Assessing the impact of digital transformation on business performance in South Africa's banking industry

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Abstract

Background: The Fourth Industrial Revolution and the recent outbreak of the Covid-19 pandemic have created a strong interest in digital transformation. Organisations have been focused on advancing their technological capabilities, thus increasing their IT investment capabilities. In the banking sector, the implementation of digital technologies has introduced the existence of digital banks and other non-financial organizations that have tapped into the financial services, such as fintech and retailer organisations. This has been gradually leading to a diluted market share, which was previously dominated by South Africa's traditional banks. Digitising has therefore become an important aspect of organisations' growth strategy.

Purpose: This research study aims to investigate the impact of digital transformation on the financial performance of the traditional South African banks.

Methodology: This study uses the quantitative research method where financial performance, is measured by return on assets (ROA) and digital technology (data analytics, artificial intelligence, cloud computing, and the Internet of Things). The data was collected using secondary data accessed from the traditional South African banks, namely; ABSA, Standard Bank, FNB, and Nedbank's annual reports and full-year consolidated financial statements, from the year 2014-2021.

Findings: Findings from this research study indicate that there is a strong relationship between digital technology and business performance, meaning that digital transformation does have an impact on the business performance of the traditional South African banks. Further, the relationship between the variables, digital technology and business performance is negative. This has been found by previous literature to be due to the initial costs of investment in digital technology.

Research limitations/implications: Digital transformation is an important concept that continues to be explored by researchers and organisations. Therefore this research is relevant to many industries in the market, which presents an opportunity for it to be expanded to other industries. The impact of digital transformation on other performance factors such as operational performance can be studied.

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This paper is dedicated to my late father, Lungile Lawrence Melamane, whose love and support have been felt even in his afterlife.

Keywords/Definitions

Financial Technology (FinTech) - Organisations that use technology to offer new or enhanced financial services

Digitisation - Process of converting information into digital form (Gartner, 20220.

Digital technology - Electronic devices and systems, and any resources that produce, process or store data (Victoria State Government, 2019)

Gross domestic product (GDP) - Monetary calculation of the value of all the final goods and services which are produced and sold by countries in a particular time period

Digital banks - The digitalisation of traditional banking services in order to deliver financial services to customers (FSCA, 2021)

Retail banking – Banking services suited for or offered to individual consumers

Traditional banks – Financial institutions with physical premises and a local banking license. For example, ABSA, Standard Bank, FNB, and Nedbank

Cryptocurrencies – A form of digital currency that is being used as an alternative to cash to pay for goods or services

Return on Assets (ROA) - This is a profitability metric, which measures the ability of an organisation to generate profits from its total assets (Investopedia, 2022)

Return on Equity (ROE) - ROE is a metric of an organisation's profitability, as well as efficiency in generating those profits. The higher the ROE, the more efficiently an organisation is at converting its financing through equity into profits

Covid-19 - The infectious disease which is caused by the recently uncovered coronavirus (WHO, 2023)

IT Investment - Expenditure in information technology to meet organisational objectives

Artificial Intelligence (AI) - AI is a network of intertwined machines that find solutions for business problems, demonstrating characteristics of human intelligence (Sammarco, et al., 2022)

Big data – A multidisciplinary field of using tools and data that contribute to decision-making by providing insights (Sammarco, et al., 2022)

Cloud computing - Devices used to access cloud applications and data through the internet from remote physical computers, databases, and servers (Chai and Bigelow, 2023)

Chapter 1

1.1. Background

Digital technology and the adoption thereof is a continuously explored topic as researchers seek to discover the role of digital technology on business performance, the economy, the way in which people interact, as well as how organisations can attain a sustainable competitive advantage in an era of a constantly changing and complex environment (Ferreira et al., 2019; Jafari-Sadegh et al., 2021; Knudsen, 2021). Digital transformation is defined as an interdepartmental effort to redefine the manner in which an organisation formulates its processes, people and systems to bring about new business models and revenue streams as a result of changing consumer preferences; through digital technology (Jafari-Sadegh et al., 2020; Matarazzo et al., 2021; Amudhan et al., 2022). Globalisation brought a need for organisations to implement digital technology as a means to operate in an interconnected world. Organisations have had to synthesise their processes using digital technology to survive and more importantly, remain competitive (Kraus et al., 2021). This was especially significant for South Africa and other emerging markets, as they have moved steadily in terms of launching into the digital technology space.

While organisations were gradually beginning to implement digital technology, the Covid-19 pandemic brought about a compelling need for most of these organisations to adopt digital technologies at a fast pace. Lockdown restriction measures and temporary closures of financial services providers called for a move away from traditional financial services activities; resulting in less physical cash being used as a medium of exchange and an increase in digital transactions (Calvey et al., 2022; Dora et al., 2022). Camarate (2022) found that while digitisation offers organisations operating advantages such as cost reduction capabilities, many countries in the Europe, Middle East, and Africa (EMEA) region, including South Africa are lacking automation and connectivity in their operations. Furthermore, that in the next five years, organisations that have adopted digital technology are expected to achieve 16% in cost reduction versus a 10% cost reduction achievement, where there is a lack of technology implementation. The South African Financial Markets Journal (SAFMJ) (2022) provides that in the current environment, most of the South African financial services providers are still heavily dependent on the traditional ways of carrying out their services to consumers. Using traditional information technology systems involve additional resources for maintenance,

which is costly and time-consuming. The SAFMJ (2022) proposes the need for financial services providers to implement digital technology to deliver a diversified product range, as well as better customer experiences.

Martínez-Caro et al. (2020) state that the implementation of digital technologies offers substantial value to organisations. Digital technology offers the financial services industry an opportunity to enhance operational efficiencies and profitability. This has been evident from financial services providers that have managed to considerably reduce the turnaround time for manual tasks and achieve an improvement in customer experience (Calvey et al., 2021). Nwankpa and Roumani (2016) suggest that since business performance improvement is generally a fundamental objective for an organisation, the impact information technology (IT) on business performance is an area of great discern. Digital technologies give financial institutions the ability to reduce operating costs through technology-driven automation, thus increasing profitability. There is also an improvement in customer satisfaction through the adoption of technology as client services being offered to customers is enhanced through convenient and mobile access to banking channels (FSCA, 2022). Customer service improvement has been become a priority in rise of digital banking (Amudhan et al., 2022). Lower operating costs and efficiency, as well as improved innovation results in increased return on assets (ROA) and return on equity (ROE) (Zhai et al.,2022). Since 2010, the accelerated growth of digital technologies such as the big data, artificial intelligence, the Internet of Things cloud computing, and artificial intelligence in organisations have made digital transformation a prevalent strategic pursuit for better business performance globally (Guo and Xu, 2016).

The aim of this research study is to examine whether a relationship exists between digital transformation and improved financial business performance in the banking industry in South Africa. The study further intends to explore the extent to which an investment return is realised from digital technology through profits or earnings in the South African banks. This will be done by drawing upon previous literature to understand digital transformation and its impact on financial business performance. The methodology adopted to assess these relationships will then be discussed using quantitative research, by gathering and analysing secondary data. Subsequently, the results of the data analysis will be discussed. The last chapter will provide limitations and implications for future research in digital transformation.

1.2. Problem Statement

Overall, the current market environment is characterized by volatility and uncertainty thus organisations need to adapt to ever changing market conditions and stay ahead of other players. This has translated into digital transformation being one of the most important business concepts in South Africa and globally, as innovation in producing new products and services have become a constant requirement (Michelotti, 2020). The adoption of digital technology is being extensively used as a tool for innovation, to remain competitive and achieve profitability. Competitiveness in the banking industry is becoming a challenge because new entrants are infiltrating a industry that was previously an oligopoly. Michelotti (2020) adds that digital transformation is more than a mere technology strategy implementation for better operational capability, as an example. It involves using technological enhancements to create new business models and strategies, products, and services, as well as to drive business growth. The South African Financial Market Journal (2022) states that innovation enabled by digital technology will allow the business environment and financial industry to keep up with the pace of change. This gives organisations the ability to introduce new financial products, bolstering potential financial performance growth.

The South African banking industry is denominated by major banks such as ABSA, Standard Bank, FNB, Nedbank, Investec, and Capitec (Ford, 2022). Although these banks have been occupying the majority of South Africa's banking community, there has been a rise in digital banking. Discovery Bank, Tyme Bank, and Bank Zero are among the list of banks that are purely digital (Mujinga, 2020). Accenture (2019), adds that the banking industry faces challenges of increasing market competition from new entrants such as digital banks and fintech (financial technology) companies, with financial services such as payments and remittances, insurance, lending, as well as savings and investments (RMB, 2019; Chouaibi et al., 2022). Changing consumer behaviours and preferences are being addressed by the new competitors infiltrating the banking industry, posing a challenge to the incumbents' financial performance and overall sustainability (Amudhan et al., 2022).

Millennials being the biggest population group in the world, prefer digital alternatives to traditional financial services, thus a technology-led insurgence of these services is imminent. It was found in the United States through a study that 75% of millennials prefer using financial

services from companies such as Amazon, Google or PayPal as opposed to using a physical bank. The study further showed that one-third of these millennials would be willing to change banks in the next three months, and 53% view banks as being the same in terms of service offerings (Kadlec, 2014, as cited in Coetzee, 2018). Organisations that continue to lag behind in the implementation of digital transformation stand the risk of being left behind or extinct. Despite that fact, South African financial services are not adopting digital technologies at the required momentum.

Non-traditional entrants, such as Fintech companies with technology-driven services have infiltrated the traditional banking environment, disrupting conventional financial services solutions. The rise of the Fintech sector has resulted in banks facing considerable competition in their core business operations, as these companies leverage innovative automation and innovative information technology (OECD, 2020). They offer digital services such as online banking, multi-channel customer services, financial software, and share trading. This sector's impact on the banking industry has in the past years increased significantly (Dapp, 2014, as cited in Coetzee, 2018).

