

Assessing the influence of digital transformation on digital maturity within a large corporate bank

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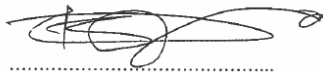
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DEDICATION

I dedicate this dissertation to my son Ofentse Kokotwane Johannes Ditshego, my family and friends; I am grateful for the love and support throughout the years of my studies.

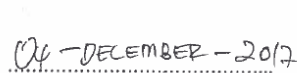
DECLARATION

I declare that this dissertation has been composed solely by myself and that it has not been submitted, in whole or in part, in any previous application for a degree. Except where stated otherwise by reference or acknowledgement, the work presented is entirely my own.



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ABSTRACT

The South African banking industry is at present well developed and controlled in comparison with other industrialised countries. The industry is under stress, however, due to a number of reasons including customer demands for more seamless banking experience. The Fintechs and other digital disruptors such as Blockchain are also causing turmoil in the industry. The banks are under massive pressure to transform their business models to a more customer-centric approach in order to stay relevant. Digital transformation is seen as the solution to the challenges faced by banks. The core digital transformation practices such as leadership, digital trends, digital transformation skills, digital strategies, implementation of digital technologies, and customer-centric approach are seen as influences to digital maturity level. The Bank has felt the disruption and is working towards changing its business model from product-centric to customer-centric. This study was undertaken to assess how the core practices influence digital maturity in the Bank. The participants were asked to rate the Bank's maturity level among the options given; early, developing, and maturing. The majority of the respondents view the Bank as developing in terms of maturity. The statistical techniques were employed to assess the relationship between digital maturity and digital transformation core practices. Furthermore, an ordinal logistic regression analysis was employed to establish what relationship exists between digital maturity level and the combined core factors, i.e. a prediction was made about an ordinal response variable given a set of independent variables. The results revealed that a relationship exists between digital maturity and core practices. In particular, the study has shown that an interconnected set of digital transformation core practices work together to influence digital maturity.

Keywords: Digital maturity, Digital transformation, Fintechs, Big data, Blockchain.

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LIST OF ABBREVIATIONS

Acronym/Abbreviation	Definition
3D	Three-dimensional
AML	Anti-Money Laundering
ATM	Automated Teller Machine
BBVA	Banco Bilbao Vizcaya Argentaria
BCP	Banco Comercial Português
CRS	Common Reporting Standard
DT	Digital Transformation
FATCA	Foreign Account Tax Compliance Act
IoT	Internet of Things
KYC	Know Your Customer
M2M	Machine to Machine

GLOSSARY OF TERMS

Term	Definition
3D printing	The action or process of making a physical object from a three-dimensional digital model, typically by laying down many thin layers of material in succession.
Actuators	A component of a machine that is responsible for moving or controlling a mechanism or system, for example by actuating (opening or closing) a valve; in simple terms, it is a "mover."
Big Data	A term for data sets that are so large or complex that traditional data processing application software is inadequate to deal with them.
Blockchain	A distributed, decentralised transaction ledger, saved by each node in the network, which is owned, maintained and updated by each node.
Customer Centric	A way of doing business with a customer in a way that provides a positive customer experience before and after the sale to drive repeat business, customer loyalty, and profits.
Digital banking	A type of banking that includes a mobile app that lets you deposit checks and view your account balance at a glance.
Digital Disruption	The change that occurs when new digital technologies and business models affect the value proposition of existing goods and services.
Digital Ecosystem	The international establishment of a flexible and proven corporate architecture.
Digital Transformation	The use of technology to radically improve performance or reach of enterprises.
Digitalisation	<i>See Digital Transformation.</i>
Digitisation	The transformation from analogue to the digital or digital representation of a physical item with the goal to digitize and automate processes or workflows.

Term	Definition
Double down	Making a calculated gamble to maximize the potential yield of a project.
Employee experience	Defined as how employees feel about their organisations about both opportunities for growth/skills development, and employees' willingness to continue to work for their current firms.
En route	During a journey.
Fintechs	Start-ups and more-established companies using technology to make financial services more effective and efficient.
Holograms	A photographic recording of a light field, rather than of an image formed by a lens, and it is used to display an entirely three-dimensional image of the photographed subject, which is seen without the aid of special glasses or other intermediate optics.
Humanoid robotics	A robot with its body shape built to resemble the human body.
Internet of Things	The network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to connect and exchange data.
Neobank	A new type of app-only bank with no branches.
Predictive analytics	The branch of the advanced analytics which is used to make predictions about unknown future events.
Scale-up	To increase the size of something while maintaining proportion.
Traditional bank	Refers to retail bank
Retail bank	A bank that offers consumer services like cheque, savings accounts, and loans.

CHAPTER 1 : NATURE AND SCOPE OF THE STUDY

1.1. Background

The digital age has arrived, and as Marcum(2014) cites, digital technologies – social, mobile, big data analytics, and cloud – have changed almost every aspect of people's lives. These technologies are reshaping how people live, work, play, and connect (Accenture, 2014:2). As a result, firms, and more specifically, retail banks are faced with an increasing need to adapt and assimilate these technologies in order to gain and sustain a competitive advantage (Stief, *et al.*, 2016). Aboelmaged (cited by Stief *et al.*, 2016) argues that by implementing digital technologies, firms stand a good chance of enhancing their competitiveness, increasing their agility and market penetration and improving their process effectiveness and efficiency. The integration and exploitation of such technologies, however, remains a significant challenge to firms (Matt, *et al.*, 2015).

The integration of digital technologies into the core business of a firm would typically require the core business activities to transform from their traditional form to a digitized form. Defined as the use of digital technologies to radically improve the performance or reach of enterprises Westerman *et al.* (cited by Nieminen, 2014:1), digital transformation is now a focus area for many corporations around the globe. A study conducted by Hoberg *et al.* (2015:1) supports the latter statement, with essential findings showing that out of 81 executives of different firms worldwide, 80% of those executives perceive digital transformation as critical to their enterprise-wide strategy. It has become evident that firms cannot ignore such a dominant force reshaping the business environment.

In spite of the prevailing consensus around the importance of digital transformation strategy and the potential it has to transform businesses radically, most banks are finding it hard to assimilate digital technologies to fully take advantage of the benefits that come with these technologies. Digital transformation is not a silver bullet and will present a different journey for different firms and different sectors of the economy.

A large corporate bank under study hereafter referred to as the Bank, has realized the importance of this transformation. The Bank is not known to be a first mover from innovation and digitisation point of view. It does regard itself, however, as the fast follower, although there is no hard evidence to support this claim. There is currently a programme that is meant to digitally transform the Bank, with the primary goal being that of customer centricity, which means reinventing the enterprise-wide business model to revolve around the customer, thus increasing customer satisfaction and the Bank's profitability (Lamberti, 2013).

Because of high expectations of customers today, and with the ever-improving technology, this move provides the Bank with the potential to become an active competitor in the market. The approach of the Bank and the pace at which this transformation is happening, however, does not provide comfort that the desired result will be achieved timeously. This study attempts to close the gap by assessing the Bank's approach to digital transformation and then provides the best practices which the digitally maturing organisations and literature findings endorse.

