge number remains multi-banked, Katarzyna (2022).

In recent times Monzo has taken advantage of its increased subscription to ratchet its lending to grow assets and balance sheet. The entity has also been reportedly investing more in treasury assets taking advantage of a huge pool of deposits at its disposal. In doing so, Monzo is taking competition to traditional banks relying on digital channels to on-board customers and expand assets, (GlobalData, 2022)

Research Methodology

3.1 Introduction

This chapter outlines the research methodology which was adopted as a blueprint for the study. In outlining the methodology, the guiding philosophy, research design, target population, procedures for selecting respondents and collecting data from them and the data analysis techniques are presented. The research instruments which were used to collect primary data are also described in detail as well as the procedures for their administration and measures taken to ensure reliability, validity and ethics of the research. Throughout the chapter the rationale for decisions made and the processes through which decisions were made are discussed.

3.2 Research philosophy

According to Bauer (2017) research philosophy refers to “the researcher’s beliefs which shape the decision to collect and analyse data in a particular manner.” Under consideration in this study there were two alternative philosophies which the researcher could have relied on. A process was initiated in which the researcher had to compare positivism and interpretivism and make the decision to adopt one of them for the study.

3.2.1 Positivism

Under the positivist philosophy, reality is considered to be stable and free of interference, making it feasible to measure reality with objectivity. Because of the objectivity it is considered that when a study is replicated following the same methodology, the findings would remain the same (Alharahsheh & Pius, 2020). Variation of some factors while holding others constant is therefore one of the

attributes which make positivism an attractive prospect for researchers who can then use it as a basis for exploring relationships among phenomena. Positivism was considered to be suitable for the study since the main interest was to explore the drivers of digital transformation in the South African banking sector and the philosophy helped to isolate the different factors and explore their inter-relationships.

3.2.2 Interpretivism

Under the philosophy of interpretivism, reality is considered to be constructed by the observer rather than existing independently. The philosophy holds that it is not possible for the researcher to avoid influencing reality as they interact with the subjects in their natural environment and because of the interference, the nature of reality will change (Irshaidat, 2019). Interpretivism opens the doors for the researcher to conduct research whose variations provide many ways for the interpretation of reality.

For this study, positivism was the adopted philosophy because the researcher desired to come up with an objective assessment of the factors which were driving the banking institutions' digital transformation.

3.3 Research Approach

Qualitative and quantitative approaches are available to the researcher to choose from and this choice is usually informed by the research philosophy being followed. There is also the Mixed Methods Approach which is a hybrid of Qualitative and Quantitative methods. Access to information resources and availability of time to conduct the study's key tasks are also determinants of the research approach. The three approaches were assessed before choosing an approach for this study.

3.3.1 Quantitative Approach

According to Feyisa (2022), mathematical and statistical methods are the cornerstone of the quantitative approach which puts emphasis on measuring phenomena objectively. The empirical measurements and observations obtained in the study are manipulated quantitatively to express relationships in mathematical terms. McLeod (2019) added that with the quantitative approach, research is done in such a manner that valid generalisations can be made regarding the research phenomena. The main attraction of the quantitative approach is the ability to make valid conclusions about a population based on measurements taken from a small group. Reliability and validity are relatively simpler to ensure in quantitative research since data analysis and data collection follow standardised approaches.

3.3.2 Qualitative Approach

Farnsworth (2019) noted that rather than dwelling on measurable characteristics, qualitative research focusses on the phenomena's qualities which are determined subjectively and may differ with the perspective of the particular researcher. The research takes a direction which is determined by social constraints acting in the context of the process of socially constructing reality from the perspective of the researcher. Mcleod (2019) observed that in-depth studies are considered to be the only way of uncovering rich information which qualitative research seeks to uncover. By virtue of its approach, qualitative research produces results which are specific to the situation being studied and are not suitable for generalisations.

3.3.3 The Mixed Methods Approach

George (2021) described the Mixed Methods research as an approach that combines qualitative and quantitative research elements to give an improved outcome. It improves credibility of the responses by giving room to contextualization. Madafg (2017) cited the disadvantage of the Mixed Methods Approach which include that the researcher can lose control through generalization. Further Madafg (2017) indicated that it increases complexity of the research, requires more time and expertise to execute.

In order to objectively describe the factors which were driving digital transformation within the timeframe provided for the study, a quantitative approach was therefore used. Using the quantitative approach, it was feasible for relationships between the study's variables to be determined objectively and accurately. According to Chukwuemeka (2022) the quantitative approach gives better accuracy because it does not focus on opinions.

3.4 Research Design

The research design refers to the methodical approach which is taken to methodically and logically put the research's components together so as to complete the required analysis of the research phenomenon. In a quantitative study as this one, the experimental and descriptive designs are the two alternatives to select from. The selection was made after considering the merits of each design separately.

3.4.1 Descriptive research

If the purpose of a study is to develop a holistic picture of the phenomenon under focus, the descriptive research is considered most suitable. Its approach is to accurately describe the participants or phenomena without answering questions regarding why, how or when events occurred. Descriptive research means that the researcher does not interfere or influence the phenomena but simply describes it.

3.4.2 Experimental Research

When the researcher takes the scientific approach of managing the state of the variables and manipulating them to see the results of certain combinations or changes, then that is known as experimental research. This type of research can analyse causal relationships among study variables by investigating the likelihood of different scenarios (Bloomfield & Fisher, 2019). Experimental research has been criticised for the possibility that the researcher may oversimplify the relationships between variables resulting in analysis which is not valid.

After considering the two research designs, the researcher settled on the descriptive research design. For studies focussing on a single organisation or sector, Creswell (2019) highly recommended descriptive research and this study was limited to the banking sector making descriptive research suitable. The answers to the research questions were considered more likely to be addressed well with descriptive research and it was therefore adopted.

3.5 Research Strategy

Observations, case studies and surveys are the research strategies which can be employed in a descriptive study. These strategies were considered on their merits to select the most suitable in this study.

3.5.1 Observation

Strandberg-Larson & Krasnik (2019) defines observation research as reseach which involves examining the characteristics of research subjects in their natural environment. One key requirement of observation is that the researcher does not interfere with the resaerch subjects , but just studies them. During obseravtion the resaercher can identify and note behaviours, incidents and events which occur but the main obstacle faced is that they are not able to establish why they occur.

3.5.2 Case Studies

Case study research limits its focus to a limited group of sample points which have something in common and studies them in detail. Conclusions which are drawn at the end of the study typically apply to the particular case study and cannot be generalised. Case studies are therefore not possible to repeat using different settings in accordance with the positivist philosophy adopted for this study.

3.5.3 Surveys

Baruch & Holtom (2018) describe the survey as a research strategy in which candidates who are expected to be familiar with the research phenomenon are asked questions which then contribute data to inform the research. The sample size for

surveys is statistically determined, making it possible to limit the margin of the error for the results which are obtained. A representative sample is easy to define, making it feasible to reach valid generalisations (Bloomfield & Fisher, 2019). Surveys however have the weakness of not being able to pursue emergent themes which arise during the data collection. When the subject of the study is sensitive or controversial it may also be difficult to get honest responses from the subjects.

Of the available strategies, the survey was found to be the most suitable and thus adopted for this study. The data collection had to be done over a period of time which was allowed for the study hence a cross-sectional study was conducted. One major advantage with th chosen strategy was the ability to reach many respondents simultaneously to collect data.

3.6 Population

The study targeted all the 31 banks which were operating in South Africa in 2021. Due to the nature of the information required, the study targeted members of management who were considered to be well informed about their banks' digital transformation process. The number of managers in the banks could not be determined with certainty. The population of the study was therefore considered unknown or indeterminate.

3.7 Sample Size

According to RAOSOFT (2004) in a study with an unknown population the sample size which gives a 5% confidence interval and a 5% significance level is 384. To ensure all the targeted categories were equally represented, the study worked with a sample size of 403.

3.8 Sampling

The study used stratified sampling for the research, with each bank being considered a stratum. The motivation for using stratified sampling was to ensure that the distinct subcategories in the study population were adequately represented. According to Rahi (2017) when stratified sampling is used greater accuracy is achieved as bias in the selection of respondents is eliminated. Within each bank, respondents who were considered to be most closely involved with the digital transformation process were purposively selected to participate in the study. The study thus included the General Manager, and one representative each from the marketing, IT, customer relations, retail banking, corporate banking, research and development, risk management, wealth management, human resources, deposit operations, mortgage banking and electronic banking departments of each bank.

Table 4.1 shows the distribution of the respondents who participated in the study according to their departments.

Table 4.1: Distribution

Department	Number of Banks	Respondents per bank	Total
General Manager	31	1	31
Marketing	31	1	31
IT	31	1	31
Customer Relations	31	1	31
Retail Banking	31	1	31
Corporate Banking	31	1	31
Research and Development	31	1	31
Risk Management	31	1	31
Wealth	31	1	31
Human Resources	31	1	31
Deposit Operations	31	1	31
Mortgage Banking	31	1	31
Electronic banking	31	1	31
Total	**31**	**1**	**403**

There were 13 individuals from each of the 31 banks who were eligible to participate in the study making a total of 403.

3.9 Research Instruments

The study made use of a structured questionnaire to collect data from the sampled individuals. According to Schoonenboom & Johnson (2017) the structured

questionnaire is advantageous as a research instrument in as far as it provides the opportunity to collect standardised information by asking respondents the same questions in the same order. This standardisation makes analysis easier including making generalisations and comparisons. A five point Likert scale was used in designing the questionnaire. The Likert Scale Questionnaire contain a set of questions that are presented uniformly across all the surveyed subjects. Respondents were required to answer within a scale ranging from 1. Strongly Agree, 2. Agree 3. Neutral 4. Disagree to 5. Strongly Disagree. The answers depended on the degree of agreement or disagreement of the respondent and it is laid down in a multiple choice format. Advantages of this approach include the fact that the Likert Scale questionnaire is one of the most used survey tools and it is easily understood. The questionnaire is inexpensive to distribute and collect responses.