Digital currencies may also disrupt traditional banking and payment solutions. Cash is increasingly used less as the ordinary function of money, that being a medium of exchange. There exists a few examples of digital currencies such are WeChat Pay in China, M-Pesa in Kenya, and cryptocurrencies. Furthermore, mobile devices have become abundant in the daily lives of consumers, and these consumers are captured into using digitally enhanced financial services functions, such as digital wallets (OECD, 2020).

According to Accenture (2019), South Africa has lower levels of inclusiveness of the broader population, continuously increased levels of the usage of cash, as well as failure to employ digital technology to improve financial outcomes. This translates into the South African financial services market having an increasing gap to close. Low levels of automation and old technology compromise the ability of financial services to quickly adjust to growing competition.

In 2019, digital banking was estimated at $803.8 billion (R146,5 billion) globally and is forecast to reach $1610 billion (R2936 billion) by 2027. Retail banking holds the biggest market share in the digital banking space with a market size of $574.4 billion (R10 475.94 billion) in 2019 and is forecast to reach $1320 billion (R24 074.23 billion) in 2027. Digital

payments are the greatest service segment in the digital banking market, reaching a market size of $194.5 billion (R3547.30 billion) in 2019 and is forecast to reach $402.5 billion (R7340.82 billion) by 2027. Digital banking channels are increasingly gaining popularity worldwide, where 2 billion people are using online banking services actively, and this is forecast to reach 2.5 billion by 2024 (FSCA, 2021). The FSCA (2021) further states that, similarly in South Africa, digital banking channels are increasingly being adopted by consumers. Between 2018 and 2019, banking mobile applications (app) and cell phone banking users increased by 4%. This was found to be the result of the advantages offered by digital banks to consumers. While digital banking launched by the traditional South African banks offers convenient access to services, upcoming non-traditional competitors are offering more innovative digital consumer offerings. It has also been found that financial service companies still lag behind in advancing to meet changed consumer behaviours and expectations (Accenture, 2019).

This study, therefore, seeks to make a contribution to determining the impact of implementing digital transformation on the South African banking industry participants' business performance, as well as providing the competitive strategies that enable organisations to remain competitive.

1.3. Objective of the study

Primary Objective

This research study's primary objective is to determine the impact of digital transformation on the traditional South African banks' financial performance.

Secondary Objective

The secondary objective of this research study is to investigate whether the investment made into digital technology is received back through profit generated, as a result of that investment.

1.4 Research Questions

The research questions that were addressed in the study are the following

- RQ_1: Does the implementation of digital technology result in improved business performance ?

- RQ2: What is the extent to which South African banks realise the return on investment through implementing digital technology?

1.5. Research Gaps

Digital transformation is being continuously studied by researchers, especially after the COVID-19 pandemic. This is where economies and local businesses had to seek means survive in an environment where entities had to operate remotely, which was not the case prior to the pandemic. The financial industry globally and locally, especially banks, have been a topic of interest because banks perform several important functions in the economy (OECD, 2020), their contribution to countries' gross domestic products (GDPs) as an example. Ferreira et al., (2019) state that although digitisation is a largely explored topic, the impact of digital transformation on performance still remains a subject matter that must be investigated further. In addition, there is still a lack of research investigating the extent to which the capital expenditure or investment in digital technology is realised through a return on profits or sales generated by organisations. Furthermore, digital transformation has also been explored by commercial banks, however, researchers and executive business leaders still face challenges in analysing the distribution of digital technology implementation to business performance (Do et al., 2022; Alsufyani and Gill, 2022).

1.6. Significance of the study

The traditional South African financial services players have over the years been implementing digital technology but still to a limited degree, compared to the new entrants in the banking industry. Changing technology and consumer expectations may largely require the adoption of technology to survive in the long term. Digital transformation has also resulted in non-financial services players establishing themselves in the financial services market by using capabilities offered by technology, such as cryptocurrencies, telecommunication operators, and retailers. Sharma (2022) states that the new players that have entered the banking market are "born digital", closing the gap in the market of customers that prefer non-contact banking. This translates into the banking market being more competitive than before. In addition, (Calvey et al., 2021) provides that even in the financial industry itself, there are untapped avenues where value can be derived through the implementation of digital technology, such as creating personalised banking experiences for clients. Some of the advantages listed by the authors as

being the result of the digital technology outcomes are; improved customer experience, improved profitability, increased revenue, higher end-to-end product offering, and services, delivering for a broader set of customer needs, and access to new datasets for shareholders. Therefore, South African banking organisations should be cautioned about the significance of digital transformation, as a means to be profitable and competitive in the future. According to Sharma (2022), there is a growing appetite for digital banking in South Africa and other developing countries. Added to that, digital banking will form part of economic growth throughout the African continent. According to Accenture (2019), The World Economic Forum (WEF) approximations that R1,2 trillion in value can be derived from digitally transforming the financial services industry between 2019 and 2026. It is important for the traditional banking industry to implement digital technology to avoid the threat of being irrelevant and uncompetitive in the future world of banking. Thus, through digital transformation, the traditional South African banks have the opportunity to participate in future economic growth by remaining relevant to their existing customer markets, as well as accessing new markets.

Since traditional banks have been gradually implementing digital technology, they are aware of the significance of digital transformation. However, implementing digital technology within the traditional banks has been a process whereby new technology is blended with old ways of banking. Consequently, banking customers in some instances end up having to visit a bank branch in order to complete an online application (Sharma, 2022). The author further states that digital transformation is more than implementing current or advanced technology, it is about focusing on untapped or previously underserved markets as a means of future income growth. Implementing technology assists the organisation in improving profitability, as it provides the ability for an organisation to be a cost leader or to differentiate their service offering.

1.7 Outline of the study

This research study covers five chapters:

i. Chapter 1 provides the background of the study and includes the introduction, which is followed by the subsequent topics, a description of the problem statement; the research gaps; the significance of the study; the research objectives and questions; ethics; as well as the outline of the study.
ii. Chapter 2 provides a review of relevant literature in terms of digital transformation and business/financial performance
iii. Chapter 3 provides the research methodology. This includes the research philosophy; the research method; the sampling strategy; the data collection; as well as the data analysis.
iv. Chapter 4 discusses the results of the quantitative data analysis.
v. Chapter 5 provides a summary of the main findings of the study; discusses the limitations; presents recommendations; and explores areas for further research.

Chapter 2

2. Literature Review

2.1.1 Introduction

The 1970s introduced a time when the influence of information technology on business strategies and the competitive landscape attracted people's attention. Since then, information technology has been recognised as a tool for competitive sustainability (Xue et al., 2022). New technology has had a substantial influence on today's competitive business context (Davis, Field, & Stavrulaki, 2015, as cited in Ferreira et.al, 2019). Critical implications in how businesses compete, and the result of this new competitive landscape are now more evident. Organisational interaction with customers and the value added have been reshaped by digital technologies (Ferreira et.al, 2019). The implementation of digital technologies in private and public sector businesses commonly known as digital transformation has rapidly expanded over the last decade. Digital transformation is creating fundamental changes in society, different sectors and businesses with the aim of business model reconstruction for better value creation (Matarazzo et al., 2021).

The review of literature will look at the defining digital transformation, and what literature has found regarding the relationship between digital transformation and business financial performance.

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2.2.2 Defining Digital Transformation

(Schwertner, 2017, p. 389) describes digital business transformation as the process of integrating digital technologies throughout all areas of the business, which results in integral changes in the way in which an organisation functions. It is a technology-driven transformation in an organisation, as digital technologies and information are used as the source to derive various developmental changes within organisations (Morakanyane et al., 2017). Another definition of digital transformation by Ismail et al. (2017) is that it encompasses the way in which organisations integrate various digital technologies to achieve enhanced business performance and a sustainable competitive advantage. On the other hand, Alsufyani and Gill (2022) and Matarazzo et al. (2021) submit that digitalisation is more than merely adopting new technologies in an organisation, it is rather a fundamental change in business strategy and

processes as it contributes to the organisation's performance and sustainable competitive advantage. According to Dang et al.(2020, p. 892), Gartner outlined the concept of digitalisation as the use of digital technologies to produce greater revenue streams, change business models and uncover value-creation opportunities.

Digitalisation is becoming a popular tool that organisations use for development and survival. It also gives the organisation the capability to effectively respond to business environment volatility (Alsufyani and Gill, 2022). Organisations can use digital technologies to achieve a sustainable competitive advantage, which is a significant long-term survival element for organisations. Such competitive advantage comes in the form of improved decision-making, organizational effectiveness, improved service and quality, as well as enhanced business processes (Salo, 2006, as cited in Martínez-Caro et al., 2020; Dang et al., 2020). Xue et al.(2022) provide that a sustainable competitive advantage can be realised through information technology. This organisational survival capability is evident through factors such as establishing a differentiated business strategy and achieving enhanced efficiency. Dang et al. (2020) provide that competitive advantage is attained through creating a framework that offers value, rarity, inimitability, and organised (VRIO) as strategic resources through using digital technologies. On the hand, Usai et al. (2021) argue that the impact of digital transformation in a business is not competitive advantage, but rather a tool to enhance organisational efficiency. Therefore, it cannot be presumed to be the direct influence of innovation in an organisation, as it is an additional resource to traditional sources of competitive advantages, such as human and financial resources. Furthermore, sustainable competitive advantage is challenging in a volatile environment to the extent that competitiveness will be fickle or ambiguous (Knudsen et al., 2021).