This chapter presents a discussion on the nature and scope of the study. The problem is described giving reference to the ideal scenario, the current situation and the possible consequences of not addressing the problem. A discussion of details about the objectives of the study is provided and further subdivided into the primary objective and the secondary objectives.

The scope of the study is presented, followed by a discussion on ethical considerations. The research methodology employed in this study is outlined and further subcategorized to include the research approach, the target population, the sample size, a viability analysis, data collection, data analysis, and the measuring instrument. Expected contribution of the study is discussed, followed by an outline of the layout of the study with a summary section presented in the closing section.

1.2. Problem Statement

Digital technologies have disrupted business environments and will continue to do so. As a result, banks, and in particular, the Bank, is facing a lot of challenges that are brought about by the advanced digital technologies, and rising technology-smart customer expectations, which highlights the need for digitalisation. In the quest to become a market leader, the Bank should pay specific attention to how to assimilate the digital technologies to radically improve their performance; a strategy known as digital transformation.

In a study conducted by Kane *et al.* (2015:5), three levels of digital maturity emerged – early, developing, and maturing. Although the financial services industry has advanced in terms of digital maturity, banks, on the other hand, have not fully embraced digital transformation and should work towards becoming digitally maturing organisations characterized by the following:

- a coherent digital strategy which is effectively communicated to all employees;
- a leadership that has sufficient skills and experience to lead the digital strategy;
- the strategy to digital trends;
- digital transformation skills gap intolerance;
- an approach to digital initiatives;
- quick implementation of digital technologies; and
- a customer-centric business model.

The above characteristics of a digitally maturing bank imply a bank's readiness in embracing change and embarking on digital transformation journeys that strategically bring together the following enablers: cloud computing, big data analytics, Blockchain technologies, mobility, social media, and Fintechs.

In spite of various opportunities that digital transformation presents to banks, the Bank is lagging behind from digital maturity point of view as compared to its competitors. Capitec was named the best bank in the digital banking category in 2017, ahead of FNB in second place (Businessstech, 2017). A few obstacles are hindering the Bank's progress on this journey, they are: a strategy that is not clearly defined; lack of adaptability to new technologies; a wide skill gap; a slow response to digital disrupters; an unhealthy attachment to legacy systems and old ways of doing business; and unwillingness to take risks.

The Bank should consider embarking on digital transformation journeys that will enable it to become customer-centric and increase their chances of becoming the market leader. Failure to successfully drive digital transformation could present undesirable results to the Bank, including but not limited to the following:

- Loss of market share
- High operational costs and inefficiencies of legacy systems
- Non-compliance with banking regulations

This study focuses on bringing together the best practices from current literature to provide guidance on how to become a digitally maturing bank. A quantitative approach will then be followed to understand the perception of the Bank's employees regarding the core practices that influence digital maturity.

1.3. Objectives of the study

The South African banking environment has not matured to a level where it can claim to be striking the right chords in the way of customer interactions through digital channels. Efforts should be directed at finding ways to formulate and implement digital transformation strategies to enable digital maturity.

1.3.1. Primary objective

The primary objective of the study is to assess the influence of digital transformation core practices on digital maturity within the Bank.

1.3.2. Secondary objectives

The review of current literature on digital transformation, as well as the general knowledge in this field, presents exciting concepts relating to the topic at hand, which leads to the research questions to be discussed below.

The breakdown of the above-mentioned research problem is as follows:

- What is the meaning of digital transformation?
- What kinds of challenges are there in digitally transforming the Bank?
- Does any relationship exist between digital maturity and individual core practices?
- Does any relationship exist between digital maturity and the combination of core practices?

1.4. Scope of the study

This study focuses on core digital transformation practices and how they can enable digital maturity in the Bank only. Due to time, and financial constraints, the study will not attempt to create a strategy that can be adopted by the Bank to drive digital transformation. The study will, however, assess the practices perceived to be core to digital maturity.

Only one corporate bank will be used to conduct the research. The reason being there is not enough time to perform an investigation on all South African banking institutions.

1.5. Limitations of the study

Various limitations were encountered in the study, they are:

- There was not enough executive reach, i.e. lack of executive response may have influenced the results.
- The study was limited to only the Bank. A broader population would have provided a better perspective.
- Time constraints negatively affected the study. With more time, the sample size would have increased significantly.
- Lack of knowledge about the research topic impacted the results.

1.6. Ethical considerations

Researchers are urged to respect the participants during the collection of data Creswell (2013:174). The below are ethical thoughts taken into account during the completion of this work as recommended by Creswell (2013:174):

- The participant's right to voluntarily take part in the survey and the right to withdraw;
- A clearly communicated purpose of study;
- The right to confidentiality, i.e. anonymity; and
- A promise to not distribute the results of the survey, and only to use the results for academic purposes.

1.7. Research methodology

1.7.1. Research Approach

The study will be quantitative in nature - a research design and method that yield numerical data (Quick and Hall, 2015). The reason for this approach is because the study attempts to quantify data and generalize the results from a sample to the population of interest. This means that the study will provide data that shows the perception of participants regarding the core digital transformation practices.

The various statistical techniques including descriptive statistics, frequency tables, contingency tables, Spearman's rho, and ordinal logistic regression will be used to analyse the collected data and to also test the relationship between the dependent variable (digital maturity) and the independent variables (core digital transformation practices).

The study will be cross-sectional; this means that surveys will be completed by a single respondent at a single point in time (Rindfleisch *et al.*, 2008). The reasons for following a cross-sectional type of survey are stated below:

- the same measures will not be repeated over time, one survey will be sent out to participants at once, and no constant follow-up will be done;
- a limited time span; and

- a cross-sectional type of research design does not require a substantial amount of money compared to a longitudinal type of research design in which data is gathered for the same subjects repeatedly over a period of time.

The research will follow a quantitative experimental approach. This type of design is preferred in this study because it involves the introduction and manipulation of an independent variable (Quick and Hall, 2015).

1.7.2. Target Population

The population under study will be participants from the Bank that possess sufficient knowledge regarding the research topic.

The participants included in the sample will best represent or have knowledge of the topic under study (Elo *et al.*, 2014). The reason for involving participants who possess sufficient knowledge of the topic under study is mainly to avoid making incorrect conclusions that could potentially be made from the data collected. Therefore a pre-analysis of potential participants will be carried out which entails speaking to representatives from different business units within the Bank to understand who the subject matter experts or people with sufficient knowledge about the research topic are.

To ensure that knowledgeable participants are adequately represented within the sample, the following steps of the stratified random sampling will be followed:

- Determine the strata that the population will be divided into;
- Determine the number of participants necessary for each stratum;
- Split the units of analysis into the respective strata; and
- Randomly sample participants.

1.7.3. Sample Size

163 participants from a stratified random sampling will be included for analysis in the study. Due to time constraints, this sample size was based on a logical guess. This logical guess fitted well between a realistic and practical range where care was taken to ensure the sample size lied in between sufficient and not excessively many participants (Mannion, 2016).

1.7.4. Viability Analysis

A pilot study or a trial run will be undertaken in preparation for the complete study. This will involve a pretesting of research instruments, including questionnaires.