3.10 Data Collection Procedures

The questionnaire was distribute to all respondents by Email. While most markets recently came out of the covid-19 pandemic during which travelling and meeting many people was discouraged to restrict the spread of the pandemic, many companies still have remote working conditions for their staff. With remote working arrangements employees rarely visit their offices preferring to work from home hence such employees could not be accessed at their company premises. There is also efficiency in the use of the emailed questionnaire when compared to other data collection methods that involve travel, discussion and physical contact. The questionnaire was hosted on an online platform and a link set to the respondents inviting them to complete it. The link to the questionnaire was emailed to the respondents through the banks' internal communication channels together with an informed consent form. The

respondents were expected to indicate their consent and proceed to respond to the questionnaire and all responses were saved on an online portal where the researcher accessed and downloaded them at a later stage.

3.11 Data Analysis

The data analysis was mainly done using Microsoft Excel and Statistical Package for the Social Sciences version 23 (SPSS23) soft wares. In the first instance data from the questionnaires was coded and captured. It was then cleaned and collated before being analysed and presented in terms of graphs, tables and charts. Significance tests were done using correlation analysis and the Chi-square test.

3.12 Reliability and Validity

The research instruments were designed in such a manner that the items were subject to singular interpretation when presented to respondents. The items were thus tested in a pilot study which included individuals who did not make the sample but satisfied the criteria for inclusion. After the pilot study a review was done to make the necessary changes for ensuring reliability such as rephrasing ambiguous items. The study ensured validity by making sure that respondents met the full criteria for inclusion in the study sample.

3.13 Pilot Study

A pilot study was conducted in order to ensure that the research instruments were capable of collecting accurate data which would answer the research questions. A sample of 20 individuals who qualified to participate in the study but who had not been selected in the study was selected from three banks which were readily accessible to

the researcher. The questionnaire was then made available for the respondents to complete it and return to the researcher. Respondents were also given the opportunity to provide feedback to the researcher in cases where they found questions difficult to understand, response options which were not complete and other shortcomings in the research instruments. After the pilot study three questions which had incomplete response options were rectified while there was also a case of two items which apparently conveyed the same meaning to respondents and hence the wording of one had to be changed to make them distinct. The pilot study also saw that the initial questionnaire required too much time to answer which respondents were not comfortable with and hence some items which were less important were removed to reduce the time required for answering the questionnaire. The final questionnaire was administered after all the issues found in the pilot study had been rectified.

3.14 Ethical Considerations

First, through a thesis proposal, permission was sought and obtained from the University of Uniselinus for this study to be conducted. The banks which participated in the study were also asked for permission which they granted. The banks also granted permission to distribute the questionnaire through their internal communication channels. All participants provided informed consent before completing the questionnaire and were made aware that they could withdraw at any time they wished. The researcher took all the necessary precautions to ensure the anonymity and confidentiality of the responses obtained from individuals.

3.15 Conclusion

This chapter outlined the research methodology which was adopted as a blueprint for the study. In outlining the methodology; the guiding philosophy, research design, target population, procedures for selecting respondents and collecting data, different techniques were introduced which will assist conduct the data analysis in the following chapter. The research instruments which were used to collect primary data are also described in detail as well as the procedures for their administration and measures taken to ensure reliability, validity and ethics of the research. Throughout the chapter the rationale for decisions made and the processes through which decisions were made are discussed. The next chapter presents data (findings) and analysis.

CHAPTER 4:

Results and Discussion

4.1 Introduction

This chapter presents the findings of the study and analyses them in order to come up with answers to the research questions posed by the study. The study sought to explore the drivers of digital transformation in South African banks. Data was collected from managerial employees who were employed by commercial banks in South Africa using a structured questionnaire. Data was analysed quantitatively and presented using graphs, tables and charts. Factor analysis was used to test for differences in perceptions among the demographic subcategories.

4.2 Response rate

The study originally intended to administer questionnaires to 403 respondents. Table 4.1 summarises the response rate which was obtained in the study.

Table 4.1: Response rate

Number in sample	Valid responses	Response Rate
403	336	83.37%

The response rate which was obtained for the study was 83.37%. The response rate exceeds 60% which was given by Baruch (2008) as a minimum for credible findings to be produced in social research. The response rate was adequate for the study to produce credible findings.

4.3 Description of respondents

Table 4.2 presents a description of the study's respondents.

Table 4.2: Description of respondents

	Frequency	Percent
Years with bank		
Less than 2 years	11	3.27
2-5 years	154	45.83
6-10 years	78	23.21
More than 10 years	93	27.68
Years in banking sector		
2-5 years	69	20.54
6-10 years	140	41.67
More than 10 years	127	37.80
Highest level of education		
High School	45	13.39
First degree	155	46.13
Higher degree	50	14.88
Non degree professional qualification	86	25.60
Level of familiarity with digital banking technology		
Very low	16	4.76
Low	7	2.08
Average	91	27.08
High	85	25.30
Very high	137	40.77

Years with bank

Three percent of the respondents had been with their bank for less than 2 years whilst 45.8% had been with their bank for between 2 and five years, 23.2% between 6 and 10 years and 27.7% for more than 10 years. The majority of the respondents had been with their banks for long enough to articulate issues pertaining to their digital transformation strategy and its progress. Tests of independence which were

conducted showed that there was no significant difference in responses from individuals with different length of service in their bank.

Years in banking sector

Twenty-one percent of the respondents had been in the banking sector for between 2 and 5 years, 41.7% between 6 and 10 years and 37.8% for more than 10 years. Respondents had been employed in the banking sector for at least two years and therefore could speak with authority on trends in the industry. Tests of independence which were conducted showed that there was no significant difference in responses from individuals of different experience in the banking sector.

Highest level of education

Thirteen percent of the respondents were educated up to high school whilst 46.1% had a first degree, 14.9% had a higher degree and 25.6% had a non-degree professional qualification. The respondents had attained adequate education to articulate the issues in the study. Tests of independence which were conducted showed that there was no sigificant difference in responses from individuals of different levels of education.

Familiarity with digital banking technologies

Five percent of the respondents had very low familiarity with digital banking technologies while 2.08% had low familiarity, 27.08% average, 25.30% high and 40.77% very high. Most of the respondents had high familiarity with digital banking technologies and hence could make quality contributions to the study.

4.4 Factors driving digital transformation in the banking sector in South Africa

Respondents were asked to rate the importance of factors which were driving digital transformation in the banking sector. Their responses are presented in Table 4.3.

Table 4.2: Factors driving digital transformation

	Very low (%)	Low (%)	Not sure (%)	High	Very high
Changing customer behaviour	1.8	10.7	11.6	38.1	37.8
Competition from Fintechs	2.7	10.7	11.1	35.7	39.8
Competition from digital banks	6.3	5.7	15.2	19.3	53.6
Changes in regulations	8.1	7.0	5.1	38.6	41.2
Availability of digital technologies	4.8	2.1	27	25.3	40.8
Accessibility of digital technologies	2.1	6.0	7.1	39.6	45.2
Impact of the COVI-19 pandemic	3.6	10.4	21.7	37.5	26.8
Desire to grow and improve financial performance	5.7	21.7	20.2	29	23.4
Feedback from customers	1.5	0.9	3.6	40.2	53.8

4.4.1 Changing customer behaviours

Most of the respondents, 76%, considered that changing customer behaviors were a significant factor driving digital transformation in their bank. Following the Perceived Characteristics of the Innovation Model (PCI) theoretical framework, the research validated the inclusion of Social factors that shape consumer behavior namely image, visibility and results demonstrability.

4.4.2 Competition from Fintechs

Seventy five percent of the respondents gave a high (or very high rating). The findings hence suggest that competition from Fintechs was a significant factor driving digital transformation in South African banks. Linking this result to the PCI conceptual framework, the research validates factors under the technological segment of the model which include relative advantage, ease of use and compatibility of the technology.

4.4.3 Competition from digital banks

Seventy three percent of the respondents gave a high (or very high rating). The findings further suggest that competition from digital banks was a significant factor driving digital transformation in South African banks. Following the PCI theoretical framework, responses to this question emphasized the significance of technological factors which are constructs of digital channels relied on by digital banks.

4.4.4 Changes in regulations

Most of the respondents, 80%, considered that changes in regulations was a significant factor driving digital transformation in their bank. This finding is aligned to the voluntary factor under the psychological segment of the PCI. In the literature review we noted that compliance with regulatory changes that support the adoption of digital technologies is compulsory and influences the growth of digital channels, (Dagada, 2013).

4.4.5 Availability of digital technologies

Most of the respondents, 66%, considered that availability of digital technologies was a significant factor driving digital transformation in their bank. As discussed in the literature review, availability and ease of use of technology under the PCI framework are factors that influence adopters of new technologies therefore this result is aligned to the PCI model.

4.4.6 Accessibility of digital technologies

The majority of respondents, 85%, considered that accessibility of digital technologies was a significant factor driving digital transformation in their bank. Technology accessibility is also considered under the PCI framework for which the result is in the affirmative.

4.4.7 Impact of the COVID-19 pandemic

Sixty four percent of the respondents considered that the impact of the COVID-19 pandemic was a significant factor driving digital transformation in their bank. The Covid-19 pandemic expedited trialability of new banking technologies as established in the literature review. In essence both banking institutions and customers found

converging interests to adopt digital channels due to travel restrictions imposed to constrain the spread of covid-19, (Machasio, 2020).

4.4.8 Desire to grow and improve financial performance

Fifty two percent of the respondents gave a high (or very high rating). The findings therefore suggest that desire to grow and improve financial performance was a significant factor driving digital transformation in South African banks. Results demonstrability under the PCI framework align to the desire to grow and improve financial performance. This is probably the biggest justification for the big spend made on digital technologies by banks as discussed in the literature review.

4.4.9 Feedback from customers

1.5% of the respondents considered that feedback received from customers had very low impact on driving digital transformation in their bank, while 0.9% considered the impact to be low, 3.6% were not sure, 40.2% considered the impact high and 53.8% very high. From these statistics most of the respondents, 94%, considered that feedback received from customers was a significant factor driving digital transformation in their bank. Torkzadeh et al, (2021) stated that being customer centric requires a realisation that no one owns a customer in the virtual service space hence the importance of customer feedback.

4.4.10 Factor Analysis

Factor analysis was carried out on the factors which affected digital transformation. The rotated factor matrix is presented in Table 4.4.

Table 3.4: Factor Analysis for factors which drive digital transformation

	Component		
	Internal developments	Market developments	Technological developments
Changing customer behaviours		.941	
Competition from Fintechs		.966	
Competition from digital banks		.970	
Changes in regulations		.956	
Availability of digital technologies			.923
Accessibility of digital technologies			.956
Impact of the COVID-19 pandemic	.817		
Desire to grow and improve financial performance	.974		
Feedback from customers		.927	

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 4 iterations.