However, digital technology has made it more challenging for business models or capabilities to be replicated (Matarazzo et al., 2021). Through digital transformation, dynamic capabilities offer a competitive advantage by creating value in the organisation (Jafari-Sadeghi, 2020). Due to the current volatile and complex business environment, there is a constant need for organisations to be adaptive and flexible. The ability to adapt to uncertain environments through innovation and competitive sustainability can be achieved through digital transformation. Continuous digital transformation enables the organisation to establish a competitive advantage better than competitors (Ferreira et al., 2019).

2.3. Digital Transformation and business performance

Business performance is considerably influenced by digital technology adoption as there exists an interconnection between digital technology and increased business performance (Khairuddin, 2020). The performance and visibility of organisations are improved through digital technology (Ismail et al., 2017). Dang et al. (2020) provide that digital technology has a positive influence on business performance, as its implementation bestows industry and market expansion broadening into foreign arenas, improving the organisation's brand, enhancing client service, and reducing business activity costs. Improved client service and better decision making is the rationale behind the implementation of digital transformation, where an increase in financial performance is the result. Xue et al.(2022) add that the communication of information costs declines through digital transformation offering greater revenue potential for an organisation. The adoption of digital transformation brings about cost reduction while increasing the organisation's ability to perform competitively (Zhai et al., 2021). Increased revenue and innovation through process re-engineering using technology have become increasingly popular (Martínez-Caro et al., 2020). Digital transformation has a generally beneficial impact on business performance through increased productivity and possibly increased sustainability of this business performance (Mubarak et al., 2019). A highly competitive and unpredictable competitive business environment requires organisations to be well-positioned to respond to the constant changes that occur and this reaction is the positive result of digital transformation (Venkatraman, 1994, as cited in Li, 2021). Moreover, digital technology enables the organisation to recognise potential challenges as well as opportunities ahead of time (Li, 2021). Organisations that have not implemented digital technology limit important financial improvement opportunities for themselves, such as improved customer service, enhanced business processes, and innovative product development (Berman, 2012 as cited in, Morakanyane, 2017). Organisations constantly need to plough investment into their processes and systems to innovate, and thus keep up with a changing environment. Those that are not embracing this need will eventually be dissolved, as such an organisation will lack the ability to capitalise on core competencies. Digital technology adoption is necessary to attain and sustain innovation (Karagiannaki et al., 2017). Zhai et al. (2021) and Chouaibi et al. (2022) also suggest that there is a positive relationship between business performance and digital transformation. The authors add that the impact of digital transformation on organisational performance is long-term, while the influence of additional digital transformation is evident in the short term. Martin, 2018 as cited in Guo and Xu, 2016 quoted a survey on global

organisations' digital technology adoption and found that only 20% of organisations experienced an improvement in financial performance because of digital transformation. Jardak and Hamad (2020) state that improvements in organisations' processes due to digital transformation are not evident in the short term. The positive effect comes gradually over the years that follow.

Digital transformation in banking has changed the way banks operate, moving away from mainly providing services in physical branches, to including online services. This has been made possible by the banks developing banking software, mobile banking, and digital banking to meet the demands and provide value to their current customers (Do et al., 2022). Do et al., (2022) add that digital transformation brings about advantages such as meeting various customer requirements as well as fulfilling the expectations of the market, thus having a positive effect on the profitability of the banks. The authors make reference to a research study conducted in Kenya, where it was found that digital banking has achieved high performance through the ability to innovate and keep abreast of new trends. Kriebel and Debener, 2020, as cited in Jardak and Hamad, 2022, submit that the successful implementation of digital technology in banks improves financial performance and produces a competitive advantage.

Organisations have been progressively adopting digital technology; such as mobile platforms, big data, cloud, analytics, and artificial intelligence to boost their IT capability. This has had a positive effect on financial performance, thus finding a positive relationship between digital transformation and financial performance (Nwankpa and Roumani, 2016). The authors further state that digital technologies are being used as a tool for disrupting current models in addition to influencing the way in which organisations are conducted. In addition, it was found that organisations that have a higher calibre of information technology through digital adoption, perform better than organisations that do not have this capability (Nwankpa and Roumani, 2016). Digital transformation has been described as the introduction of mobile banking experiences and services in banking organisations; such as mobile apps, internet, and cell phone banking which have been enabled by digital technology (Kitsios et al., 2021). Kitsios et al.(2021) describe digital transformation as a way through which new technological platforms enable new services to be offered by banking organisations. According to Yip et al. (2018, as cited in Kitsios et al., 2021) digital transformation involves the digitization of services such as payment systems, documents, electronic signatures for transactions, as well as statements.

2.4 Theoretical Framework

This chapter provides an overview of the South African banking industry landscape in light of digital technology. The theoretical concepts which are Porter's generic competitive strategies and the resource based view theory, are then discussed. These concepts will also be used in the analysis of the study's results.

2.4.1 The South African banking industry and digital technology

The big four South African banks have held the biggest market share for many years, operating as an oligopoly. However, the recent years have been witness to the inception of digital solutions which offer lower cost models. These lower cost models are being continuously launched by other financial services market players (PWC, 2018), such as TymeBank through reaching a larger market share digitally. PWC (2018) further provides that the high barriers to entry in the South African banking industry has dissipated with the entry of banks such as Capitec, Discovery Bank and BankZero. The new entrants in the banking industry are largely digital banks, which demonstrates the industry's transformation into digital technology and big data. This has been experienced on a global scale (OECD, 2020). The competitive landscape in the banking industry has thus increased, where more players are striving for a sustainable competitive advantage through increased financial performance. Digital transformation is used as a tool to achieve a competitive advantage, because through digitisation, the organisation is able to be a cost leader or differentiator.

2.4.2 Porter's generic competitive strategies

Porter's framework of generic competitive strategies is intrinsically linked to business performance (Islami et al., 2020; Chan and Wong, 1999). The strategies determine the level of competitive advantage that an organisation has, where profitability for a competitive organisation is considered to above the market average. There are two main strategies; namely cost leadership and differentiation. The third of these strategies is the focused strategies (University of Cambridge, 2016). Pulaj et al. (2015) define cost leadership as the ability of an organisation to provide their services at a low cost and more efficiently. Differentiation is about offering products and services that are unique in the market.

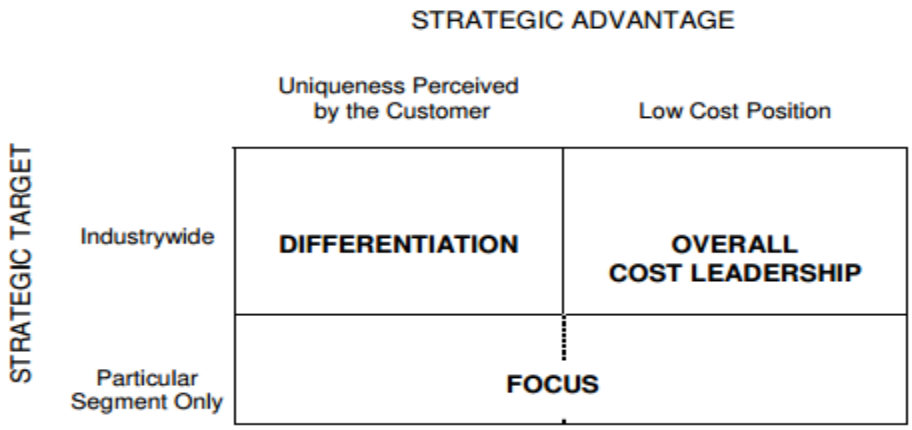

Figure 1: Porter's typology of business strategies (Porter, 1980, p. 39).

The four main banks (Absa, Nedbank, FirstRand and Standard Bank) or incumbents have responded to the digital banking competitors and each other by continuously investing in projects such as digital transformation (PWC, 2018).

2.4.3 The Resource Based View Theory

The resource-based view (RBV) theory of the organisation suggests that the resources and capabilities of an organisation must offer value, rarity, inimitability and organisational support (VRIO); to achieve a sustainable competitive advantage (Barney, 1991). Barney (1991, p. 99-120) explains that these resources should allow the organisation to respond to environmental threats and be distinctive, where a limited number of or no competitors own the resources and capabilities. In addition, these resources should be complex and expensive to attain and that the organisation should be well positioned to capitalise on opportunities that arise from the resources and capabilities being valuable, rare and inimitable. The RBV of digital transformation proposes that the implementation of digital technology or digitization in an organisation is assumed to enable the organisation to attain a sustainable competitive advantage through improved business performance (Mubarak, et al., 2019). Oduro et al., (2023) states that digital technologies can produce enhanced organisational performance, through effectively integrating internal resources and capabilities to offer value, be rare and not easy to imitate. The authors examined components of digital technologies such as the Internet of Things, artificial intelligence (AI) and big data analytics. Digital technology is assumed to enable the

organisation to obtain a sustainable competitive advantage from an RBV perspective (Mubarak, et al., 2019) through improved business performance. Masoud and Basahel (2023) found that digital transformation improved business performance through increased customer experienced, thus contributing to an organisation's competitiveness. Digital technology as a resource is therefore seen as valuable, and imperative in the current technology-focused era. Similarly, Zhao, et al. (2023) studied the relationship between digital transformation and an organisation's performance, stating that digital transformation increased an organisations' efficiency, knowledge-sharing and relationship building, as well as agility. These components contribute to the competitiveness of the organisation, therefore finding a positive relationship between digital transformation and business performance.

Taking into consideration the theoretical models used in this research paper, the hypotheses that have been raised will respond to the research questions.

H_1: There is a relationship between digital transformation and business performance.

H_0: There is no relationship between digital transformation and business performance.

H_2: The relationship between digital transformation and business performance is negative.

H_0: The relationship between digital transformation and business performance is positive.