1.7.5. Data Collection

A survey data which takes the form of quantitative data will be collected. The goal of this study requires obtaining quantitative data from individuals in the Bank. The survey has an advantage when the goal of research require obtaining quantitative data on a particular problem or population.

A link will be shared with participants - via email - which they will use to access the survey. In the email, there will be a brief summary of what the survey is about, how long it will take to complete, and a pledge of confidentiality, i.e. anonymity. Most questions in the survey have been adapted from a report by Kane *et al.* (2015:17).

An online tool - eSurvey Creator - will be used in this study to allow for the creation of the survey. The participants will be able to complete the survey on any electronic device. All the responses from the participants will be displayed in real time, allowing for an instant view of responses as well as analysis of aggregated reports.

1.7.6. Data Analysis

The data analysis technique is selected prior to the collection of data. This analysis, mainly by means of statistical techniques will be useful in investigating variables and their effect, relationships, and patterns (Welman *et al.*, 2005:211). This research will make use of inferential statistics technique (ordinal logistic linear regression) to understand the influence of core practices on digital maturity within the Bank. This is because logistic regression analysis presents a good view of relationships between variables the response variable and independent.

Microsoft Excel and its add-in program called PHStat, in conjunction with SAS Enterprise Guide will be used to analyse the collected data. eSurvey Creator, the online survey tool introduced above return results in Microsoft Excel format, the results are then imported into SAS Enterprise Guide for further analysis. But first, the data will need to be coded prior to being imported into SAS Enterprise Guide. This is because SAS Enterprise Guide will not make sense of the data that is not correctly coded.

The variables to be analysed will be identified, and different coding decided on (Welman *et al.*, 2005:213). The following steps obtained from (Welman *et al.*, 2005:228) will be followed:

- Count, for example, the number of employees that "strongly disagree" on a five-point Likert-scale questionnaire item concerning the Bank's coherent digital strategy;
- Describe, for example, the experience levels of participants;
- Compare, for example, the responses of respondents in different ranking level; and
- Categorize, for example, identified patterns of themes through the use of statistics.

Other techniques to be used include a statistical rotation technique. This technique will provide a summary of the relations that are among different variables, e.g. the ratings from male respondents and the ratings from female respondents.

1.7.7. Measuring Techniques

The study will use an ordinal scale of measurement in determining the appropriateness of the use of specific statistical analyses. Due to the nature of ordinal scale to be used, only nonparametric statistics will be used in the study. The statistical technique is key to this study due to different perspectives it provides. The table below summarizes the hypothesis tests that the technique offer:

Table 1.1: Statistical techniques

Non-Parametric
Chi-square test
Spearman's rho
Ordinal logistic regression

1.8. Contribution of the study

The study will provide validity to the concept of digital transformation and provide guidelines to the Bank on how to drive digital transformation, covering essential aspects the Bank should know in its quest towards digital maturity. It will also summarize the core concepts or characteristics that define the digitally maturing organisation, elaborate on why the characteristics are defining and suggest possible ways to enable the Bank in becoming a digitally maturing bank admired by all of its stakeholders.

1.9. Layout of the study

The layout of the study provides a roadmap of this study. There are four chapters in total which cover the nature and scope of the study, literature review, empirical investigation, and conclusions and recommendations. A breakdown of how the study is laid out is provided below:

Chapter 1: Nature and scope of the study

This chapter introduces the research topic by focusing on the background of the study, description of the problem and the objectives of study including both the primary and secondary objectives, the scope, the limitations of the study, ethical considerations, research methodology to be adopted, and lastly, a description of how the study will contribute to the current literature.

Chapter 2: Literature review

This chapter provides a conceptual overview of the research topic with specific focus to the origins of digital transformation, how the topic has evolved over the years, benefits and challenges, big data and the role it plays in digitalisation, and lastly, challenges the faced by banks in responding to regulatory requirements.

Chapter 3: Empirical investigation

This chapter provides an analysis of empirical data received in assessing the influence of digital transformation core practices on digital maturity within the Bank. Linkages are created between the findings of the study and the current literature.

Chapter 4: Conclusions and recommendations

This chapter provides conclusions of the study, outlining the primary findings from the empirical investigation. The chapter further provides an overview of the contribution of the study to current literature. An evaluation of the study is then carried out in section 3 of this chapter with specific focus on why and how the study was successful in meeting the set objectives. Recommendations are given to the Bank based on both the literature study and the empirical investigation. This chapter then closes by providing suggestions for future research.

1.10. Summary

Digital technologies – cloud, mobility, analytics, and social - are reshaping how people live, work, play, and connect. Their disruptive nature has resulted in banking institutions, in particular, the Bank facing challenges to adapt and assimilate these technologies in order to gain and sustain a competitive advantage.

Digital technologies alone, however, will not create any competitive edge for the Bank. A well-formulated strategy with a clear action plan of how to assimilate digital technologies must be implemented to digitally mature. Digitally maturing organisations are already reaping the benefits, and the Bank must quickly follow to have a competitive edge over its competitors. The journey towards becoming a digitally maturing bank characterised by streamlined operational processes and value generating business models coupled with better customer experience and engagement must start now. If the Bank does not move quickly enough, the results could be catastrophic.

CHAPTER 2 : LITERATURE REVIEW

2.1. Introduction

The primary aim of this chapter is to provide a conceptual outline of digital transformation including the following its origin, evolution and definitions as provided in current literature; benefits of digitalisation in banking; challenges facing banks in the process of digitally transforming; big data and the role it plays in digitalisation; and challenges faced by banks in responding to regulatory requirements.

The chapter also outlines core practices relating to digital maturity, highlighting critical success factors of digital transformation.

2.2. Definitions of digital transformation

Digital transformation as a concept has been defined extensively in the literature. Below is a list with some of the standard definitions of digital transformation that are found in the literature. These definitions do not differ significantly, with commonalities being the use of technologies, process improvements, and value creation. For the purposes of this study, the digital transformation will refer to the definition by Stief *et al.* (2016), see definitions below.

Definitions of digital transformation

- A staged program of business and revenue model improvements to people, processes, and tools used for integrated digital marketing to maximize the potential business contribution of digital technology and media (Chaffey & Carson, 2016:3).
- The profound and accelerating transformation of business activities, processes, competencies, and models to fully leverage the changes and opportunities brought by digital technologies and their impact on society in a strategic and prioritized way (Demirkan *et al.*, 2016).
- The innovative re-assembly of customer and company resources, products, and services to grow value, revenue, and efficiency via digital technologies (McDonald *et al.*, 2014:5).
- The use of technology to radically improve performance or reach of enterprises (Westerman cited by Nieminen, 2014:1).

- Enterprises' use of 3rd Platform technologies (mobile, social media, cloud, and big data and analytics) to create value and competitive advantage through new offerings, new business models, and new relationships (Patano & Rizzotto, 2016:1).
- Delivering perfect, extraordinary service to colleagues, clients, and stakeholders through frictionless interactions of business intelligence and business processes, thereby increasing revenue and decreasing cost (SAP SE, 2016:5).
- The use of new digital technologies to enable significant business improvements (Stief *et al.*, 2016).
- The reinvention of business practices to derive the maximum value from digital technologies such as social media, cloud computing, mobile technology and big data analytics (The Economist Intelligence Unit Limited, 2015:2).