Adapted from Sherwani et al, (2021)

Discussion

Three factors were extracted which represented internal developments, market developments and technological developments as the distinct drivers of digital transformation in banks.

The Kruskal-Wallis test ($p>0.05$) was used to test whether the individual's familiarity with digital technologies significantly influenced their perception on the impact of market developments, internal developments and technological developments. The findings indicated that for all three factors, there was no significant difference between individuals with high familiarity with digital technologies and those with low familiarity.

The Kruskal-Wallis ($p>0.05$) was used to test whether the individual's length of service in the banking sector significantly influenced their perception on the impact of market developments, internal developments and technological developments as drivers of digital transformation. The findings indicated that for all three factors, there was no significant difference between individuals with long service and those with less service periods.

4.5 Impact of the drivers of Digital Transformation

Respondents were asked whether drivers of digital transformation had significant impact on the process of digital transformation. Their responses are presented in table 4.5.

Table 4.4 : Impact of the drivers of digital transformation

	Strongly agree (%)	Agree (%)	Not sure (%)	Disagree (%)	Strongly disagree (%)
The number of physical branches has reduced significantly	9.8	50	9.5	20.5	10.2
The number of employees has reduced significantly	14.9	39.1	18	25	3
The bank now offers a wider range of services	45.2	16.7	32.7	3.6	1.8
Traditional products and services have been replaced by digital ones	32.4	25.3	18.8	13.7	9.8
The cost of delivering services has significantly reduced	23.6	31.5	32.7	10.4	1.8
The number of active accounts has increased significantly	33.3	46.4	16.4	3.9	0.0

4.5.1 The number of physical branches

Sixty percent of the respondents agreed (or strongly agreed) that the number of physical branches for their bank had reduced as a result of digital transformation. The findings of this research therefore suggest that the number of physical branches for South African banks reduced which is consistent with the notion that digital channels diminishes the need for physical presence, (Louw and Nieuwenhuizen, 2020).

4.5.2 The number of employees

Respondents agreed (or strongly agreed) in the majority, 54% that the number of employees for their bank had reduced as a result of digital transformation. The closure of branches highlighted by Louw and Nieuwenhuizen (2020) in the literature review

consequent to the increased use of digital channels led to the reduction of the number of employees.

4.5.3 Range of services

Most of the respondents, 62% agreed (or strongly agreed) that their bank now offers a wider range of services as a result of digital transformation. The findings suggest that the range of services for South African banks had increased as a result of digital transformation. According to Jenik (2022) the range of services vary with location and demands of the clientele. While the range of digital products and services in large cities is high in the countryside there is a hybrid combining digital and classic banking services.

4.5.4 Traditional products and services

Fifty eight percent of the respondents agreed (or strongly agreed) that traditional products and services had significantly been replaced by digital. This is consistent with the PCI model where once new technology is accepted it becomes the standard operating platform, (Agarwal and Prasad, 1997). The findings align to (Louw and Nieuwenhuizen (2020) who observed that in cosmopolitan urban locations digital products and services had become the standard offering in the majority of banks in South Africa.

4.5.5 The cost of delivering services

Sixty four percent agreed or strongly agreed. Therefore most of the respondents agreed that the cost of delivering services had significantly reduced. Again, this finding supports the observation by Louw and Nieuwenhuizen (2020) that branches and employees in banks reduced with the adoption of digital channels simultaneously dropping the associated costs.

4.5.6 The number of active accounts

Most of the respondents, 80%, agreed (or strongly agreed) that the number of active accounts had increased significantly as a result of digital transformation. In line with the literature review, digital channels made banking accessible and increased financial

inclusion, (Altron, 2021). This would explain the increase in the number of active bank accounts.

4.5.7 Factor Analysis

Factor analysis was carried out on the impact of the factors which affected digital transformation. The rotated factor matrix is presented in Table 4.6.

Table 4.5: Impact of the drivers of digital transformation

	Impact of drivers
The number of physical branches has reduced significantly	.760
The number of employees has reduced significantly	.739
The bank now offers a wider range of services	.837
Traditional products and services have been replaced by digital ones	.771
The cost of delivering services has significantly reduced	.969
The number of active accounts has increased significantly	-.744

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Adapted from Sherwani et al, (2021)

Discussion

One factor was extracted in the factor analysis which thus represented impact of the drivers of digital transformation.

The Kruskal-Wallis test ($p>0.05$) was used to test whether the individual's familiarity with digital technologies significantly influenced their perception on the impact of the drivers of digital transformation. The findings indicated that there was no significant difference between individuals with high familiarity with digital technologies and those with low familiarity in terms of their perception on the impact of the drivers of digital transformation.

The Kruskal-Wallis ($p>0.05$) was used to test whether the individual's length of service in the banking sector significantly influenced their perception of the impact of the drivers of digital transformation. The findings indicated that there was no significant

difference between individuals with long service and those with less service periods in terms of their perceptions on the impact of the drivers of digital transformation.

4.6 Success of digital transformation of the banking sector in South Africa

Respondents were asked the extent to which they agreed that some factors in their bank had improved as a result of digital transformation. Their responses are in Table 4.7.

Table 4.6: Success of digital transformation

	Strongly agree (%)	Agree (%)	Not sure (%)	Disagree (%)	Strongly disagree (%)
Deposit Operations	37.3	34.8	19.6	8.3	0.0
Mortgage Banking	30.4	32.4	35.4	1.8	0.0
Account Enquiries	51.2	40.2	8.6	0.0	0.0
Retail Banking	29.5	55.1	15.5	0.0	0.0
Corporate Banking	67.6	30.7	1.8	0.0	0.0
Wealth management services	72.9	11.3	11.6	0.9	3.3
Electronic Banking	65.5	12.2	14.9	4.8	2.7
Domestic payments	56.8	21.1	11.3	6.3	4.5
International payments	47.6	35.1	8.0	3.9	5.4

4.6.1 Deposit Operations

None of the respondents strongly disagreed that deposit operations in their bank had improved as a result of digital transformation, while 8.3% disagreed, 19.6% were neutral, 34.8% agreed and 37.2% strongly agreed. Most of the respondents agreed that deposit operations in their bank had improved as a result of digital transformation. As discussed in the literature review, Bhanda and Vitucci (2022) identified deposits among other products that were pushing huge volumes on digital channels through the use of Real Time Gross Payments (RTGS) platforms thereby aligning to this research finding.

4.6.2 Mortgage Banking

Most of the respondents 62.8% agreed (or strongly agreed) that mortgage banking in their bank had improved as a result of digital transformation. In line with observations made in the literature review; the findings show benefits of online lending which include short turnaround time of approvals, (Bergera and Asli, 2021). The research suggests that the mortgage banking business in South African banks increased as a result of the shift towards mortgage loan applications and processing on e-platforms.

4.6.3 Account Enquiries

The majority of the respondents, 91.4% agreed (or strongly agreed) that account enquiries in their bank had improved as a result of digital transformation. The findings suggest that the account enquiries in South African banks had improved as a result of digital transformation. This is aligned to observations made in the literature review that for non-transactional services such as enquiries, chatbots replaced employees at the office and provided accurate information especially on frequently asked questions while giving contact details for specialized services, (Reddy, 2020).

4.6.4 Retail Banking

84.6% of the respondents agreed (or strongly agreed) that retail banking in their bank had improved as a result of digital transformation. The research results are supported by literature review which noted an increase in the adoption of internet banking, (Maharaj & Pooe, 2021) suggesting that the online retail banking business in South African banks increase consequent to the digital transformation.

4.6.5 Corporate Banking

Almost all respondents, 98.3% agreed (or strongly agreed) that corporate banking in their bank had improved as a result of digital transformation. The findings suggest that corporate banking business in South African banks increased as a result of digital transformation in the advent of covid-19. Louw & Nieuwenhuizen, (2020) noted that businesses adapted quickly to e-KYC and assessment of Corporate Banking proposals actually improved with the adoption of digital applications.

4.6.6 Wealth management services

84.2% of the respondents agreed that wealth management services improved as a result of digital transformation. In the literature review it was noted that Digalaki (2022) linked high returns in asset management to the adoption of AI based technologies developed by mostly fintechs for fund management.

4.6.7 Electronic Banking

77.7% of the respondents agreed (or strongly agreed) that electronic banking in their bank had improved as a result of digital transformation. In the literature review, Mckinsey & Company (2020) made an observation that electronic banking especially mobile banking applications were simplified and financial education on their operation was advertised on social media, newspapers, the radio and television among other media thereby increasing mobile based electronic banking transactions.

4.6.8 Domestic payments

77.9% of the respondents agreed (or strongly agreed) that domestic payments in their bank had increased as a result of digital transformation. Increase in domestic online payments explain the development of a cashless society discussed in the literature review by Altron, (2021).

4.6.9 International payments

82.7% of the respondents agreed (or strongly agreed) that international payments in their bank had improved as a result of digital transformation. In the literature review Yanagawa & Yamaoka (2019) discussed the role of fintechs in expediting international payments which can be linked to the improvements found in this research.

4.6.10 Factor Analysis

Factor analysis was carried out on the success of digital transformation. The rotated factor matrix is presented in Table 4.8.

Table 4.7: Rotated component matrix

	Value added services	Traditional banking
Deposit Operations		.840
Mortgage Banking		-.710
Account Enquiries		.660
Retail Banking		.865
Corporate Banking		.736
Wealth management services	.750	
Electronic Banking	.848	
Domestic payments	.807	
International payments	.787	

Discussion

Two factors were extracted which represented traditional banking and value added services as the distinct areas of improvements which resulted from digital transformation in banks.

The Kruskal-Wallis test ($p>0.05$) was used to test whether the individual's familiarity with digital technologies significantly influenced their perception on the improvements which resulted from digital transformation. The findings indicated that there was no significant difference between individuals with high familiarity with digital technologies and those with low familiarity in terms of their perception on the improvements which resulted from digital transformation both in terms of traditional banking and value added services.

The Kruskal-Wallis ($p>0.05$) was used to test whether the individual's length of service in the banking sector significantly influenced their perception on the improvements which resulted from digital transformation. The findings indicated that there was no significant difference between individuals with long service and those with less service periods in terms of their perceptions on the improvements which resulted from digital transformation both in terms of traditional banking and value added services.