Chapter 3

Research Methodology

3.1. Introduction

This research paper investigates the impact of digital transformation on financial business performance. The methodology that was used in this study seeks to determine whether a relationship exists between digital transformation and business performance in quantitative research. The sample used is comprised of the traditional South African banks, commonly known as the Big Four Banks. This chapter will be discussed in the following order; 3.1 will explain the research philosophy, 3.2 describes the research type being quantitative research, 3.3 will discuss the sampling strategy, 3.4 will describe the data collection methods that were used, and 3.5 the data analysis methods/techniques will be explained.

3.2. Research Philosophy

The research paradigm that will inform this study is positivism. The main objective of the positivist philosophy is to create a causal relationship or association between variables. The eventual result is based on a predetermined causal relationship (Sciarra, 1999; Gergen, 2001 as cited in Park et al., 2020). In addition, Rehman and Alharthi (2016), submit that the positivist philosophy prescribes quantitative research as the research type to be used. The purpose of this study is to assess the causal relationship between digital technology transformation and business performance. The quantitative research method will be discussed below.

3.3. Research Type

Sukamolson (2007) describes quantitative research as a method that seeks to represent the truth about the population by using a sample, as well as to test hypotheses. Quantitative research is applicable to this study as the aim of conducting the study is to quantify a relationship between variables. The independent variable is digital transformation and the dependent variable is the return on assets (ROA) to represent financial or business performance.

3.4. Sampling Strategy

The study sample is the four big South African banks, namely; ABSA, First National Bank (FNB), Nedbank, and Standard Bank. This sample was selected to examine the digitalisation of the big four banks in an industry where there have been new entrants who are heavily focused on digital technology or are digital only banks. This has increased the competitive environment in the banking industry. In the previous years, the South African traditional banking incumbents, offered banking services in a less digitised format, such as having customers physically in branches for their banking transactions. With the entrance of new competitors and the need to digitise to remain competitive, these banks started embarking on digital transformation journeys. Digitisation was also implemented to reduce costs and improve efficiencies (PWC, 2018).

This study sample was selected by means of convenience sampling. Convenience sampling is considered non-probability sampling, as this method is usually used where the study items are easier to access (Qualtrics, 2023).

3.5. Data Collection Method

The research study has been conducted through secondary data analysis of the sample group mentioned above. Full-year consolidated financial statements and integrated annual reports were used to extract return on assets (ROA) data from the year 2014 to 2021. The financial statements of organisations show the financial performance, indicating management or strategic decisions such as investment choices (PWC, 2020). Annual reports provide information about the organisation’s performance in the previous year, as well as objectives for the year ahead (Corporate Finance Institute, 2023). The data is available as open source data of the sample group, i.e., each of the traditional South African bank's websites. Over the years, digitisation or digital transformation became part of these organisations’ strategies, although the respective digital journey progressed at different levels.

3.5.1 Measures (description of the variables)

Digital Transformation

Sujana (2018) describes digital transformation as a completely consolidated mobile experience. Traditional banking activities are done using digital technologies, without customers having to physically visit a bank. Guo and Xu (2016) define digital transformation as adopting digital technologies in an organisation such as big data analytics, artificial intelligence, cloud computing, and the Internet of Things (IoT). Digital transformation has been described as the alteration or modification of organisations, driven by digital technologies (Tolboom, 2016). Therefore, digital transformation is defined as the organisational change of information technology to include mobile platforms, big data, cloud, analytics, and Artificial Intelligence (Nwankpa and Roumani, 2016). Digital technologies such as blockchain, big data, Artificial Intelligence, cloud technology, 5G, social media, the Internet of Things, and cyber-security technologies promote digital transformation. This in turn conveys that the basis of digital transformation is digital technology (Teng, 2022). This research study therefore used digital technologies as a measure of digital transformation, by looking at mobile platforms, big data, cloud, analytics, and artificial intelligence; as constructs.

Business Performance

Business Performance as a variable is described as the financial performance of a banking organisation measured by the two financial performance matrices; return on equity (ROE) and return on assets (ROA). The reason for using these financial ratios is that they show profitability(Corporate Finance Institute, 2023). Sharma et al., (2016) and Guo and Xu (2021) state that ROA and ROE portray a good representation of profitability. Moneo (2016) adds that banking organisations perceive performance, primarily by looking at banks' profitability ratios, being return on assets and return on equity. This can be attributed to the banks' fundamental goal of profit maximisation. This research study uses ROA as the independent variable because digital transformation or digital technologies becomes an asset for an organisation, where the extent to which the investment in digital technologies is realised through profitability can be examined. Guo and Xu (2021) used ROA as a representative variable for financial performance. Furthermore, Wadesango and Magaya (2020) state that ROA is the most reliable measure of financial performance.

Table 1. illustrates the variables and how they have been measured. The measures are represented through the listed constructs and extracted from annual reports and consolidated financial statements. Each bank's investment in mobile platforms, big data, analytics, and Artificial Intelligence (AI) was considered part of digital technologies or a component in calculating digital technologies. Similarly, the banks also report on their annual financial performance and provide what they have achieved in return on assets (ROA). Although the table indicates how ROA is calculated, the measure used in this research was readily provided by the bank's reports and not manually calculated.

Variable	Measure
Digital Transformation	Digital Technologies - Mobile platforms - Big data - Analytics - Artificial Intelligence (AI)
Business Performance	Return On Assets - Financial performance metric - Usually calculated by net income divided by total assets as represented in financial statements

Table 1. Descriptions of the measures of the variables Digital Technologies(DT) and Return On Assets(ROA)

3.6. Data Analysis Methods/Techniques

Descriptive and inferential statistical techniques were used to summarise the data. Sutanapong and Louangrath (2015) describe descriptive statistics as a representation of the data set, whereas inferential statistics are used to draw a conclusion derived from descriptive statistics. Correlation and regression analysis were used to interpret the results of the data.

3.6.1. Correlation – hypothesis and equation for correlation

Correlation is used to determine whether a relationship exists between variables, as well as the direction and strength of that relationship. In this study, correlation was used to examine the relationship between digital transformation and business performance. Business performance was presented as ROA as this ratio measures profitability. According to Gogtay and Thatte (2017), correlation represents a relationship between two or more variables in quantitative analysis. Binary variables show the extent or strength of the association of the variables.

Table 2 shows the correlation between digital transformation (measured as digital technologies) and business performance (measured as return on assets), over the years 2014-2021 can be shown in the example below.

Year 1		
Bank	Digital Technologies	ROA
Bank 1	X1	Y1

Year 2		
Bank	Digital Technologies	ROA
Bank 2	X2	Y2

Table 2. Correlation of the variables DT and ROA

Do et al., (2022) conducted a correlation analysis to test the hypothesis, to determine whether a relationship between digital transformation and business performance exists, and the strength of that relationship. The authors found that digital transformation has a positive impact on business performance.

The outcome of a correlation analysis which is known as the correlation coefficient falls between -1 and 1 (Gogtay and Thatte, 2017). This determines the strength (or extent) and direction of the relationship between these variables. The correlation analysis of the relationship between digital transformation (measured by the investment in digital technology)

and business performance (measured by return on assets). Pearson correlation outcomes that are lower than 0.3 are deemed weak, those between 0.3 and .05 are considered moderate, and finally, those with 0.5 to 1 are considered strong (Pallant, 2013, as cited in Mujinga, 2020).

According to (Keller, 2015), the result of a relationship between the dependent and independent variables does not prove causation. Thus, the result of a relationship between digital transformation and business performance does not necessarily show that high investment in digital transformation causes high business performance. It only proves that there is a relationship between the two variables.

Keller (2015) proposes that to assess whether the independent variable and dependent variable are related, the linear regression model should be used test to that relationship. Whereas, the correlation coefficient is a tool used to test and calculate whether there is a linear association between variables. Linear association is a statistical expression used to portray a straight-line relationship or association between two variables on a graph (Mindrila and Balentyne, 2017).

3.6.2. Regression analysis

To establish the causal relationships between digital technologies (independent variables) and business performance (dependent variable), a linear regression analysis was conducted. According to Maulud and Abdulazeez (2020), linear regression is used to test forecasts and predictions, as well as assess causal relationships between variables. The regression analysis used in this paper evaluates the impact of the digital transformation variable on the business performance (profitability) variable. Meuleman et al. (2015, as cited in Rosenthal, 2017) state that for linear regression to be valid, the data set under observation must assume that there is a relationship between the dependent variable and the independent variable. The test for whether such a relationship exists is through using the x-y scatter plot, where, the values of the independent variable are represented on the *x*-axis and the values of the dependent variable are represented on the *y*-axis. The straight line which lies closest to the group of plotted data points has a slope referred to as the regression coefficient.