Section 2.3 below provides insights into the concept of digital transformation as detailed in the literature.

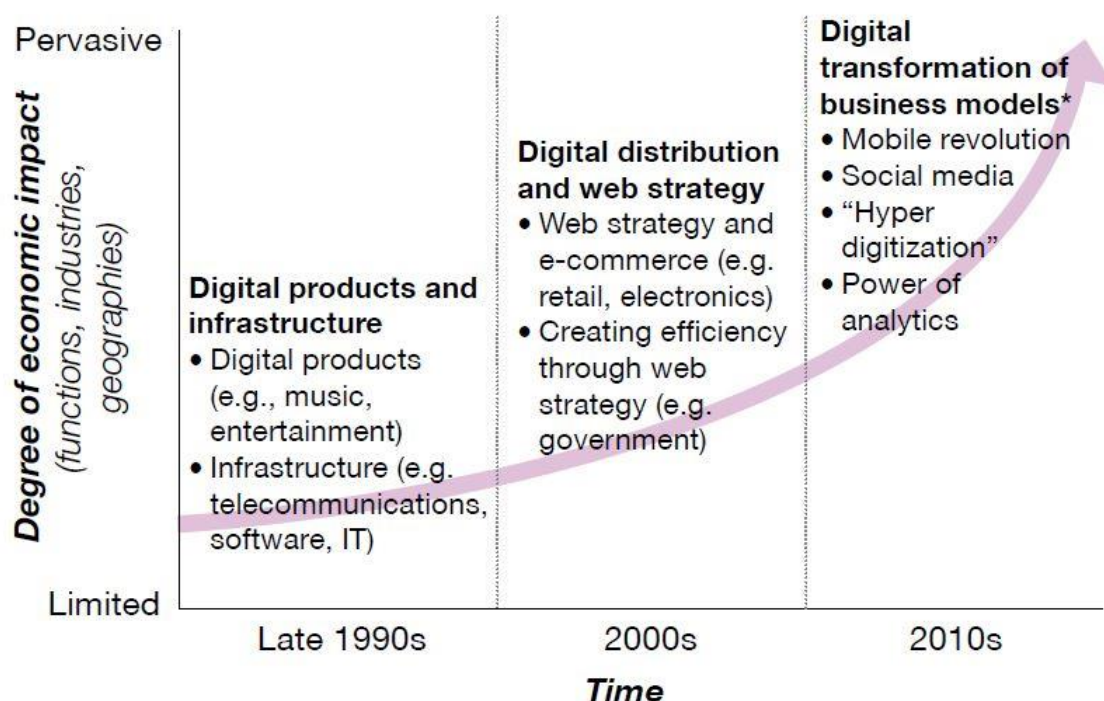
2.3. The concept of digital transformation

This section reviews the current literature in establishing how digital transformation has evolved, what the digital transformation journey entails, and the key drivers of digital transformation. Because digital transformation is different for each company, the section provides guidelines to follow in the process of digitalisation.

2.3.1. Evolution of digital transformation

The progress made in the past ten years from a technology point of view is remarkable (Dapp, 2015:4). According to IBM (2011:2), there has been a shift in focus and impact of the internet and global connectivity. Technologies such as mobile internet, self-learning algorithms, predictive analytics, humanoid robotics, holograms, 3D printing at home, web-based contact lenses for people with diabetes; drones and hot air balloons that transmit open Wi-Fi to earth and autonomous vehicles are seemingly the beginning of a digital and a societal change (Dapp, 2015:4). Figure 2.1 below depicts how digital transformation has evolved over the years.

Figure 2.1: Evolution of digital transformation



Source: IBM (2011:2)

In the banking industry, however, digitisation is not a new phenomenon. This sector has seen a shift towards digital banking in the past ten years, with digital strategies adopted across various leading traditional banks (Jaubert *et al.*, 2014:1). The battle amongst most banks today is to capture the market by becoming digital banking leaders, as most customers exist in that market. It is imperative that traditional banks adapt their operating models to stay in the race in this fast-changing market.

The past decade has seen digital transformation evolve from digital products and infrastructure in the late 1990s to digital distribution and web strategy in the 2000s, and later to digital transformation of business models in the 2010s. Although many organisations have been on a digital transformation journey, each organisation faces different challenges. Section 1.2.2 below provides an overview of the journey towards digital transformation as documented in the current literature.

2.3.2. Journey towards digital transformation

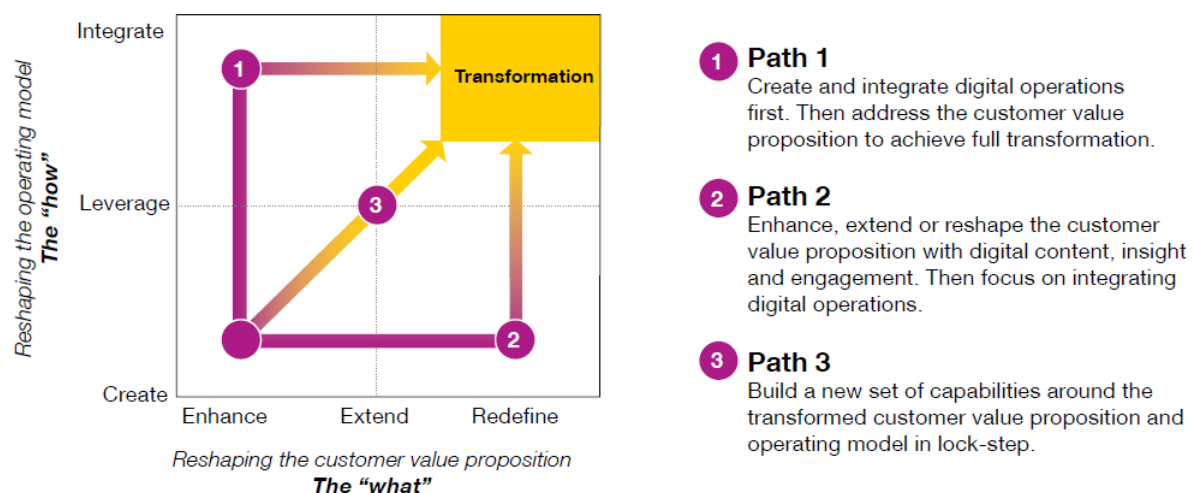
Many businesses have been on a digital transformation journey since the launch of the web, more than 25 years ago (Chaffey & Carson, 2016:3). The journey has not been easy though, as many have come short of where they need to be to remain competitive (Chaffey & Carson, 2016:3). The challenges of this type of journey are well-documented in the literature, as are the opportunities, and businesses must first understand their consumers' behaviour, preferences, and choices for a successful digital transformation (Seufert & Meier, 2016).

For most banks, the journey towards digital started a while back; and although these banks have clear digital strategies in place, they are still experiencing significant changes that they must address (Jaubert *et al.*, 2014:1). These banks have current processes, models, and capabilities which must continue, while digital transformation journey continues. The challenge, however, is that the current way of working is not sufficiently agile to respond timeously to problems in the market they operate in, resulting in them playing catch-up to remain competitive (Chaffey & Carson, 2016:3).