4.7 Ways to further improve delivery of digital banking services in South Africa

4.7.1 Intensified consumer education about digital banking

Respondents were asked the extent to which they agreed that intensified consumer education about digital banking is effective in improving digital banking services. Their responses are presented in Figure 4.1.

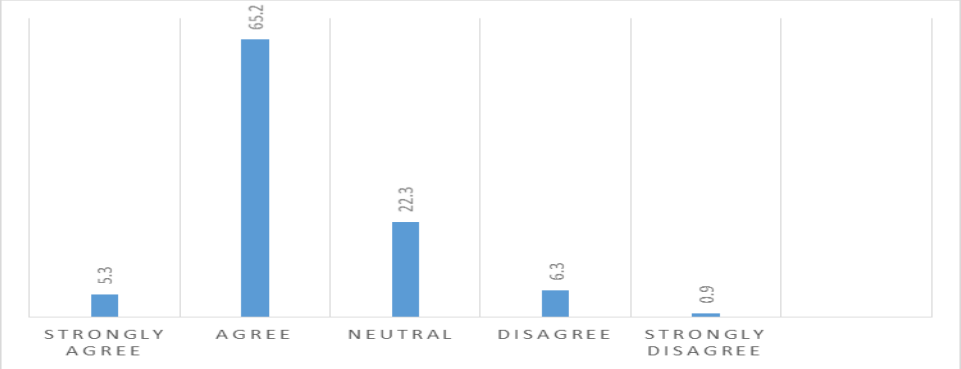

Figure 4.1: Intensified consumer education about digital banking

0.9% of the respondents strongly disagreed that intensified consumer education about digital banking is effective in improving digital banking services, while 6.3% disagreed, 22.3% were neutral, 65.2% agreed and 5.3% strongly agreed. Most of the respondents agreed that consumer education about digital banking is effective in improving digital banking services. Linked to this is probably Mckinsey & Company (2020)'s assertion that simplified financial education about mobile banking applications was necessary to increase usage during the covid-19 period.

4.7.2 Incentives for using digital banking

Respondents were asked the extent to which they agreed that incentives for using digital banking are effective in improving digital banking services. Their responses are presented in Figure 4.2.

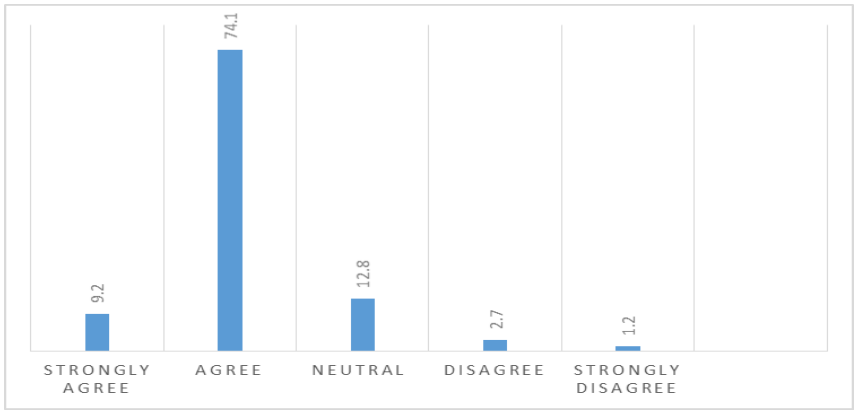

Figure 4.2: Incentives for using digital banking

1.2% of the respondents strongly disagreed that incentives for using digital banking are effective in improving digital banking services, while 2.7% disagreed, 12.8% were neutral, 74.1% agreed and 9.2% strongly agreed. Most of the respondents agreed that incentives are effective in improving digital banking services. This result is supported by literature reviewed wherein price and promotion were noted as common incentives driving traffic to digital channels in addition to convenience (Gypsy, 2020).

4.7.3 Assisting customers with acquisition of digital devices

Respondents were asked the extent to which they agreed that Assisting customers with acquisition of digital devices is effective in improving digital banking services. Their responses are presented in Figure 4.3.

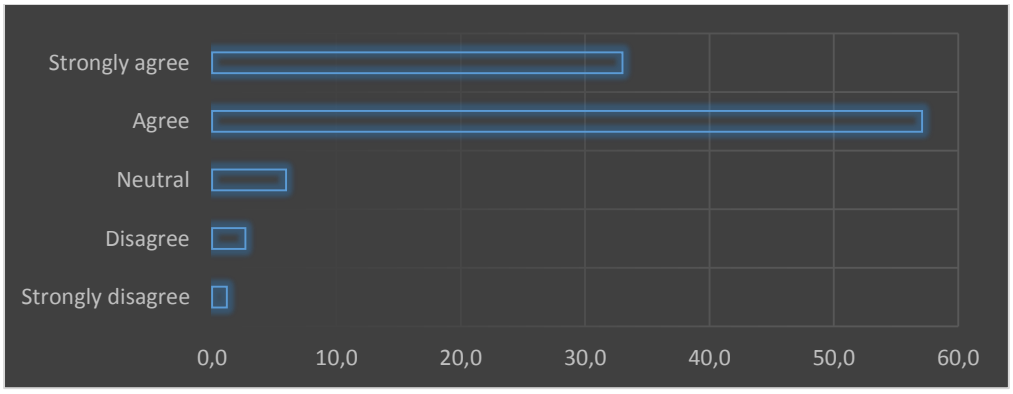

Figure 4.3: Assisting customers with acquisition of digital devices

1.2% of the respondents strongly disagreed that assisting customers with acquisition of digital devices is effective in improving digital banking services, while 2.7%

disagreed, 6% were neutral, 57.1% agreed and 33% strongly agreed. Most of the respondents agreed that assisting customers with acquisition of digital devices is effective in improving digital banking services. From the literature review we noted that some banks were assisting account holders to purchase smart phones for the provision of services such as bank statements, transaction notifications and one time pin (OTP) for security verification, (Dutta, 2015).

4.7.4 Remote terminals for accessing digital banking services in supermarkets and other public places

Respondents were asked the extent to which they agreed that providing remote terminals for accessing digital banking services in supermarkets and other public places is effective in improving digital banking services. Their responses are presented in Figure 4.4.

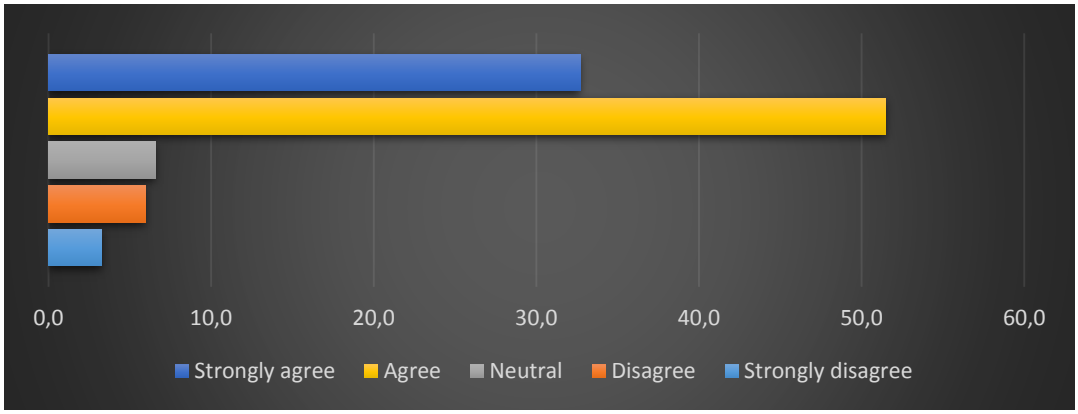

Figure 4.4 : Remote terminals for accessing digital services

3.3% of the respondents strongly disagreed that providing remote terminals for accessing digital banking services in supermarkets and other public places is effective in improving digital banking services, while 6% disagreed, 6.5% were neutral, 51.5% agreed and 32.7% strongly agreed. Most of the respondents agreed that providing remote terminals for accessing digital banking services in supermarkets and other public places is effective in improving accesibility of digital banking services. Again linking up with the literature review we noted that distribution of Point of Sale (POS) machines was a critical factor in the use of cards (plastic money) in a cashless society, (Sabine & Carsana, 2017).

4.7.5 Recruitment of digital technology experts for research and development

Respondents were asked the extent to which they agreed that recruitment of digital technology experts for research and development is effective in improving digital banking services. Their responses are presented in Figure 4.5.

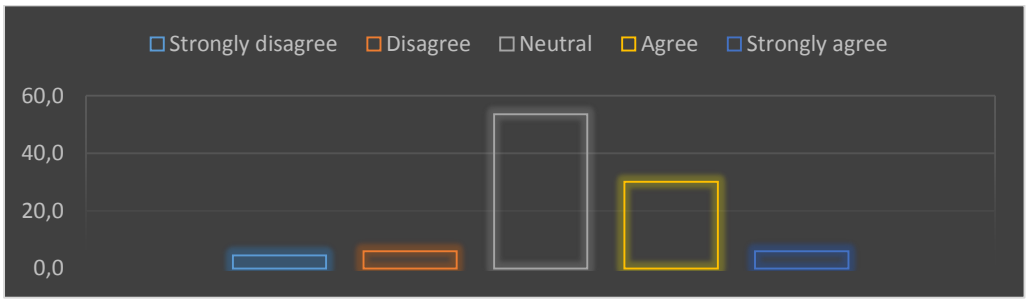

Figure 4.5 : Recruitment of digital technology experts

4.5% of the respondents strongly disagreed that recruitment of digital technology experts for research and development is effective in improving digital banking services, while 6% disagreed, 53.6% were neutral, 30.1% agreed and 6.0% strongly agreed. Most of the respondents were not sure whether recruitment of digital technology experts for research and development is effective in improving digital banking services. The findings were inconclusive on whether recruitment of digital technology experts for research and development is effective in improving digital banking services.

4.7.6 Regular employee training to keep up with trends

Respondents were asked the extent to which they agreed that regular employee training to keep up with trends is effective in improving digital banking services. Their responses are presented in Figure 4.6.