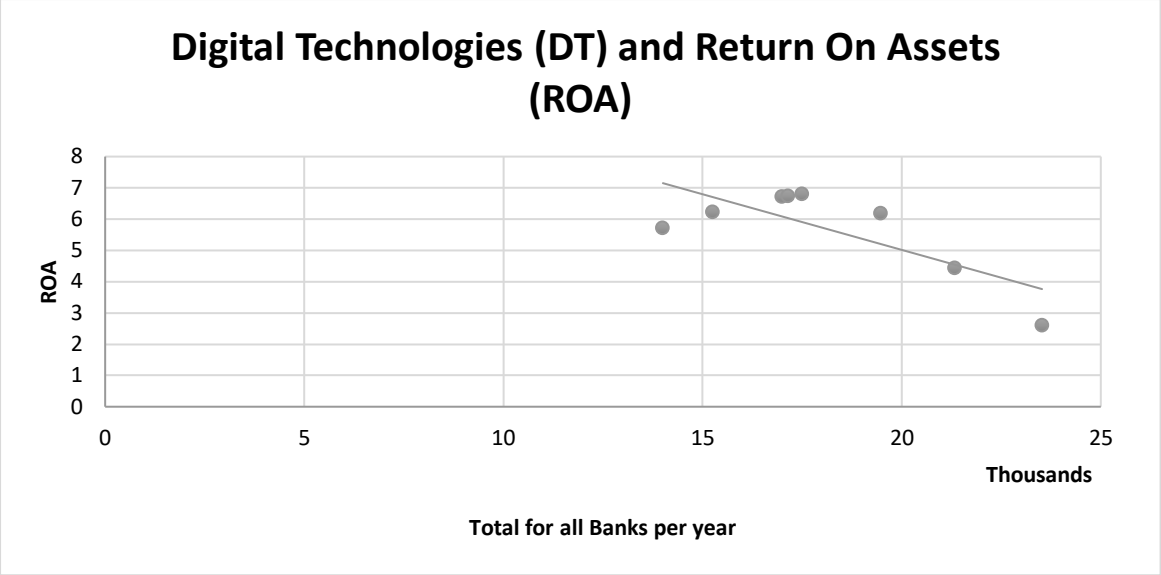

Figure 2. Scatterplot diagram measuring whether a relationship exists between DT and ROA

The scatter plot of Figure 1, shows that there is a fairly strong association between the variables, digital technology and ROA. This is because the collection of data points are lying close to the line or slope. More than that, the correlation coefficient of the data is 0.81. Therefore, using the simple linear regression model will be a useful tool to assess the impact of digital technology on return on assets (ROA), as a measure of business performance. A simple linear regression is commonly applied when there is one independent variable (Maulud and Abdulazeez, 2020). In this case, there is one such variable; namely digital technologies (as a measure of digital transformation).

The simple linear regression formula is as follows:

$$\hat{y} = B_0 + B_1 x + e \quad (1)$$

$\hat{y}$ - represents the value/s of the dependent variable

B_0 – represents the intercept

B_1 – represents the coefficient for X or the slope

X - represents the independent variable

e – represents the error

Thus, digital technologies = intercept + the coefficient for ROA. This formula or model was used to test how the dependent variable, digital technology affects the ROA of a bank.

3.6.3. Descriptive Statistics

Descriptive statistics were used to illustrate the impact of digital technology implementation and the business/financial performance of the banks. The financial performance of the banks, using ROA as a measure was compared. Descriptive statics describe the features of a data set by explaining the relationship between variables under a study (Kaur et al., 2018). The data used for the descriptive statics in this research paper was extracted from South Africa's banking institutions' consolidated financial statements, as well as annual reports from the years between 2014 and 2021.

3.6.4. Test of Significance

The AVONA table, which exhibits the p-value was used to evaluate the validity of the estimates of the variables. The outcomes of the ANOVA test determined the significance of the variable, which influences the results of the statistical hypothesis test.

Chapter 4

4.1. Results of the analysis

For a better explanation of digital transformation and business performance, the measures of the two variables (digital technologies and return on assets) have been presented on two graphs (Figure 2). These two graphs show the spending on digital technologies or acquired digital assets in most of the years, depicted in numbers 1 to 8; digital transformation and ROA follow a similar direction with one year (2020) being significantly different in terms of the investment made by the Banks into digital technology versus the return on assets achieved.

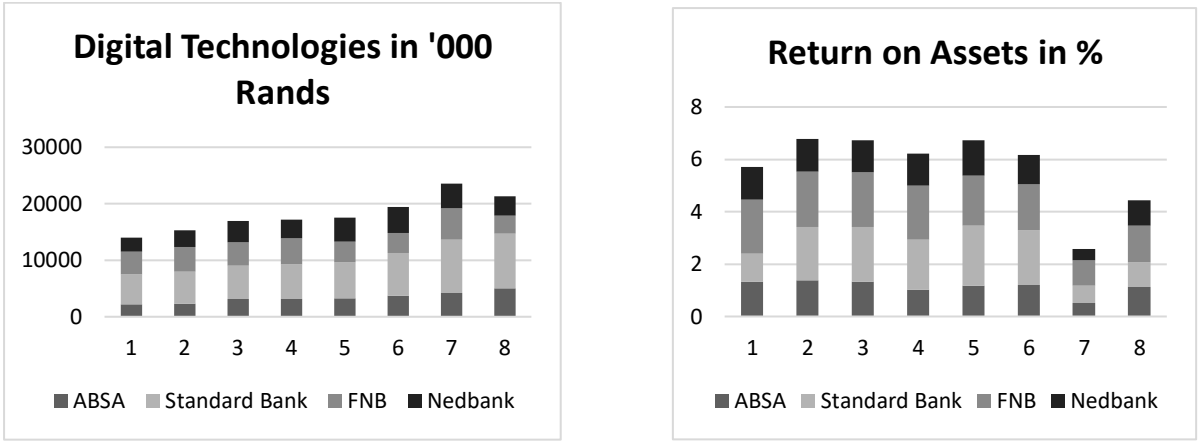

Figure 3. Digital technologies spend per year compared to the return on assets in percentage, between 2014 and 2018 (8 years)

In 2020, economies all over the world were hit by the outbreak of the Coronavirus pandemic. As banks are one of the main institutions in an economy, they were adversely affected by the pandemic. During the pandemic, measures were put in place by governments to curb the spread of the highly contagious virus. Social distancing was one of the most important measures implemented, which meant that people could not physically go to banks, retail stores, and work; to name a few. This affected banking profits or returns as the number of transactions reduced drastically. More than that, some banks had not digitised to an extent that all stages of transacting could be done remotely or online. Therefore, some of these banks invested heavily in their digital assets while the economy as a whole suffered from the outbreak.

Year	Digital Technologies	Return on Assets
2014	14005	5,72
2015	15252	6,79
2016	16992	6,73
2017	17141	6,22
2018	17498	6,72
2019	19474	6,18
2020	23524	2,59
2021	21338	4,44
Mean	18153	5,67375
Std Deviation	3143,24	1,47
Median	17319,5	6,2

Table 3. Simulated data of the variables, DT and ROA. DT is represented by billion (bn) and ROA is represented in percentage

Table 3 illustrates the results of the descriptive statistics. This table shows that the average spend on digital technologies is R18,153 (bn) between the years 2014 and 2021 among the traditional banks. This average was compared to the average mean of ROA achieved by the banks to be 5,6%. The standard deviation is R 3,143 (bn) and 1,47%, for each of these variables. With the outcome variable, which is ROA, the median (6,2%) is greater than the median (5,67%). This means that the data has been affected by extreme values or outliers, as can be seen in the table. The years 2020 and 2021 are the extreme values, which is when the banks' financial performances were negatively affected by the measures that were implemented to curb the spread of the Covid-19 pandemic. However, where market conditions were stable, the banks were able to generate an upward trajectory with their digital technology investments. At this stage banks were able to offer differentiated offering through mobile transacting.

4.1.1. Inferential Statistical Analysis

The inferential statistical analyses that were conducted include regression, Pearson Correlation, and the one-way ANOVA test.

Model/Equation Description :

To test the relationship between the variables, digital technologies and ROA, and the strength or the extent of the relationship; this study uses the linear regression model identified by the equation provided below. This model is derived from the linear regression equation, Y = a+bx.

$\hat{y} = B_0 + B_1 x + e$

$ROA = B_0 + B_1 (DT) + e$ (2)

$= -0{,}000390741 * X + 12.82$

4.1.2. Regression Model Output

Regression Statistics	
Multiple R	0,806679973
R Square	0,650732578
Adjusted R Square	0,592521341
Standard Error	0,971890147
Observations	8

Table 4. Regression statics of the data

4.1.3. Pearson Correlation Result

Pearson Correlation defines the strength and direction of the relationship between the variables. In this study, r = 0.81 means that the relationship between the variables is strong, as the correlation outcome is between 0.5 and 1. Therefore, digital technologies do have an impact on ROA. This means that technology would enable the banks to either be a cost leader or differentiator.

In terms of direction, the slope of the line is facing downwards, as illustrated in Figure 1. This implies that there is a negative relationship between digital technologies and ROA.

4.1.4. Coefficient of Determination Result

The coefficient of determination or the r-square is 0.65. A value of < 0.3 is weak, a value between 0.3 and 0.5 is moderate and a value > 0.7 means the independent variable has a strong effect on the dependent variable. Since the coefficient of determination in this study is 0.65, it indicates that 65% of the variance in ROA can be accounted for by digital technologies. 35% of the variance is caused by other factors (Turney, 2022).

The adjusted r square is 0.59, which takes into account the number of independent variables in the analysis and corrects for bias. This is usually relevant when there is more than one independent variable, therefore will not be a factor in this study as there is only one independent variable.

The standard error is another measure of variability besides standard deviation. In this model, the standard error is 0.97, which measures the accuracy with which a sample distribution represents a population by using standard deviation. The smaller the standard error, the more precise the linear regression model is (Bhandari, 2022).

4.1.5. One-Way NOVA Test

	df	SS	MS	F	Significance F
Regression	1	10,55917725	10,55917725	11,1788138	0,015544613
Residual	6	5,667422746	0,944570458		
Total	7	16,2266			

Table 5. Regression analysis of the ANOVA test

The One-way ANOVA is the analysis of variance and this statistical test is relevant when there is one independent variable. It does apply to this study as there is one independent variable, ROA. The ANOVA includes the F Test, where the higher the F value, the more it is possible that the variation that is related to the independent variable is actual and not by coincidence (Bevans, 2022).