Figure 2.2 below shows the three paths that a firm would typically follow in carrying out a strategic approach to transformation (IBM, 2011:6). The decision to select the best way will, however, be influenced by the firm's strategic objectives, industry context, competitive pressures and customer expectations (IBM, 2011:6). Banks may discover that the best path to choose is path 2, due to the revenue-based services they offer online and through mobile applications; this track focuses mainly on the customer value proposition which provides immediate financial benefits (IBM, 2011:6).

The challenge for banks, however, is how they can succeed in digital transformation and therefore may have to redefine their customer value proposition and operating models simultaneously, or in near tandem; path 3 (IBM, 2011:6). IBM (2011:6) stresses that should the banks successfully execute path three; they could take a unique position to seize the market and become leaders in that particular market.

Figure 2.2: Paths to digital transformation



Source: IBM (2011:6)

Just as digital technologies have disrupted banks for many years, journey *en route* digital transformation will be just as disruptive. This according to current literature will have an impact on most departments, if not all. The section below provides an overview of what digital transformation impact in most firms.

2.3.3. What digital transformation affects

A standard error that organisations make is to focus on IT and not the strategic goals of the whole enterprise. Banks, in particular, tend to have various clusters direct efforts at developing systems and improving their departmental processes and end up having siloed systems across the enterprise. Digital transformation, however, is not merely an IT department initiative or reinventing of services for a mobile world, it is a strategy that if done right, has potential to ‘permeate the very fabric of an organisation’ (Microsoft, 2016:1).

Hess *et al.* (2016) maintain that digital transformation is a complex issue which touches on a significant number of departments in an organisation, if not all departments. Hess *et al.* (2016) identified four critical dimensions of every digital transformation journey:

- The use of technologies reflects a firm’s approach and capability to explore and exploit new digital technologies;
- Changes in value creation demonstrates the influence of digital transformation on a firm’s value creation;
- Structural changes refer to the modifications in organisational structures, processes and skill sets that are necessary to cope with and exploit new technologies; and
- The financial dimension relates to both a firm’s need for action in response to a struggling core business as well as its ability to finance a digital transformation endeavour.

The dimensions above show the key areas within a firm that are affected by each digital transformation journey that a company undertakes. In addition to this, banks must always take into consideration the broader consequence of digital transformation and how it can affect all parts of the organisation (Microsoft, 2016:6).

Firms are driven, however, to undertake a digital transformation journey. Section 1.2.4 outlines primary digital transformation drivers reported in current literature.

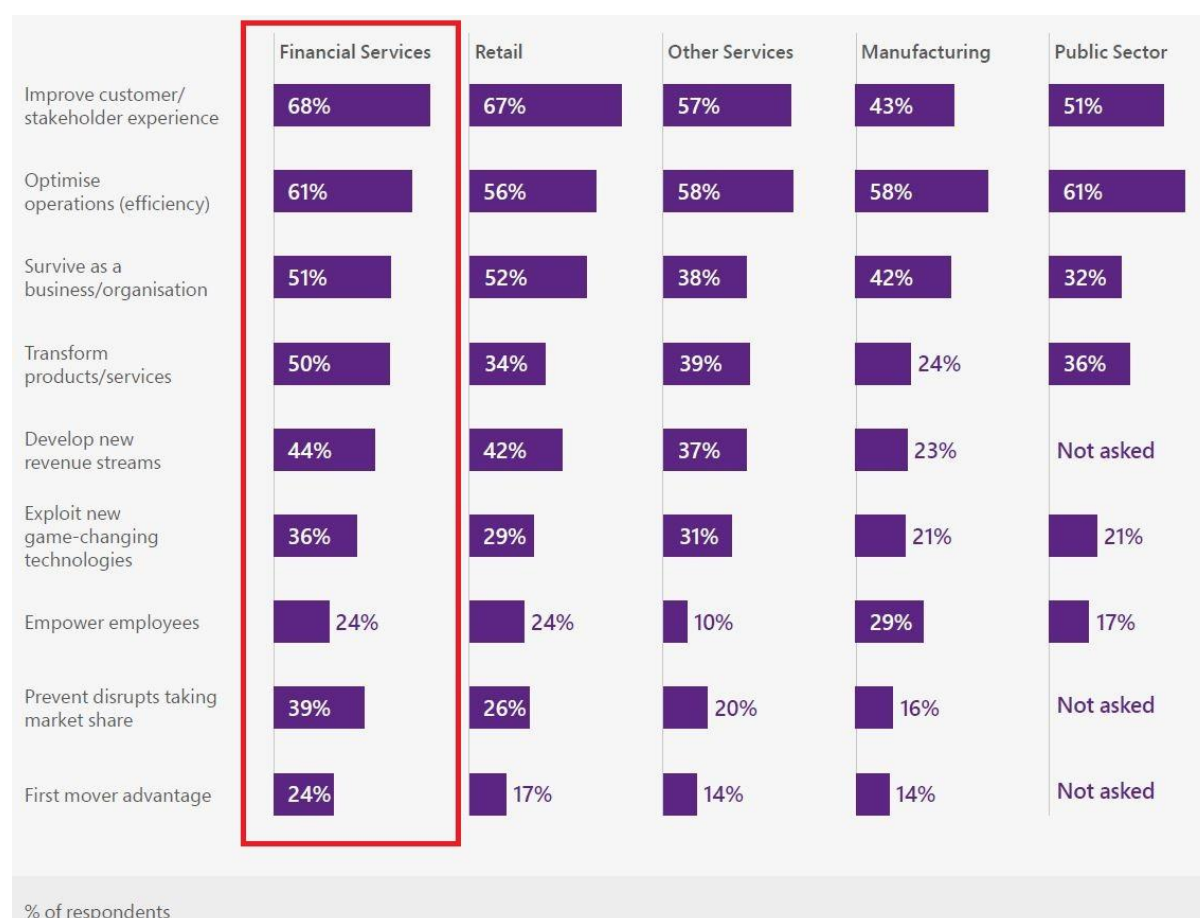
2.3.4. Digital transformation drivers

Banks today are facing many challenges that are driven by modern technology advances coupled with increasing customer demands, stressing the need for IT modernization and digital innovation (Intel and Red Hat, 2016:2). A review of literature points to the below, as drivers of digital transformation.

2.3.4.1. Threat of disruptors

The threat of disruptors in the financial services industry (where banks operate) has previously seen banks acquire disruptors to counter the threats (Microsoft, 2016:11). This is not always possible, however, as Fintech (See section 2.7.1 for a discussion on Fintechs) players are aware of the value they sit on, prompting large banking institutions to treat single figure headcount start-ups as their peers (Microsoft, 2016:11). In a survey conducted by Microsoft (2016:11), respondents were asked what the primary drivers are for digital transformation initiatives at their workplaces; Table 2.1 below summarizes the main findings of the survey.