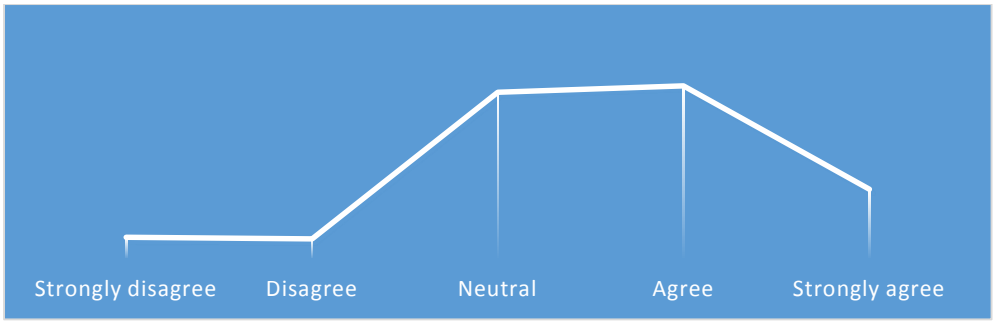

Figure 4.6 : Regular employee training

4.2% of the respondents strongly disagreed that regular employee training to keep up with trends is effective in improving digital banking services, while 4.2% disagreed, 36.9% were neutral, 38.3% agreed and 15.2% strongly agreed. Most of the respondents agreed that regular employee training to keep up with trends is effective in improving digital banking services. The findings align with Khan (2022)'s position stated in the literature review that training of employees prior to the introduction of new technology is important as it determines speed with which the new technology is adopted.

4.8 What is new that we learn

The Impact of covid-19 on technology acceptance is a major learning point coming out of this study. Covid-19 resulted in lockdowns which restricted people movement thereby making it imperative to rely on technology because people could not regularly visit their banks. We learnt that digital transformation of banks moved faster during the pandemic period because customers did not have alternative ways to transact. By implication change in the environment is a major factor which should be considered in the technology acceptance models going forward.

Chapter Five

Conclusions and Recommendations

5.1 Introduction

This chapter presents the conclusions and recommendations of the study. Quantitative data was collected from employees of South African commercial banks in order to investigate the drivers of digital transformation in the banking industry. The study managed to attain its objectives and reached conclusions which are discussed herein. The study also made recommendations based on the conclusions which were made. The recommendations are presented with an implementation plan and estimates of the resources required for the implementation. Limitations of the study and suggestions for future research are presented at the end.

5.2 Conclusions

5.2.1 Factors driving digital transformation in the banking sector in South Africa

The Kruskal-Wallis ($p>0.05$) was used to test individual's length of service and familiarity with digital technologies on perception to the factors driving digital transformation and it was concluded that there was no significant difference between individuals with long service and those with less service periods as well as between those with high familiarity and low familiarity.

Factors assessed and their relative impact are summarised in table 5.1 below:

Factor	Impact *High/Moderate/Low*
Regulation	High
Competition from Fintechs and Digital banks	High
Changing Customer Behaviours	High
Availability of Digital technologies	High
The Covid-19 pandemic	High
Desire by banks to grow and improve financial performance	High

The study concluded that all the assessed factors had significant positive influence driving digital transformation in South African banks. Bank regulations which were risk

averse and rules based changed to become more open and inclusive to improve financial inclusion, (Chitimira and Ncube, 2020). While this trend allowed growth of digitally-driven products under the financial inclusion objectives, it increased competition in the banking space from fintechs, (Maumbe, 2018). Hinton (2020) noted that flexibility on digital channels to transact wherever and whenever added to the empowerment of consumers which in a way forced banks to partner fintechs or adopt their products. According to Nel and Boshoff (2020) markets witnessed the emrgence of digital only banks (without a branch network) and these neobanks also presented fierce competition to the traditional banks. Pressure to digitise was hightened by the availability of digital technologies as noted by Dutta (2015). These technologies (discussed by Pooja, 2021) include Artificial intelligence, blockchain technologies, cognitive analytics, robotic process automation and chatbots. There are also open banking technologies which use Application Program Interface (APIs) to enable high speed access, agility and personalization of data giving customers accelerated transaction processing time, improved decision making, empowerment to transact from any place of their choice hence financial independence, (Agarwal & Varghese, 2018).

The covid pandemic which broke out in 2019 accelerated digital transformation of banks in an environment characterised by lockdowns, the need for contactless payment platforms and reduced use of cash, (Machasio, 2020). Banks responded in various ways including internet banking, mobile banking, e-lending and deployent of chatbots as noted by Monaghan (2021) hence, the conclusion made in this study of high impact to digital transaformation.

Linking to the Perceived Characteristics of the Innovation Model (PCI) theoratical framework used in this study it was concluded that the findings support the technological, social and psychological aspects discussed by Gounaris and Koritos (2008).

5.2.2 Impact of the drivers of Digital Transformation

The factor (statistical) analysis carried out led to the conclusion that length of service and familiarity with digital technologies did not pose significant influence on the perceived impact.

The impact of banking digital transformation in South Africa is seen through the following findings:

Table 5.2

Component	Research Finding
Branches	The number of bank branches reduced
Employees	Staff compliment reduced
Range of Services	Range of services increased through adoption of digital channels
Classic banking products	Some of these were replaced by digital products
Cost of delivering Service	The cost had gone down
Number of active bank Accounts	Active accounts increased

The study concluded that branches, employees and costs of delivering service for South African banks reduced significantly as a result of digital transformation. Meanwhile the range of services and number of active accounts increased which could point to increased transactions consequent to the adoption of digital channels. This conclusion is supported by Kaur & Malik, (2019) who noted that online digital channels are quick and available outside the traditional banking hours which make digital banking convenient.

Patel (2022) acknowledged that digital transformation helps maintain consistent customer experience across all products and services, improve customer lifetime value, customer retention and achieve a high net promoter score (NPS). By inference we conclude that banks who successfully implement their digital transformation should be able to on-board more customers (high number of active accounts), retain the customers through a low cost strategy, enjoy greater customer lifetime value through a wide range of products and services while achieving a high NPS (business referrals).

Monaghan (2021) commenting in the Journal Fintech Connect wrote that a whole new range of products and services had been introduced to the satisfaction of customers hence the profound growth of digital offerings in recent years.

5.2.3 Success of digital transformation of the banking sector in South Africa

To conclude the success of digital transformation the table below summarises elements tracked in this research:

Table 5.3

Product / Service	Research Finding
Deposit Operations	Deposits went up
Mortgage and Loans	Mortgage and loan facility utilization increased
Account Services	Turnaround time for enquiries and other account services improved due to process automation and digital roll-out
Retail Banking	Personal banking online and on USSD increased uptake
Wealth Management Services	Funds under management increased with online placements
Electronic Banking	Number of transactions increased
Domestic Payments	Digital payment platforms had high number of transactions
International Payments	Cross border payments were boosted by digital

The findings align to Bathula & Gupta (2021) who found that digital transformation improved banking operations. The findings also support Laukkanen (2016)'s assertion that digital transformation created opportunities for innovative wealth management services to be rolled out. According to Gomber, Koch, & Siering, (2017) domestic and international payment systems had become faster as a result of digital transformation. Overall the research findings helps us conclude that the banking sector in South Africa achieved digital transformation goals cited in the literature review.

5.2.4 Ways to further improve delivery of digital banking services in South Africa

Table 5.4 below outlines Ways to further improve delivery of digital banking services.

Table 5.4

Strategy	Research Finding
Intensified consumer education	Was effective in improving digital banking services
Incentives for using digital banking	Were a major driver of digital adoption
Assisting customers acquire digital devices	Is a strategic drive that support digital uptake
Providing remote terminals (POS machines)	Supports the usage of bank card products which is part of the digital strategy
Recruitment of digital technology experts	The findings were inconclusive on the role of technology experts
Regular employee training	Affirmatively confirmed by research to support digital deployment

These strategies are supported by Theiri & Alareeni (2021) who found consumer education to be most effective for the adoption of digital banking services. The study also concluded that providing remote terminals for accessing digital banking services in supermarkets and other public places supports the usage of card products which is part of the bank digital accessibility strategy. These findings are similar to Altron, 2021 who found that improved access to digital devices was important for the acceleration of digital transformation in banks. On regular employee training the findings were similar to (Ofosu-Ampong, 2021) who found that since employees are important for the implementation of new strategies, employee training was critical during the digital transformation process.

The findings were however inconclusive on whether recruitment of digital technology experts is effective in improving digital banking services; surprisingly so because literature seems to suggest that technology experts are required at board level to support digital strategy, (Gagua, 2021). This is probably an area that requires further research.

5.3 Recommendations

The study made the following recommendations based on its conclusions:

5.3.1 Employees

Employee training was found to be important for successful digital transformation, hence the banks were recommended to institute continuous employee training programmes to support the digital strategy as follows:

Table 5.5

Aim	To equip employees with relevant skills to deliver digital services efficiently
Implementation Strategy	Commission a digitalisation project that include training staff on new tech innovation introduced
Resource Costs	An average of US$1000 training budget per employee per year
Resource Benefits	More knowledgeable employees, Improved service quality

It is often argued that staff is the most important asset of a business, (Ofosu-Ampong, 2021). Continuous digital training helps banks keep up with trends, productivity and innovation. Product knowledge and service quality improve, hence the recommendation.

5.3.2 Customer

Customer education, provision of incentives for adoption of digital banking and assisting customers acquire digital devices are recommended to support digital banking uptake. The implementation of which is as follows:

Table 5.6

Aim	To increase digital banking transactions
Implementation Strategy	Availing loan facilities for the purchase of digital devices such as smart phones - Zero rated internet and mobile banking applications - Digital advertising of loans
	US$ 500 loan limit for digital gadgets and 10% product specific advertising budget support
Resource Benefits	Increased loan book and digital transactions

Banks are recommended to avail loan facilities and advertising budget for customers to acquire digital devices that support online transactions. Banks are further recommended to incentivise digital banking given the benefits to be realized thereon.

5.3.3 Accessibility of Digital Banking Technology

Banks are recommended to increase investment in digital technology so that customers have ready access to digital banking products and services.

Table 5.7

Aim	**To increase accessibility of digital banking technologies**
Implementation Strategy	Increase the population of POS, ATMs, USSD, mobile applications and internet or web based banking platforms
Resources	Ensure at least one POS machine per supermarket, 2 ATMs at each shopping mall, USSD short code, 100% mobile and internet banking availability
Resource Benefits	High traffic of transactions, preferred banking partner, customer retention

Increasing investment in digital technology will improve access to ATMs, POS, internet and mobile banking. These are critical platforms required to increase the number of digital banking transactions. Accessibility on digital platforms is required to become a preferred banking partner.