Table 5 shows the regression analysis of the ANOVA test. In Table 5, the point of focus is Significance F. The null hypothesis in this research study states that there is no relationship between digital technologies and ROA. On the other hand, the alternative states there is a relationship between DT and ROA. If $p \leq 0{,}05$ (less than or equal to) the null hypothesis must be rejected and the alternative hypothesis must be accepted. If $p > 0.05$ (greater than) then we will fail to reject the null hypothesis. Accepting the alternative means the linear regression model is significant. The P value of 0,015 means that the null hypothesis or intercept is zero. The alternative hypothesis, intercept or slope is not equal to zero. Thus, the F-test of the overall significance of 0,015 is greater than the p-value of 0,05. This means that the null hypothesis must be rejected and the alternative hypothesis must be accepted. In words, the hypothesis (H_1) that states that there is a relationship between digital technologies and ROA must be accepted.

4.2. Discussion

The aim of this research study was to investigate whether digital transformation (measured by the sum of digital technologies, DT) has any effect on business performance (measured by the performance metric, ROA). Thereby examining the influence that digital transformation has on the business performance of the South African traditional banks. A hypothesis was formulated to test these questions, stating that a relationship exists between digital transformation and business performance. Pearson correlation revealed that there is a strong relationship between the variables. The regression model outcome showed that there is a significant deviation from the horizontal. This means that the outcome is that of a non-zero slope, indicating that there is a significant linear relationship between the independent variable *X (digital technology)* and the dependent variable *Y (return on assets - ROA).* Thus, for H_1, the null hypothesis was rejected and the alternative hypothesis was accepted. this means that digital technology is a resource that is significant for an organisation's sustainable competitive advantage as it can be costly to rare, costly to imitate while offering value.

Previous studies, included in the literature review have found that investment in digital technology does assist organisations in improving financial performance (Do et al., 2022; Dang et al., 2020; Zhai et al., 2021). An unexpected outcome of the research findings was that the relationship between the variables is negative. In this study, it was discovered that investment in digital technology has a negative effect on the return on assets. This outcome was proved by using a regression model, thus not limiting the investigation results only to correlation. The

return on assets performance metric is used to assess an organisation's ability to create profit from assets invested in that organisation. Jardak and Hamad (2022) provide that when an organisation is going through a process of digitising or digital transformation, there is a substantial IT investment made. Therefore this increased spending on digital technologies, in other words, assets, yields a negative effect on the financial returns of organisations. In their research study, the authors also found that there is a negative relationship between digital transformation, return on equity (ROE) and ROA. They found the investment in information technology (IT) could take a few years to transpire and for the implementation thereof to be seen in improved financial performance. This is due to the high costs in IT that are incurred, however, they add that in the long-term organisations can achieve the intended business performance. Cost leadership while an organisation is in the process of implementing digital technology is a strategy that organisations should not opt for due to ensure that there is business continuity. During the investment years in digital transformation and the first few years thereafter, organisations would aim to differentiate themselves to what the current market is offering.

The negative result substantiates the lag phase between implementation and reaping organisational benefits such as improved business performance. One of the main reasons for this lag in obtaining financial benefits is the costs involved in the digital transformation process or the investment process (Guo and Xu, 2021). Guo and Xu (2021) further provide that the net financial benefits of the investment in digital technologies are seen as the transformation process intensifies. The cost of investment is also offset through business performance improvement in the long term. Wadesango and Magaya (2020) through a study of commercial banks in Zimbabwe, also found that there exists a strong and negative relationship between digital banking infrastructure spending and ROA. Teng et al. (2022) learned that digital transformation is an intricate and long-term investment process, which in the short term is not realised in financial performance. The authors further discovered that the implementation of digital technology and the costs of recruitment to support the digital transformation journey are expensive. Martínez-Caro et al. (2020) state that during a time of high IT investment in an organisation, productivity growth is subdued, referring to this occurrence as a productivity paradox.

Moreover, with reference to Table 3, the traditional banks in the years 2020 and 2021 yielded the lowest ROA although the investment in digital technologies was increased annually. These

were peak years when the Covid-19 pandemic negatively affected many operating areas within the banks. This could also be an additional reason that this study's findings show a negative relationship between the variables. The South African economy has had several years of slow growth, to the extent that the country went into a recession in 2019. This weak economic environment continued into the year 2020 because of the outbreak of the Covid-19 pandemic. In the year 2020 economic activity ceased due to lockdown measures implemented to curb the spread of the virus. Consequently, financial institutions' profits were negatively affected (FSCA, 2022). Therefore, for H_2, the null hypothesis was accepted and the alternative hypothesis was rejected.

Chapter 5

5.1 Conclusion

Although the relationship between information technology and organisational performance has been under debate for a number of years, the Fourth Industrial Revolution (4IR) has made an impact on various industries, including the banking industry. Many of these industries believe in the importance of the implementation of digital technology or going through a digital journey to remain competitive. 4IR has also led to the establishment of what has become known as purely digital banks, such as Discovery Bank, Bank Zero, and Tyme Bank (Mujinga, 2020). The traditional South African banks; namely ABSA, Standard Bank, Nedbank, and FNB, have responded to this rise in digitisation and these purely digital banks by offering customers virtual or digital services. These services include Internet banking, smartphone mobile application (app), and mobile transacting (Louw, C. & Nieuwenhuizen, C., 2020).

This research study discussed the important subject of the impact of digital transformation on the performance outcomes of the traditional South African banks. This was done by gathering data from annual reports, as well as consolidated financial statements. The data that was gathered was the digital technology investment that was done by the banks in Rand terms, as well performance outcomes, from the year 2014 to 2021. The measures or constructs that constituted digital technology for the purposes of this study were; mobile platforms, big data, cloud, analytics, and artificial intelligence. Business performance was measured by looking at the accounting performance metric, return on assets (ROA). The premise of these measures was previous literature.

The theoretical models used to underpin the research study was Porter's generic competitive, cost leadership and differentiation. The Resource-Based View (RBV) theory was also used to determine the competitiveness attained by the traditional banks through implementing digital technology.

The research findings showed that there is a strong relationship between digital transformation and business performance in South Africa's banking industry. This means that through the implementation of digital technology, cost leadership and differentiation can be attained; translating to higher profit margins. This outcome is aligned with the previous literature discussed in this paper and the proposed hypothesis. The results further went on to show that for the time period used in the study for the South African traditional banks, the relationship between those digital technology and business performance is negative. Therefore, the second hypothesis stating the relationship to be positive was rejected.

Since the implementation of digital technology is an investment, the positive influence of that investment takes some time to be evident through business performance. Thus in the short term, the actual contribution of digital technology to organisational performance is not positive. Jardak and Hamad (2022), add that the negative influence of digital technology on business performance shows that the economic value is not realised due to the implementation process. They also state that it takes some time for organisations to offset the investment and the return thereof as digital technology implementation employs increased expenses, which then negatively impacts the financial performance of an organisation. The time frame used in this research study also includes years were South Africa was experiencing slow growth and a subdued investment environment. This was worsened by the outbreak of the Covid-19 pandemic, having a negative impact on many organisations' financial performance, including the banking industry. Although this period influenced organisations to digitise at a faster pace to reach their customers virtually, the investment in digital technology had to be done first. Consumers are increasingly using mobile or virtual banking services, as also evident through the rise of purely digital banks, thus investment in digital technology should be evident in the future. Moreover, millennials, the largest population group in the world, prefer digital transacting as provided by evidence. Therefore it is important to note the significance of digital transformation but with the understanding of the negative impact thereof, on financial performance in the short term. This is due to the expenses incurred in the implementation phase of digital transformation.

5.2. Recommendations

This research study can contribute to organisations that are in the process of implementing digital transformation, through investing in digital technologies. It will equip these organisations with the understanding that the value of digitisation will be seen in their bottom lines a few years post the investment in digital technologies and not immediately. This will assist business leaders in understanding and preparing for the financial challenges that may experience in their digital adoption journeys. Thus, in the short term, organisations that are pursuing digital transformation will experience negative ROA but in the long term, they can achieve positive financial performance. Digital technology will enable the organisation to offer products and services cheaper, as well as be able to differentiate themselves from competitors. Therefore, the period in which digitisation yields negative results in terms of profitability shouldn't deter managers from implementing digital technology. Over time, the organisation should be able to achieve a competitive advantage.

Business leaders in the banking industry would gain insights into which strategies will best fit digital technology expansion or digitisation, such as strategic planning, industry analysis and exploring strategic competitive models.

5.3. Limitations and Implications for future research

5.3.1 Limitations

This study has limitations. The most significant one is the limited time of this project. Given an extended research period, more or other banks could be included for comparison purposes. In this way, the relationship between digital transformation and the business performance of non-traditional or smaller banks and purely digital banks, for example, could also have been analysed. This would have made the conclusion highlighted in this study stronger.

5.3.2. Implications for future research

Using other variables to assess the impact of technology on business performance could lead to more accuracy. The addition of other variables can expand opportunities for future research. There may be other factors contributing to the impact that digital transformation (Martínez-Caro et al.,2020) has on business performance.

Digital transformation applies to all players in the market, this therefore also presents an opportunity to expand this research into other industries such as telecommunications and manufacturing.

5.3.3. Ethical Considerations

This research study adhered to all ethical standards for research without direct contact with human subjects.

The findings or results of this study may be misinterpreted and applied under inaccurate judgment. This can therefore lead to different implications than expected by those who intend to use the study.