Table 2.1: Main drivers of digital transformation



Source: Microsoft (2016:1-62)

Listed in order of importance as perceived by respondents, the primary drivers behind digital transformation initiatives identified in Table 2.1 above provide an indication of what firms perceive as the reason behind their digitalisation initiatives.

2.3.4.2. Improving customer/stakeholder experience

Improving customer/stakeholder experience emerged as the primary driver behind digitalisation, not only in the financial services industry where banks operate but across all surveyed industries. Research conducted by the Economist Intelligence Unit Limited (2015:9) provides another perspective, see Table 2.2 below. In this report, the top driver of digital transformation is identified as 'evolving customer needs and expectations.'

This could be a reflection of high standards of digital experiences set by the online goliaths such as Amazon, Google, and Facebook (The Economist Intelligence Unit Limited, 2015:8). These online giants have created a platform where customers can ‘interact whenever and however they want and need to’ (The Economist Intelligence Unit Limited, 2015:8).

Table 2.2: Key drivers of digital transformation



Source: The Economist Intelligence Unit Limited (2015:9)

A report by IBM (2011:4) argues that customers and employees have moved past the traditional boundaries. These customers are letting businesses know what they require, pushing the industry into the digital end of the physical-digital continuum (IBM, 2011:4).

In a study conducted by Stief *et al.* (2016), various experts were asked to identify the primary drivers of digital transformation; the aggregated results are as depicted in Table 2.2. The results provide a visibly different view in comparison to Table 2.1 and Table 2.2 where the top driver is customer experience. Stief *et al.* (2016) argue that the most influential force that stimulates investments in digital technologies is competition, which then forces companies to improve and secure their positions in the market. Furthermore, new entrants to the market disrupt the established businesses and change the rules of the competition (Stief *et al.*, 2016). Nonetheless, customers are not too far off, playing a role of almost equal importance, as seen in Table 2.3 below.

Table 2.3: Main drivers of digital transformation listed by frequency

MAIN DRIVERS OF DIGITAL TRANSFORMATION LISTED BY FREQUENCY OF REPLIES (MULTIPLE INDICATIONS POSSIBLE)	
Driver	Counts
Competition	13
Customers	12
Initiative of one's own/ Intrinsic motivation	6
Innovation/technical progress	4
Strategic consideration	2

Source: Stief *et al.* (2016:1808)

Lastly, a report published by Cisco (2017:4), identifies the factors below as driving the need to transform digitally.

2.3.4.3. A transformed competitive landscape

Digital transformation in firms could indicate a change in the competitive landscape (Vaughan-Brown, 2015). New 'digitally native' players in the market are forcing traditional banks to innovate and transform Cisco (2017:4). This report points out that these new players have elevated the customer-centric distribution model to meet customers' requirements for digital interactions. Amazon has set the bar very high with regards to providing customers with customized, fast, and reliable media services. In an attempt to become market leaders, banks are continuing to focus on digitalisation, with some banks explicitly setting goals to become customer-centric enterprises (Andrus *et al.*, 2016:2).

2.3.4.4. Regulatory environment

Aggressive regulatory compliance requirements are pushing banks to undergo digital transformation (Intel and Red Hat, 2016:13). The South African banking industry, in particular, is under increased pressure from the South African Reserve Bank to do the following as stipulated in the Financial Intelligence Centre Amendment Act, 2017:

- ✚ to formulate a risk-based approach to client identification and verification;
- ✚ to strengthen their customer-due-diligence measures including concerning beneficial ownership and persons in prominent positions, and
- ✚ to provide for the obligation to keep identity and verification and transaction records.

The above has seen banks go through an almost overhaul of compliance and risk management requirements. This has seen some banks exit profitable but riskier business lines and is also forcing banks to meet the paradigm of speed, agility, and creativity (Cisco, 2017:4).

2.3.4.5. Customer demand

Banks are under massive pressure to upgrade their delivery architectures in ensuring a secure support of traditional and mobile browsers together with native and hybrid mobile technologies (Intel and Red Hat, 2016:1-18). Customer demand is one of the critical factors that drive digital transformation (Rashid, 2017). Banks realize the importance of keeping up with their customers' demand and are responding by providing digital banking experience that their customers have come to expect from interacting with other players in other industries (Intel and Red Hat, 2016:2). This according to van der Meulen (2017), will require seamless integration of IoT (Internet of Things) products and IoT platforms, cloud and mobile applications.

2.3.4.6. Macroeconomic challenges

The convergence of suppressed interest rates, coupled with continuing low-growth condition has created a constant challenge for financial institutions, including the best-prepared (Cisco, 2017:4). According to (Dutton, 2015), the economic challenges have potential to set up an environment that is exceedingly high-paced, high-risk, and characterised by lean operations. Despite the economic challenges, CEOs are maintaining their focus to transform and grow digitally (Pettey, 2016). A banking model independent of traditional components of performance is required.

2.3.4.7. The move to “mobile first” initiatives

Success in a digital transformation journey begin and finish with a culture (Lumbreras, 2017). Asia-Pacific and Latin America have seen self-service banking become a preferred method of banking, prompting retail banks to look to the power of mobility. MobileFirst has enhanced digital transformation across 14 industries, making it easier to innovate and deliver value to customers (IBM, n.d.).

2.3.4.8. Digital disruption

The digital disruption continues to impact the industries, so much that 95% of the fortune 1000 companies are expected to have undertaken a digital transformation by the end of 2017 (Cisco, 2017:4). These disruptions are as a result of new technologies including mobile internet which possess the potential to transform how people live and work (Manyika, *et al.*, 2013).

2.3.5. What digital transformation is

The banking industry is currently facing many uncertainties, and as such, business-as-usual and competitive advantage have been impacted (Microsoft, 2016:1). As a result of these possibilities, banks are desperate to restore their positions in the market they operate in, a report conducted by Microsoft (2016:21) stipulates that a fundamentally new approach be needed. A review of literature points to digital transformation as the solution to some of the identified challenges. In an attempt to remediate, banks often go through systems development processes and end up losing the bigger picture of what digital transformation is about. Digital transformation is not about incremental improvements; which is often the case in systems development projects; it entails transforming to a world where everything depends on digital information systems (Nieminen, 2014:9). Also, digital transformation is not necessarily about the technology itself; it is about the integration of those technologies to transform the way in which firms work (Kane *et al.*, 2015:15).