5.4 Limitations of the Study

- The methodology of the study was quantitative and made use of a structured questionnaire. The structured questionnaire however has the weakness of compartmentalizing the response options available thereby possibly compromising the quality of the research findings. In this study the quantitative approach was chosen because it is fast, scientific, focused and relatable. It was possible to use data computing equipment to process and analyse fairly quickly a large sample of data with efficiency and accuracy required in this kind of research. However to overcome the weaknesses of quantitative research methods but still achieving good quality responses some elements of qualitative research methods are required. Hence, for future research the Mixed Methods

Approach is recommended as it combines qualitative and quantitative research elements to give an improved outcome, George (2021).

- Some respondents only completed the questionnaire after repeated reminders, this could have compromised the quality of the data as such individuals might not have taken time to provide considered responses.

- Lack of previous research studies on digital transformation in South Africa meant that there was limited relevant literature to review on the topic.

5.5 Suggestions for future research

- The study revealed that knowledge on digital transformation was still growing and the digital space itself was in constant transformation. Further studies therefore could improve on the findings.

- Results of this study were not conclusive on the role of technology experts contradicting literature which advocated for the setting up of a research and development function (innovation hub) critical for the advancement of digital systems. Future research should determine whether this function is required inside the banks or outsourced from third parties.

- The study revealed the drivers of digital transformation in the banking industry in South Africa. However, it does not determine which drivers are the most important. Further studies can be carried out in order to determine the salience of the drivers of transformation. Ranking the drivers of transformation assist with resource prioritization in the implementation of recommendations made in this study.

References:

Adamson, C. (2021, August 3). *KPMG*. Retrieved from Banking in the new Reality: https://home.kpmg/zw/en/home/insights/2021/04/banking-in-the-new-reality.html

Agarwal, R., & Prasad, J. (1998). The Antecedents and Consequents of User Perceptions in Information Technology Adoption. *Decision Support Systems, 22*, 15-29.

Agarwal, S., & Varghese, I. (2018, December 20). *Digital-only banking - a souring wave in consumer banking*. Retrieved from infosys.com: https://www.infosys.com/industries/financial-services/white-papers/Documents/next-wave-banking.pdf

Ahmed, S., & Sur, S. (2021). Change in the uses pattern of digital banking services by Indian rural MSMEs during demonetization and Covid-19 pandemic-related restrictions. *Vilakshan-XIMB Journal of Management*, 1-27.

Al-Emran, M., Mezhuyev, V., & Kamaludin, A. (2018). Technology Acceptance Model in M-learning context: A systematic review. *Computers & Education,, 125*, 389-412.

Alex. (2023). *What Are The Digital Customer Expectations From Banking And Financial Services*. Retrieved from The Uxda.com: https://www.theuxda.com/blog/banking-should-meet-customer-expectations

Alharahsheh, H., & Pius, A. (2020). A review of key paradigms: Positivism VS interpretivism. *Global Academic Journal of Humanities and Social Sciences*, 39-43.

Alnemer, A. A. (2022). Determinants of Digital Banking Adoption in the Kingdom of Saudi Arabia: A technology acceptance model approach. *Digital Business*, 17-35.

Al-okaily, M., Lutfi, A., Alsaad, A., Taamneh, A., & Alsyouf, A. (2020). The Determinants of Digital Payment Systems' Acceptance under Cultural Orientation Differences: The Case of Uncertainty Avoidance. *Technology in Society*.

Al-Qaysi, N., Mohamad-Nordin, N., & Al-Emran, M. (2020). Employing the technology acceptance model in social media: A systematic review. *Education and Information Technologies, 25*(6), 4961-5002.

Alt, R., Beck, R., & Smits, M. (2018). FinTech and the transformation of the financial industry. *Electronic markets, 28*(3), 235-243.

Altron. (2021, 6 25). *Cash And Atm Trends During The Covid Pandemic*. Retrieved from Altron Managed Solutions: https://www.altronmanagedsolutions.co.za/cash-and-atm-trends-during-the-covid-pandemic/

Amin, H. (2009). An analysis of online banking usage intentions: an extension of the Technology Acceptance Model. *International Journal of Business and Society*, 5-17.

April, R., & Govender, C. (2023). A Mixed Methods Exploration of Measurement, Impact and Strategy for Affirmative Action and Socio-economic Justice in the South African Financial Sector. *Management & Economics Research Journal,, 5*(1), 83-105.

Armelia, N., Nurrani, W., Niken, K., Revira, L., & Puspasuci, A. (2022). Digital-only banking experience: Insights from gen Y and gen Z. *Journal of Innovation & Knowledge*.

Baruch, Y., & Holtom, B. (2018). Survey response rate levels and trends in organizational research. *Human relations, 61*(8), 1139-1160.

Bathula, S., & Gupta, A. (2021). The determinants of Financial Inclusion and Digital Financial Inclusion in India: A Comparative Study. *The Review of Financial and banking, Bucharest*, 109-120.

Bauer, T. (2017). Research Philosophy and Method. *Responsible Lobbying*, 69-84.

Baxter, M., & Vater, D. (2014). How Banks Can Prime Themselves for Digital Transformation: How Banks Can Prime Themselves for Digital Transformation. *Financial Planning*.

Bergera, A., & Asli, D.-K. (2021). Banking research in the time of COVID-19. *Journal of Financial Stability*.

Bhanda, S., & Vitucci, C. (2022, March 20). *A snapshot on Digital Transformation in Banking 2022*. Retrieved from Qentelli Imagine automate: https://www.qentelli.com/thought-leadership/insights/digital-transformation-banking

Bloomfield, J., & Fisher, M. (2019). Quantitative research design. *Journal of the Australasian Rehabilitation Nurses Association,, 22*(2), 27-30.

Bora, L., & Romny, L. (2022). Internet banking Adoption under technology acceptance model - Evidence from Cambodian users. *Computers in Human Behavior Reports 7 (2022) 100224*, 14 -33.

Bora, L., & Romny, L. (2022). Internet Banking Adoption under TechnologyAcceptance Model -Evidence from Cambodian Users. *Computers in Human Behavior Reports*.

Broby, D. (2021). Financial technology and the future of banking. *Financial Innovation, Heidelberg*, 7-47.

Bulbulia, T. (2022, 03 15). *South Africa's major banks deliver strong financial performance*. Retrieved from Engineeringnews.co.za: https://www.engineeringnews.co.za/article/south-africasmajor-banks-deliver-strong-financial-performance-2022-03-15

Ceci, L. (2021, 8 24). *South Africa: mobile Usr penetration 2016 - 2026*. Retrieved from Statista: https://www.statista.com/statistics/972866/south-africa-mobile-internet-penetration/

Chatimira, H., & Ncube, M. (2020). The Role of Regulatory Bodies and Other Role-Players in the Promotion of Financial Inclusion in South Africa. *ACTA Universitatis Danubius*, 56-62.

Cheng-Xiawa, E., Garry, W.-H., Tanab, T.-H., Chama, R., & Ramanc, K.-B. (2022). Alexa, what's on my shopping list? Transforming customer experience with digital voice assistants. *Technology Forecsting and Social change*.

Chigudu, D. (2021). Picking up Pieces of Good Corporate Governance to Sustain National Railways of Zimbabwe. *Indian Journal of Corporate Governance, 14*(1), 27-47.

Chitimira, H., & Ncube, M. (2020). The Role of Regulatory Bodies and Other Role-Players in the Promotion of Financial Inclusion in South Africa. *ACTA Universitatis Danubius* , 56-62.

Chukwuemeka, E. S. (2022, September 13). *Advantages and Disadvantages of Quantitative and Qualitative Research*. Retrieved from Bscholarly: https://bscholarly.com/advantages-and-disadvantages-of-quantitative-and-qualitative-research/

Cloudentity. (2023, 03 13). *UK Open Banking Overview*. Retrieved from cloudentity.com: https://cloudentity.com/developers/basics/openfinance/open_banking_uk/

Creswell, J. (2019). *Research design: Qualitative, quantitative, and mixed methods approaches.* London: SAGE Publications.

Dagada, R. (2013). Digital banking security, risk and credibility concerns in South Africa. *Second International Conference on Cyber Security,* (pp. 4-6). New York: Heinneman.

Dapp, T. (2017). Fintech: the digital transformation in the financial sector. In *Sustainability in a digital world* (pp. 189-199). Cham: Springer.

David, C. (2023, 04 17). *Monzo Revenue and Growth Statistics (2023)*. Retrieved from Signhouse: https://www.usesignhouse.com/blog/monzo-stats

Davis, F. (1989). Perceived Usefulness, Perceived ease of use and user acceptance of information technology. *MIS Quarterly*, 319-349.

Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use and User Acceptance of Information Technology. *MIS Quarterly*, 318-340.

DBI. (2016). *Traditional Banking*. Retrieved from BDI: https://www.doing-business-international.com/traditional-banking/

De Venn, P. (2023). The evolution of digital banking. *Journal of Digital Banking, 7*(4), 365-377.

Denecker, O., d'Estienne, A., Gompertz, P., & Sasia, E. (2023). Central bank digital currencies: An active role for commercial banks. *Journal of Payments Strategy & Systems, 17*(1), 26-35.

Derin, C. (2022, 3 16). *A Comprehensive Guide to Open Banking, Technology and Beyond*. Retrieved from fintechmagazine.com: https://fintechmagazine.com/banking/a-comprehensive-guide-to-open-banking-technology-and-beyond

Diener, F., & Špaček, M. (2021). Digital transformation in banking: A managerial perspective on barriers to change. *Sustainability, 13*(4), 20-32.

Digalaki, E. (2022, 2 2). *The impact of artificial intelligence in the banking sector & how AI is being used in 2022*. Retrieved from Businessinsider.com: https://www.businessinsider.com/ai-in-banking-report

Dimitrova, I., Öhman, P., & Yazdanfar, D. (2022). Barriers to bank customers' intention to fully adopt digital payment methods. *Dimitrova, I., Öhman, P. and Yazdanfar, D. (2022), "Barriers to bank customers' intention to fully International Journal of Quality and Service Sciences*, Dimitrova, I., Öhman, P. and Yazdanfar, D. (2022), "Barriers to bank customers' intention to ful 16-36.