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Annexures

Regression Analysis

Regression Statistics								
Multiple R	0,806679973							
R Square	0,650732578							
Adjusted R Square	0,592521341							
Standard Error	0,971890147							
Observations	8							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	10,55917725	10,55917725	11,1788138	0,015544613			

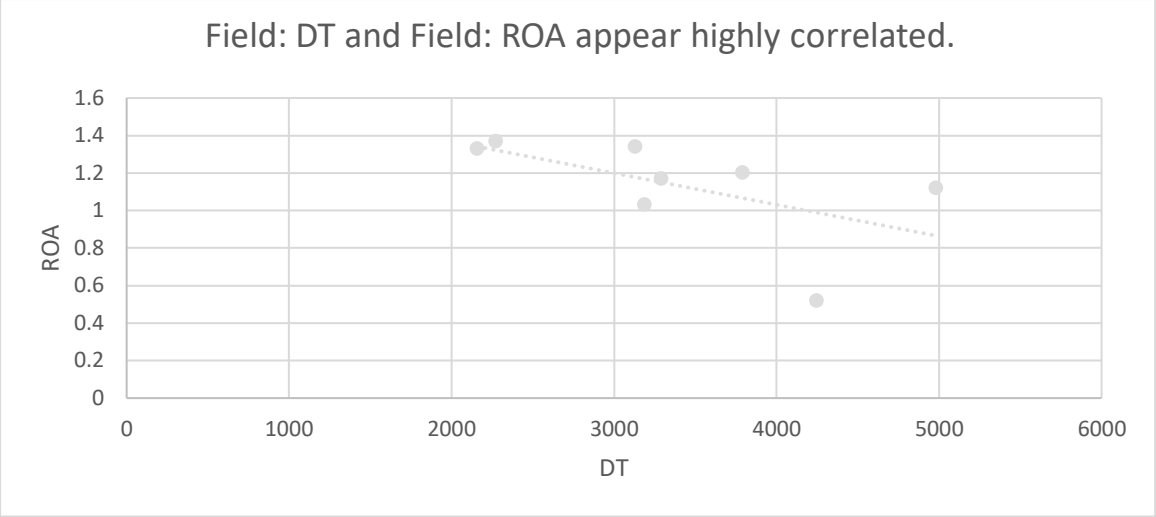
Residual	6	5,667422746	0,944570458					
Total	7	16,2266						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	12,8231132	2,149127853	5,966659073	0,00099313	7,564386791	18,0818396	7,56438679	18,0818396
Total for all Banks per year	-0,000390741	0,000116867	-3,343473312	0,01554461	-0,000676703	-0,0001048	-0,0006767	-0,0001048
RESIDUAL OUTPUT					PROBABILITY OUTPUT			
Observation	*Predicted ROA*	*Residuals*	*Standard Residuals*		*Percentile*	*ROA*		
1	7,350791802	-1,630791802	-1,812402844		6,25	2,59		
2	6,863538336	0,376461664	0,418385836		18,75	4,44		
3	6,183649779	0,546350221	0,607193815		31,25	5,72		
4	6,125429437	0,094570563	0,105102293		43,75	6,18		
5	5,98593506	0,73406494	0,815813143		56,25	6,22		
6	5,213831733	0,966168267	1,07376436		68,75	6,72		
7	3,631332506	-1,041332506	-1,157299168		81,25	6,73		

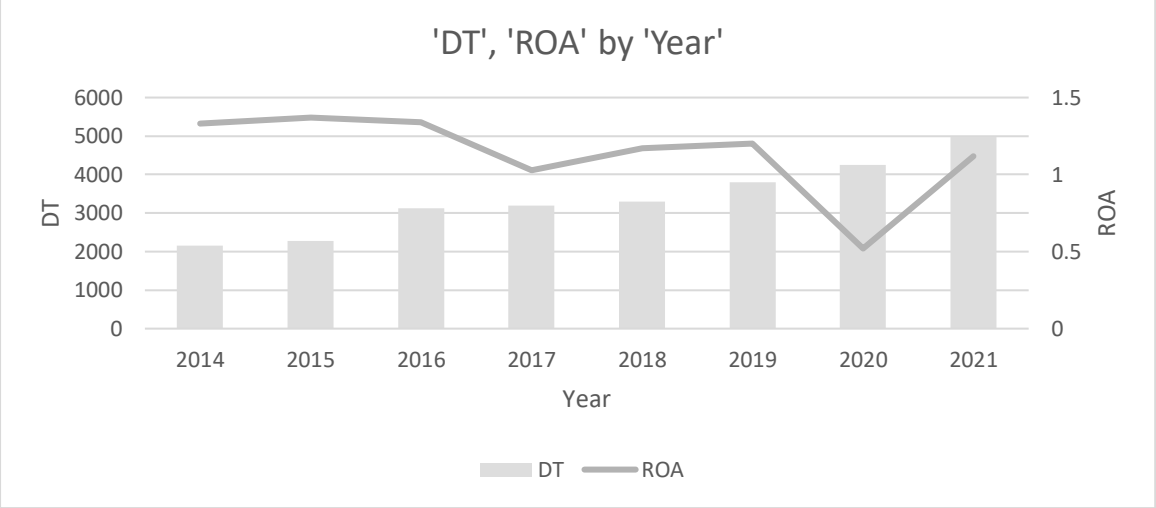
8	4,485491348	-0,045491348	-0,050557434		93,75	7,24		

Individual Bank Results

1. **ABSA**

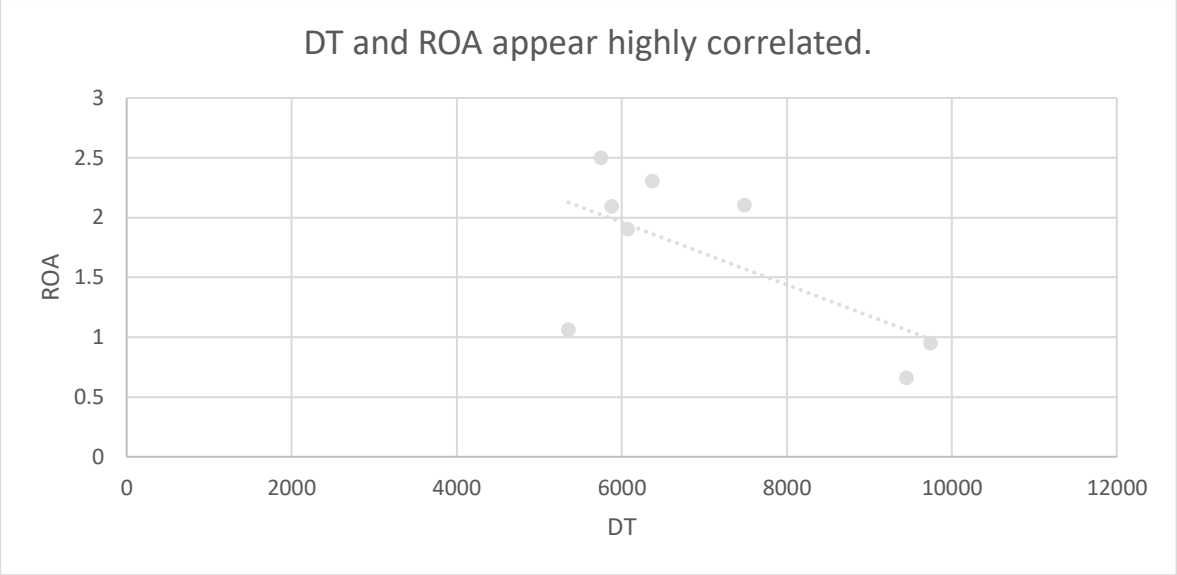
Year	**DT**	**ROA**
2014	**2156**	**1,33**
2015	**2274**	**1,37**
2016	**3131**	**1,34**
2017	**3188**	**1,03**
2018	**3292**	**1,17**
2019	**3793**	**1,2**
2020	**4247**	**0,52**
2021	**4980**	**1,12**