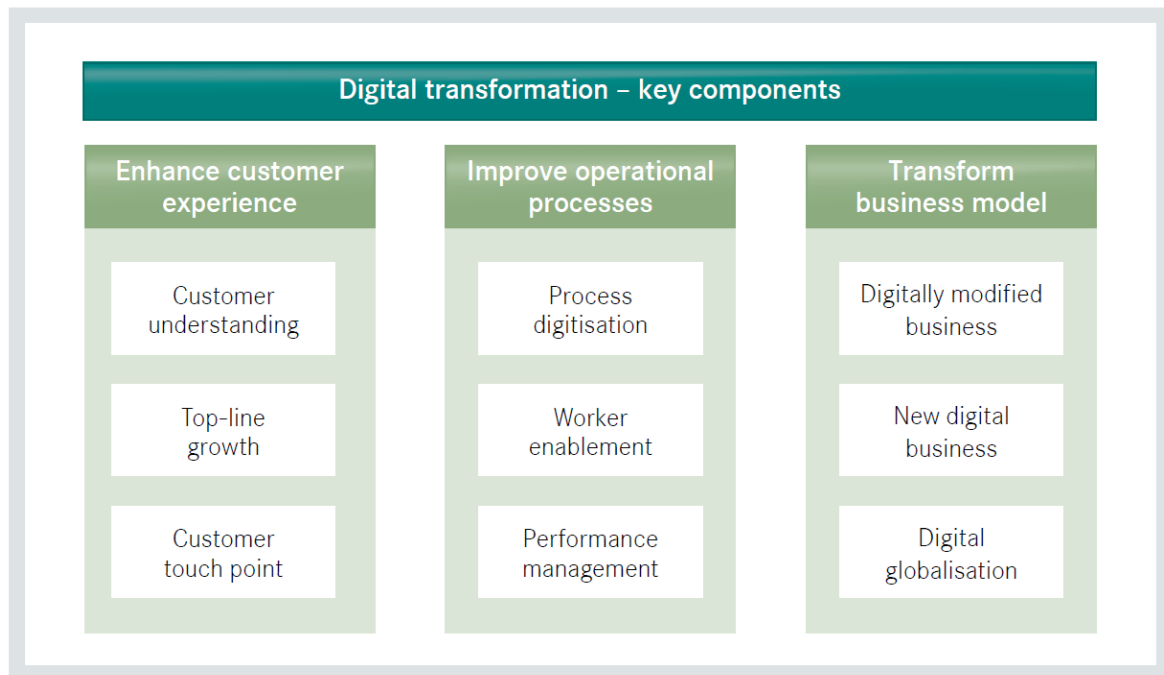
Microsoft (2016:1) stresses that digital transformation is not an IT department initiative or reinventing of services for a mobile domain. Hess *et al.* (2016) support the statement above, pointing out that there is a significant distinction between digitisation and digital transformation. According to Hess *et al.* (2016), the former refers 'to either the conversion of information from the analogue to the digital world (e.g., storage) or the automation of processes through information and communication technologies (ICT)'. The latter is 'concerned with the changes that digital technologies can bring about in a company's business model, products, processes and organisational structure' (Hess *et al.*, 2016). Digital transformation touches on nearly all divisions within a firm (Hess *et al.*, 2016).

Undertaking a digital transformation journey requires a culture change (Chahal, 2016:18). Chahal (2016:18) argues that senior leaders must be on board, and once they are on board, the changes must be shared with the rest of the employees. According to Chahal (2016:18), digital transformation entails adapting the culture of the business and the way it functions to work with technology instead of making the selected technology fit.

In banking, Intel and Red Hat (2016:5) point out that digitally transforming a bank will entail the acquisition of a broad range of technology-centric capabilities that will allow new methods of interaction and service provision to enhance the client experience. The report further states that the acquired technology-centric capabilities will require robust, dynamic and accessible digital infrastructure, and also a strictly open banking system to support them.

Bharathi *et al.* (2016:6) identify the fundamental areas where banks are using digital technologies to transform how they do business, as illustrated in Figure 2.3 below. Due to the complexity of most retail banks, digital transformation within retail banks will require an envisioned customer experience, proliferated operational processes, and restructured business models that meet regulatory requirements and the banking industry standard (Bharathi *et al.*, 2016:6).

Figure 2.3: Nine elements of digital transformation



Source: Bharathi *et al.* (2016:6)

While it is widely understood that digital transformation is not necessarily about digitizing the traditional offerings, Birkinshaw *et al.* (2016) provide a different angle. The report points out that a digital transformation is a two-phase approach in which traditional offerings are first digitized, and then followed by the introduction of entirely new offerings, stressing that the offerings are only possible because of digital technology. While this analysis is not necessarily off track; digital transformation involves much more than digitization. Dapp (2015:24) states that digitally transforming entails far-reaching structural changes that go way beyond every internal and external process and systems, a view that is consistent with what is available in the literature.

2.3.6. A test for digital transformation

This section provides an outline of the two tests for digital transformation; the age test and the seven-by-seven test. Both these test were examined by Caudron & van Peteghem (2016:122-149).

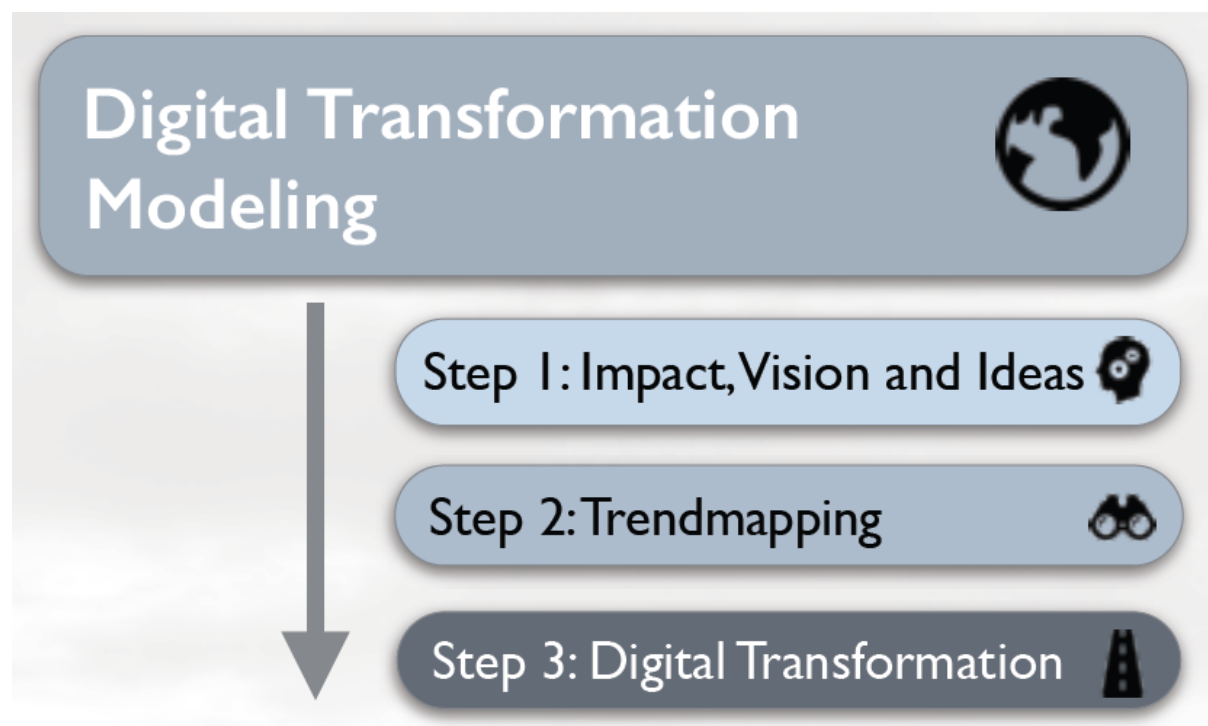
When it has become apparent that digital is disrupting the organisation and the industry that the organisation operates in, it is likely that the organisation cannot go through a positive transformation in its current form. The Bank felt the disruptive nature of digital technologies, and it was clear to the Bank that transformation needed to happen and fast. To better understand the impact of the disruption, and the probable transformation to face in the foreseeable future, the use of a digital transformation modelling is required; see Figure 2.4 below.