Dönmez-Turan, A., & Kır, M. 2. (2018). User anxiety as an external variable of technology acceptance model: A meta-analytic study. *Procedia Computer Science,, 15*, 715-724.

Dubey, V. (2019). FinTech Innovations in Digital Banking. *International Journal of Engineering Research & Technology*.

Dutta, S. (2015). Digital Business: A new Customer -savvy business platform for Indian banking & Retail sector - issues and challenges. *Indian Journal of Management Science*.

Elnahass, M., Trinh, V., & Li, T. (2021). Global banking stability in the shadow of Covid-19 outbreak. *Journal of International Financial Markets, Institutions and Money, 72*, 102-122.

Expatica. (2022, 4 1). *The Difference Between Traditional and online Banks*. Retrieved from Expatica.com: https://www.expatica.com/finance/banking/traditional-vs-online-banking-27854/

Farnsworth, B. (2019, June 11). *Qualitative vs Quantitative Research – What Is the difference?* Retrieved from Imotions: https://imotions.com/blog/qualitative-vs-quantitative-research/

Feyisa, M. (2022). When Does a Researcher Choose a Quantitative, Qualitative, or Mixed Research Approach? . *Interchange A Quarterly Review of Education*, 113-131.

Filotto, U., Caratelli, M., & Fornezza, F. (2021). Shaping the digital transformation of the retail banking industry. Empirical evidence from Italy. *European Management Journal,, 39*(3), 366-375.

Fischer, A. (2019). *The rise of Fintech.* Cham: Springer.

Flaming, M., & Jenik, I. (2020, 11 11). *How Does Tech Make a Difference in Digital Banking?* Retrieved from cgap.org: https://www.cgap.org/blog/how-does-tech-make-difference-digital-banking

Gagua, F. (2021, 12 15). *Retail banking*. Retrieved from The Asian Business Review: https://asianbusinessreview.com/retail-banking/exclusive-news/why-banks-need-more-tech-experts-in-their-board-rooms

George, T. (2021, 8 13). *Mixed Methods Research | Definition, Guide & Examples*. Retrieved from scribbr: https://www.scribbr.com/methodology/mixed-methods-research/

Giebe, C. (2019). The Chief Digital Officer–savior for the digitalization in German banks? *Journal of Economic Development, Environment and People, 8*(3), 6.

GlobalData. (2022, 12 23). *Digital Banking Trend Analysis – The Quest for Profitability Driving Strategies and Product Development of Digital-Only Providers* . Retrieved from Global Data: https://www.globaldata.com/store/report/digital-banking-trend-analysis/

Gnevko, S. (2020). UK Challenger Banks' Market cools down in recession. *Journal of Accounting and Finance*.

Gomber, P., Koch, J., & Siering, M. (2017). Digital Finance and Fintech: Current and Future research Directions. *Journal of Business Economics*, 537-580.

Gounaris, S., & Koritos, C. (2008). Investigating the Drivers of Internet Banking Adoption Decision: A Comparison of Three Alternative Frameworks. *The International Journal of Bank Marketing*, 282-304.

Granić, A., & Marangunić, N. (2019). Technology acceptance model in educational context: A systematic literature review. *British Journal of Educational Technology,, 50*(5), 2572-2593.

Gypsy, D. (2020). Digital financial technology and the future of banking. *Financial Innovation, 3*(1), 2-14.

Harunavamwe, M., Nel, P., & Van Zyl, E. (2020). The influence of self-leadership strategies, psychological resources, and job embeddedness on work engagement in the banking industry. *South African Journal of Psychology,, 50*(4), 507-519.

Harvey, D. (2016). Digital transformation in banks: The trials, opportunities and a guide to what is important. *Journal of Digital Banking, 1*(2), 136-145.

Hinton, J. (2020). Could Digital Transformation Break the Banking Industry? . *Global Banking and Finance Review*, 16-21.

Irshaidat, R. (2019). Interpretivism vs. positivism in political marketing research. *Journal of Political Marketing*, 1-35.

Jameaba, M. S. (2023). *Digitalization, Emerging Technologies, and Financial Stability: Challenges and Opportunities for the Indonesian Banking Sector and Beyond.* Thousand Oaks: Sage.

Jenik, I. (2022, 1). *TymeBank Case Study: The Customer Impact of Inclusive Digital Banking*. Retrieved from CGAP: https://www.cgap.org/research/publication/tymebank-case-study-customer-impact-inclusive-digital-banking

Kamal, S., Shafiq, M., & Kakria, P. (2020). Investigating acceptance of telemedicine services through an extended technology acceptance model (TAM). *Technology in Society, 60*, 101-112.

Katarzyna, S. (2022). The Impact of Covid-19 on digital only banks: are they winners or losers? *Journal of Banking regulation*.

Kaur, A., & Malik, G. (2019). Examining Factors Influencing Indian Customers' intentions and Adoption of Internet Banking. *Innovative Marketing*, 42-57.

khan, I. U. (2022). How does culture influence digital banking? A comparative study based on the unified model. *Technology in Society*.

Khanboubi, F., Boulmakoul, A., & Tabaa, M. (2019). Impact of digital trends using IoT on banking processes. *Procedia Computer Science, 151*, 77-84.

Kitsios, F., Giatsidis, I., & Kamariotoy, M. (2021). Transformation and Strategy in the Banking Sector: Evaluationg acceptance Rate of e-services. *Journal of Open Innovation: Technology, Market and Complexity*, 7-204.

Kkozyra. (2020, 2 5). *10 Use Cases of Blockchain in Banking* . Retrieved from concisesoftware.com: https://concisesoftware.com/blog/10-use-cases-of-blockchain-in-banking/

Kolade, O., Odumuyiwa, V., Abolfathi, S., Schroder, P., Wakunuma, K., Akanmu, I., . . . Oyinlola, M. (2022). Technology Acceptance and Readiness of Stakeholders for Transitioning to a Circular Plastic Economy in Africa. *Technology Forecasting and Social Change*.

Kruger, A. (2019, June 13). *Tymebank clients take their time*. Retrieved from www.moneyweb.co.za/: https://www.moneyweb.co.za/news/companies-and-deals/tymebank-clients-take-their-time/

Laukkanen, T. (2016). Consumer adoption versus rejection decisions in seemingly similar service innovations: the case of the internet and mobile banking. *Journal of Business Research, Vol. 69*, 2432-2439.

Lee, S., Kwon, Y., Quoc, N., Danon, C., Mehler, M., Elm, K., . . . Cho, S. (2021). Red Queen Effect in German Bank Industry:Implication of Banking Digitalization for Open Innovation Dynamics. *Journal of Open Innovation Technology*, 7-90.

Louw, C., & Nieuwenhuizen, C. (2020). 'Digitalisation Strategies in a South African Banking Context: a consumer Services analysis. *South African Journal of Information Management*, 11 -15.

Machasio, I. (2020). Covid-19 and Digital Financial Inclusion in Africa: How to Leverage Digital Technologies during the Pandemic. *Africa Knowledge in Time* .

Madafg. (2017, 6 15). *Mixed Methods*. Retrieved from Get Revising: https://getrevising.co.uk/grids/mixed-methods

Maharaj, S., & Pooe, R. I. (2021). Overcoming challenges associated with managing change towards Digital Banking-a case of a South African bank. *Journal of Contemporary Management, 18*(1), 70-92.

Maiti, M., Vuković, D., Mukherjee, A., Paikarao, P., & Yadav, J. (2022). “Advanced data integration in banking, financial, and insurance software in the age of COVID-19'. *Software: Practice and Experience*, 887-903.

Maiya, R. (2017). How to be a truly digital bank. *Journal of Digital Banking, 1*(4), 338-348.

Makina, D. (2021). CAN COVID-19 BE A CATALYST OF OPEN BANKING IN SOUTH AFRICA? *Financial markets Journal*.

Malar, D., Arvidsson, V., & Holmstrom, J. (2022). Digital transformation in banking: Exploring value co-creation in online banking services in India. *Journal of Global Information Technology Management, 22*(1), 7-24.

Manceron, H. (2021, 12 3). *Digital lending is the next horizon for Africa’s banks*. Retrieved from African Business: https://african.business/2021/12/technology-information/digital-lending-is-the-next-horizon-for-africas-banks-says-skaleet-ceo/

Maumbe, B. M. (2018). Digital financial service delivery to poor communities in South Africa: A preliminary assessment. *International review of business research papers 2, 2*(2), 72-79.

Maune, A. (2015). Corporate governance in Zimbabwe: An overview of its current state. *Asian Economic and Financial Review, 5*(1), 167-178.

Mccrocklin, S. (2021, 02 26). *Geopoll*. Retrieved from Mobile Penetration In South Africa: https://www.geopoll.com/blog/mobile-penetration-south-africa/

Mckinsey & Company. (2020, 11 11). *COVID-19 has made South Africans much more comfortable with online banking* . Retrieved from mckinsey.com: https://www.mckinsey.com/featured-insights/coronavirus-leading-through-the-crisis/charting-the-path-to-the-next-normal/diverse-building-blocks

McLeod, S. (2019, April 7). *What’s the difference between qualitative and quantitative research?* Retrieved from Simple Psychology: https://www.simplypsychology.org/qualitative-quantitative.html

McPherson, S. (2020, 3 19). *COVID-19 has made remote working the new normal - why this might be good for productivity*. Retrieved from Graduate School of Business: https://www.gsb.uct.ac.za/ideas-exchange/covid-19/fo-remote-working-could-soon-be-the-new-normal

Mhlanga, D. (2020). Industry 4.0 in finance: the impact of artificial intelligence (ai) on digital financial inclusion. *International Journal of Financial Studies, 8*(3), 45.

Monaghan, S. (2022, March 16). *Fintech connect.com*. Retrieved from Fintech Connect Noth America: https://www.fintechconnect.com/events-toronto/blog/top-5-drivers-of-digital-banking-transformation-in-2021#.YohK3Go7f_M.whatsapp

Moon, J., & Kim, Y. (2001). Extending the TAM for a World-Wide-Web context. *Information & management, 38*(4), 217-230.

Moore, G. C., & Benbasat, I. (1991). Development of an Instrument to Measure the Perceptions of Adopting an InformationTechnology Innovation. *Information Systems Research*, 192-222.

Murinde, V., Rizopoulos, E., & Zachariadis, M. (2022). The impact of the FinTech revolution on the future of banking: Opportunities and risks. *International Review of Financial Analysis*, 21-39.