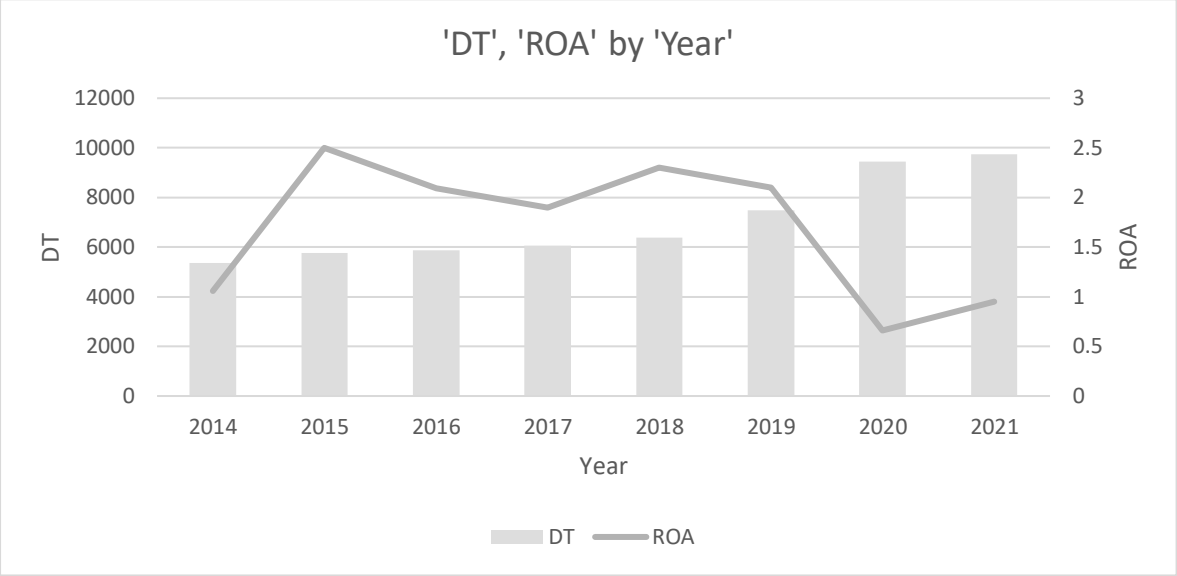




2. Standard Bank

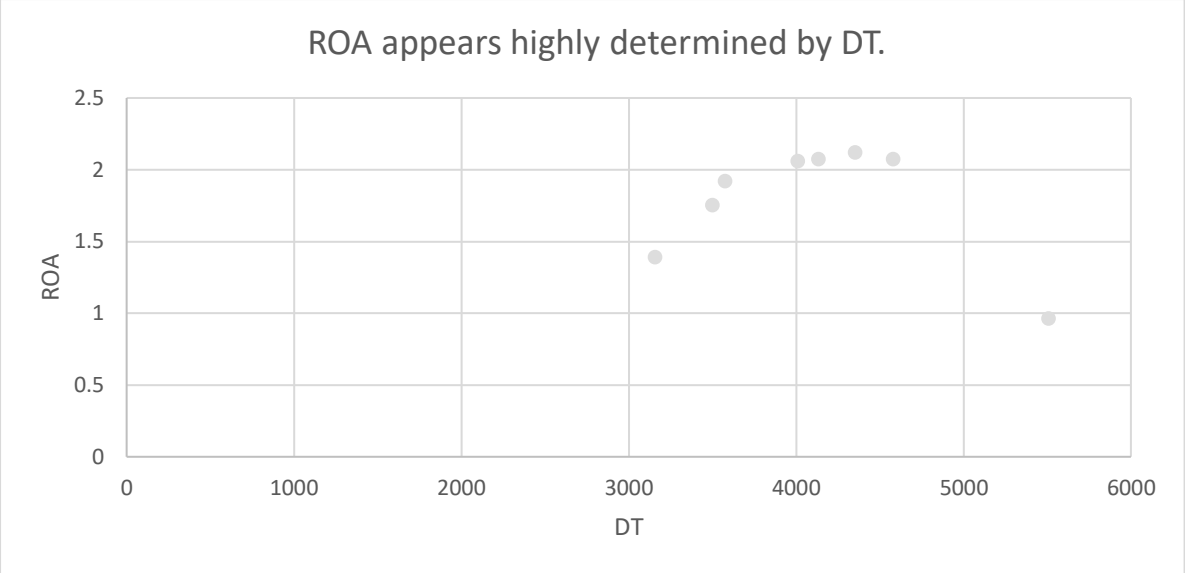
Year	DT	ROA
2014	**5355**	**1,06**
2015	**5755**	**2,5**
2016	**5880**	**2,09**
2017	**6073**	**1,9**
2018	**6379**	**2,3**
2019	**7487**	**2,1**
2020	**9454**	**0,66**
2021	**9743**	**0,95**

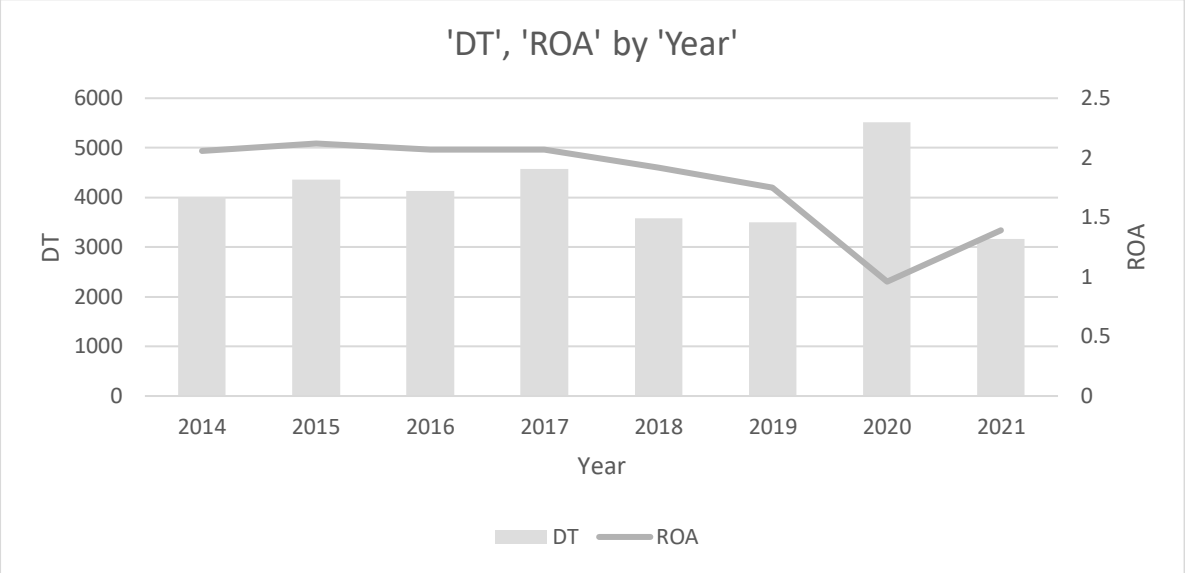




3. First National Bank (FNB)

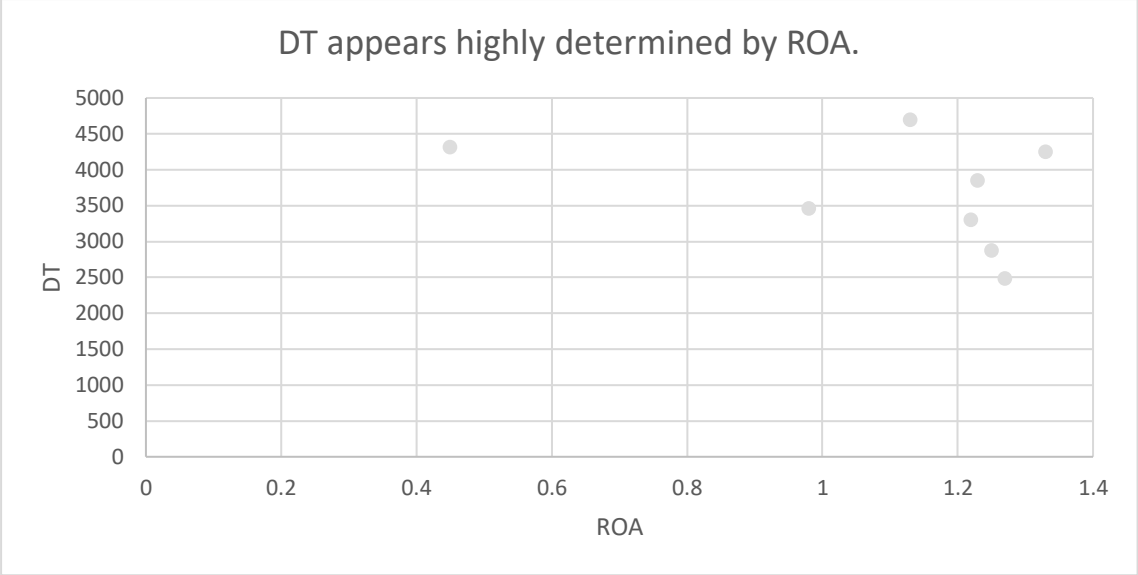
Year	DT	ROA
2014	4011	2,06
2015	4356	2,12
2016	4135	2,07
2017	4581	2,07
2018	3577	1,92
2019	3503	1,75
2020	5510	0,96
2021	3160	1,39

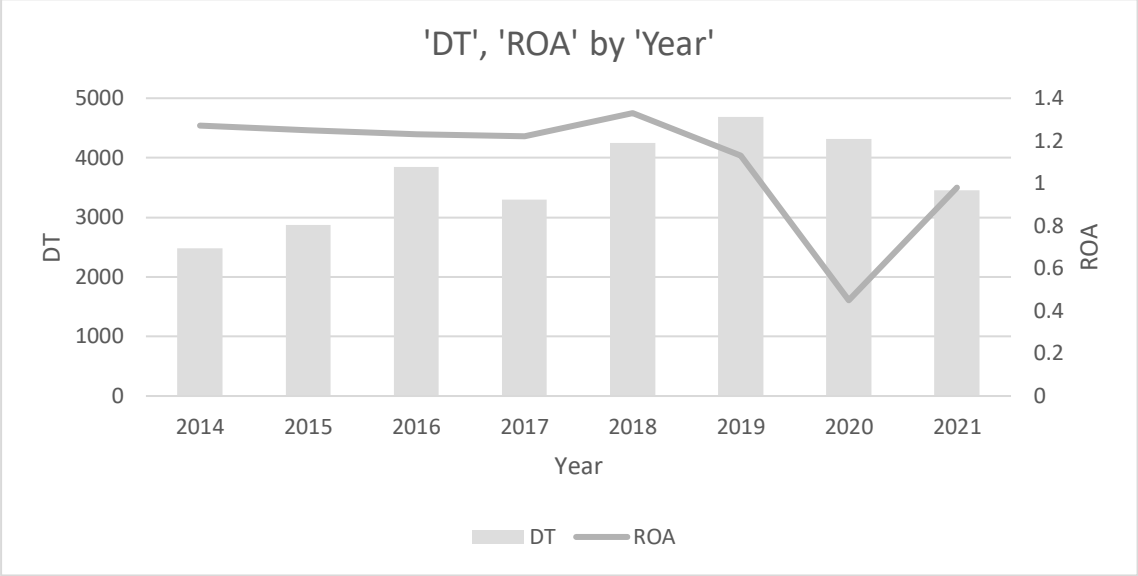




4. Nedbank

Year	DT	ROA
2014	**2483**	**1,27**
2015	**2867**	**1,25**
2016	**3846**	**1,23**
2017	**3299**	**1,22**
2018	**4250**	**1,33**
2019	**4691**	**1,13**
2020	**4313**	**0,45**
2021	**3455**	**0,98**


DT appears highly determined by ROA.
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
DT
0
0.2
0.4
0.6
0.8
1
1.2
1.4
ROA


'DT', 'ROA' by 'Year'
5000
4000
3000
2000
1000
0
DT
1.4
1.2
1
0.8
0.6
0.4
0.2
0
ROA
2014
2015
2016
2017
2018
2019
2020
2021
Year
DT
ROA