Musyaffi, A., Mulyani, S., Suraida, I., & Sukmadilaga, C. (2021). Lack of Readiness of Digital Banking Channel Acceptance: Study on Tam 3 and Technology Readiness. *Academy of Strategic Management Journal, 20*, 1-18.

Naimi-Sadigh, A., Asgari, T., & Rabiei, M. (2022). Digital transformation in the value chain disruption of banking services. *Journal of the Knowledge Economy, 13*(2), 1212-1242.

Nel, J., & Boshoff, C. (2020). *Traditional Bank Customers' digital only bank resistance: evidence from South Africa.* Bloemfontein: University of the Free State, South Africa.

Nkoyi, A., Tait, M., & Van der Walt, F. (2019). Predicting the attitude towards electronic banking continued usage intentions among rural banking customers in South Africa. *South African Journal of Information Management*, 10-16.

Ofosu-Ampong, K. (2021). Determinants, barriers and strategies of digital transformation adoption in a developing country Covid-19 era. *Journal of Digital Science, 3*(2), 67-83.

Ortakoy, S., & Ozsurunc, Z. (2019). The Effect of Digital Channel Migration, Automation and Centralization on the Efficiency of Operational Staff of Bank Branches. *Procedia Computer Science*, 938-946.

Özlem, D.-d., & Schandlbauer, N. A. (2022). COVID-19, bank deposits, and lending. *Journal of Empirical Finance*, 12-22.

Palframan, M. (2020, 4 7). *Can fintech challengers break the banks?* Retrieved from yougov.co.uk: https://yougov.co.uk/topics/economy/articles-reports/2020/04/07/can-fintech-challengers-break-banks

Parikh, S. (2021, 12 20). *Top 10 RPA Use Cases in the Banking Industry*. Retrieved from nividous.com: https://nividous.com/blogs/rpa-use-cases-in-banking-industry

Patel, R., Migliavaccaa, M., & Oriania, M. (2022). Blockchain in banking and finance: A bibliometric review. *Research in International Business and Finance*.

Pooja, S. (2021, 12 31). *How AI chatbot with RPA helps banking and financial services to enhance customer experience?* . Retrieved from linkedin.com/pulse: https://www.linkedin.com/pulse/how-ai-chatbot-rpa-helps-banking-financial-services-enhance-sharma

PWC. (2016, 4 25). *What is FinTech?* Retrieved from pwc.com: https://www.pwc.com/us/en/financial-services/publications/viewpoints/assets/pwc-fsi-what-is-fintech/

PYMNTS. (2021). *The Pymnts.com Global Cash Index - South Africa Analysis*. Retrieved from Global Cash Index: https://www.studocu.com/en-

za/document/university-of-south-africa/software-engineering/the-pymntscom-global-cash-index-south-africa-analysis/3398365

Rafique, H., Almagrabi, A., Shamim, A., Anwar, F., & Bashir, A. (2020). Investigating the acceptance of mobile library applications with an extended technology acceptance model (TAM). *Computers & Education,, 145*, 103-132.

Rahi, S. (2017). Research design and methods: A systematic review of research paradigms, sampling issues and instruments development. *International Journal of Economics & Management Sciences, 6*(2), 1-5.

Rajesh, K., & Webology, V. (2021). COVID 19 Outbreaks on the Growth of Self Servicing Technology Using Digital Payments. *Tehran*, 22-40.

RAOSOFT. (2004). *RAOSOFT Sample Size Calculator*. Retrieved from RAOSOFT: http://www.raosoft.com/samplesize.html

Reddy, R. (2020, 5 6). *How banks are leveraging Conversational AI amidst covid-19*. Retrieved from BotCore: https://botcore.ai/blog/conversational-ai-amid-covid-19/

Rita, A., Fernando, R., Fernando, F. F., Constantin, T., & Zopounidisef, F. (2022). Artificial intelligence, digital transformation and cybersecurity in the banking sector: A multi-stakeholder cognition-driven framework. *Research in International Business and Finance*.

Rogers, E. M. (1962). *Difussion of Innovations.* New York, NY: The Free Press.

Rohal, S. (2021, 8 23). *Is South Africa Ready For The Next Phase In The Cloud Evolution?* Retrieved from Tech Financials: https://techfinancials.co.za/2021/08/23/is-south-africa-ready-for-the-next-phase-in-the-cloud-evolution/

Sabine, R., & Carsana, L. (2017). The effect of digital design in retail banking on customers' commitment and loyalty: The mediating role of positive affect. *Journal of Retailing and Consumer Services, 37*, 132-138.

Saji, T. G., & Paul, D. (2019). Behavioural intention to the use of mobile banking in Kerala: an application of extended classical technology acceptance model. *Metamorphosis, 17*(2), 111-119.

SARB. (2022, March 21). *Prudential Authority 2021 Annual Report*. Retrieved from www.resbank.co.za: https://www.resbank.co.za/content/dam/sarb/publications/reports/pa-annual-reports/2021/Prudential%20Authority%20Annual%20Report%202020%202021.pdf

Schoonenboom, J., & Johnson, R. (2017). How to construct a mixed methods research design. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie, 69*(2), 107-131.

Scott, S., Van Reenen, M., & Zachariadis, C. (2017). The long-term effect of digital innovation on bank performance: An empirical study of SWIFT adoption in financial services. *Research Policy*, 984-1004.

Sherwani, R., Shakeel, H., Awan, W., Faheem, M., & Aslam, M. (2021, 10 17). *Analysis of COVID-19 data using neutrosophic Kruskal Wallis H test*. Retrieved from BMC Medical Research Methodology: https://bmcmedresmethodol.biomedcentral.com/articles/10.1186/s12874-021-01410-x

Sholom, S., & McKeever, W. (2021). OSL with chips from US credit cards. *Radiation Measurements*.

singh, H. (2023, 03 18). *How digitization is shaping the future of banking*. Retrieved from The Times of India: https://timesofindia.indiatimes.com/blogs/voices/how-digitization-is-shaping-the-future-of-banking/

Stefanini. (2022, 2 15). *The Need for Cloud Computing in Banking and Financial Services*. Retrieved from stefanini.com: https://stefanini.com/en/trends/news/need-for-cloud-computing-in-banking-financial-services

Strandberg-Larson, M., & Krasnik, A. (2019). Measurement of integrated delivery: a systematic review of methods and future reserach design. *International Journal of Integrated Care, 8*, 1-10.

Taherdoost, H. (2017). A review of Technology Acceptance and Adoption Models and Theories. *11th International Conference Interdisciplinarity in Engineering* (pp. 960-967). Tirgu-Mures, Romania: Procedia Manufacturing.

Tan, G., Chong, C., Ooi, K., & Chong, A. (2010). he adoption of online banking in Malaysia: an empirical analysis. *International Journal of Business and Management Science*, 169-193.

Tardieu, H., Daly, J. E., Hall, J., & Miller, G. (2020). *Deliberately Digital - Rewriting Enterprise DNA for Enduring Success.* Cham: Springer.

Tayibnapis, A. Z., Wuryaningsih, L. E., & Gora, R. (2018). The development of digital economy in Indonesia. *IJMBS International Journal of Management and Business Studies, 8*(3), 14-18.

Thakor, A. (2020). Fintech and Banking: what do we know? *Journal of Financial Intermediation*, 10 -18.

The Banking Association of South Africa. (2020, 03 26). *Banks Respond to COVID-19: Keeping Essential Banking Services Open, Protecting Our Staff and Helping Our Customers*. Retrieved from banking.org.za: https://www.banking.org.za/news/banks-respond-to-covid-19/

TheBanks.eu. (2022, April 17). *Market Share and Rank: Monzo Bank Limited*. Retrieved from The Banks.eu: https://thebanks.eu/banks/18773/market_share

Theiri, S., & Alareeni, B. (2021). Perception of the digital transformation as a strategic advantage through the Covid 19 crisis? case of Tunisian banks. *Journal of Sustainable Finance & Investment*, 1-22.

Thomas, T. (2023). *How to grow a user base by utilizing Adjust's deep integration with Facebook*. Retrieved from Adjust.com: https://www.adjust.com/resources/case-studies/monzo/

Thusi, P., & Maduku, D. (2020). South African millennials' acceptance and use of retail mobile banking apps: An integrated perspective. *Computers in Human Behavior, 111*, 164-165.

Torkzadeh, S., Zadeh, A., & Zolfagharian, M. (2021). Customer Engagement and Participation Behavior: The Underlying Mechanisms of the Virtual Servicescape and Service Outcomes. *e-Service Journal; Bloomington*, 1-26.

Tsindeliani, I. P., Sadovskaya, T., Popkova, Z., Davydova, M., & Babayan, O. (2022). Digital transformation of the banking system in the context of sustainable development. *Journal of Money Laundering Control, 25*(1), 165-180.

Turker, C., Altay, C. B., & Okumus, A. (2022). Understanding user acceptance of QR code mobile payment systems in Turkey: An extended TAM. *Technology Forecasting and Social Change*.

Tyson, J. (2021). *The impact of Covid-19 on Africa's banking system*. Retrieved from odi.org: https://odi.org/en/insights/the-impact-of-covid-19-on-africas-banking-system/

Valvedere, S., & Fernandez, R. (2020). Financial Digitalization: Banks, Fintech, Bigtech and Consumers. *Journal of Financial Management and Market institutions*, 1-13.

Venkatesh, V. (2000). Determinants of Perceived Ease of Use; Integrating Control, Intrinsic Motivation and Emoton into the Technology Acceptance Model. *Information Systems Research*, 342-365.

Visser, A. (2020, 6 18). *South Africans are leaning towards contactless payments fearing that cash carries COVID-19* . Retrieved from businessinsider.co.za: https://www.businessinsider.co.za/south-africans-are-leaning-towards-contactless-payments-fearing-that-cash-carries-covid-19-2020-6

World Bank. (2018, 9 13). *Rural population (% of total population) - South Africa*. Retrieved from World Bank.org: https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=ZA

Xie, X., & Wang, S. (2023). Digital transformation of commercial banks in China: Measurement, progress and impact. *China Economic Quarterly International, 3*(1), 33-45.

Yanagawa, N., & Yamaoka, H. (2019). Digital innovation, data revolution and central bank digital currency. *Bank of Japan, E*(2), 19.