The digital transformation modelling technique is divided into three steps. Step one involves conducting an analysis of the current state of the firm to establish the impact that could be expected from pursuing a digital transformation journey. Vision and ideas about where the firm is heading are also crafted in step one.

Step two visually illustrates trends that are influencing the firm regarding digital transformation, a technique called trend-mapping.

The third and final step of the digital transformation modelling entails starting with the digital transformation journey.

Figure 2.4: Digital transformation modelling



Source: Caudron & van Peteghem (2016)

Over and above the proposed digital transformation modelling, efforts must be directed at formulating strategies to deal with the change. One proposal includes building a new company from scratch, bottom up, based on the 'as-is,' employing digitally smart people across the organisation, with lightweight yet scalable technology where an agile approach is adopted. The real challenge lies in rebuilding a plane while flying it, however, an exceedingly difficult task, maybe even an impossible one. Caudron & van Peteghem (2016:122) quote George Colony (CEO Forrester research) in the following manner:

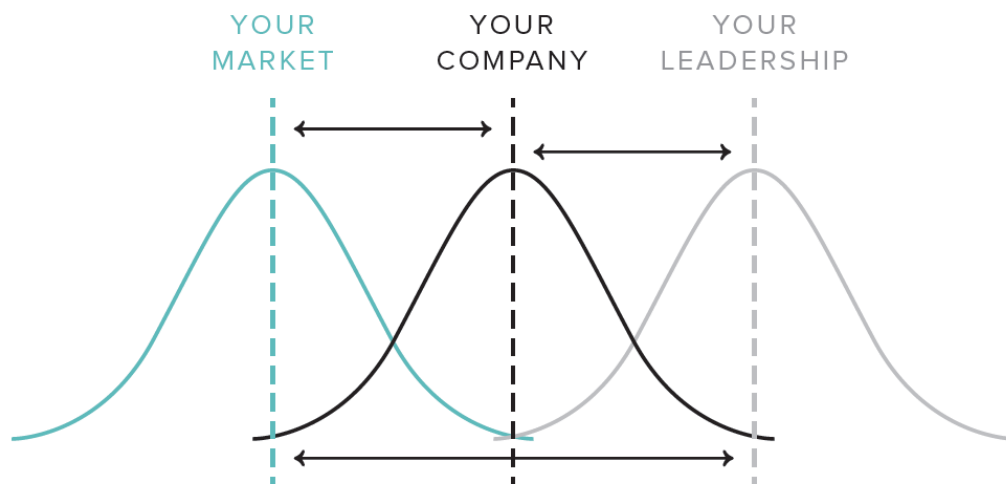
“If you cannot understand the new world of digital, fire yourself. Build an executive team that is digital-first (when problems arise, the first solution is always digital). Ensure there is a techie on the board of directors. If the board has a low digital IQ, the company will have a low digital IQ.”

The 7x7 test as proposed by Caudron & van Peteghem (2016:126) is discussed below. This test is useful in measuring leadership's technology intelligence and will be recommended to the Bank.

Without digital leadership, the likelihood of successfully dealing with digital transformation remain nil. What is desirable is an organisation that is sufficiently flexible to be in constant state of change. Two tests for evaluating the gap between as-is and where the market is at the current moment are 1) the age test, and 2) the seven-by-seven test.

An average age of employees is amongst the first things that organisations are confronted with and the larger the organisation, the more likely that it is an 'old' organisation. In the instance where the organisation is 'old,' the particular organisation typically fail to keep up with the way in which the market acts. Figure 2.5 shows an instance where the average age of employees is larger than that of the market.

Figure 2.5: Age of a company vs market



Source: Caudron & van Peteghem (2016:125)

It gets more challenging when the average age of the leadership of an organisation is higher than the average age of that organisation. The challenge would typically come as a result of the speed of innovation chased by employees as opposed to the inertia enforced by the organisation's leadership.

In the digital age, the ideal scenario is the one depicted in Figure 2.6, the age test for Facebook, where at the time of publication, Mark Zuckerberg was 30, his team marginally older, and the market maturing exponentially. In pursuit of the digitally enabled bank, the Bank can adopt the test, and if it turns out that the leadership age is higher than that of the market, the Bank is to recognize this and make a decision on how to move forward.

Figure 2.6: The age test for Facebook



Source: Caudron & van Peteghem (2016:122-149)

Even more, confronting than the age test is the seven-by-seven test; a seven-by-seven matrix where technologies and channels are drawn on the vertical axis and senior management on the horizontal axis. The next task is to evaluate the level of understanding of each senior member of the organisation on each channel or technology, marking yeses with a green tick and noes with a red cross. Figure 2.7 below shows the digital leadership assessment. In cases where there are not at least four yeses out of the seven senior management members, the company can consider itself to be in a vulnerable position and should highly consider adding new blood to be able to deal with the ever-changing market.

Figure 2.7: The seven-by-seven test

DIGITAL LEADERSHIP ASSESSMENT
The 7x7 Test

	CEO	SALES	MKT	CIO	COO	HR	CFO	...
Facebook			✓				✗	
Twitter			✗				✗	
LinkedIn			✓				✓	
Snapchat			✗				✗	
YouTube			✓				✗	
Smartphone			✓				✓	
Tablet			✓				✗	
...			IN				OUT	

Pick 7 (or more) relevant digital activities

If the majority of leadership is out, the company is out

Score your leadership team on active usage/ understanding

If a member doesn't score at least 4 out of 7, he's out

Source: Caudron & van Peteghem (2016:126)

The next section looks at digital transformation with a specific focus on banking.

2.4. Digital transformation in banking

The retail banking industry is undergoing transformational changes. The Bank, in particular, is in the process of transforming its business model from a traditional product-focused model to a more customer-centric business model. This section looks at the digital transformation in a banking industry with specific attention to the current state of the banking industry, and retail banking industry in 2020.

2.4.1. The banking industry today

The retail banking industry is today, still unstable although the world economy has improved significantly (Cisco, 2017:4). For approximately four decades, banks have been adopting new technologies in independent projects that addressed the specific needs, with not much attention to system interoperability (Patano & Rizzotto, 2016:2). As a result, banks are finding it difficult to manage their siloed management and information technology systems (Cisco, 2017:9). Added to this, misaligned departmental goals, data, priorities, processes, and tools have resulted in the risk of losing business, lower operational excellence and efficiency, increased exposure to regulatory requirements, and higher operating and capital expenses (Cisco, 2017:9).

According to Andrus *et al.* (2016:3), the banking industry has yet to explore, in its entirety, what it means to be fully digital from the inside out. Many traditional banks' digital strategies are, according to Dapp (2015:5), exceedingly insubstantial and not capable of continuing to be competitive in medium to long term. Patano & Rizzotto (2016:2) argue that despite the banks being relatively quick adopters of technology and innovation, currently, the banking technology architecture is not adequate for digital transformation purposes.

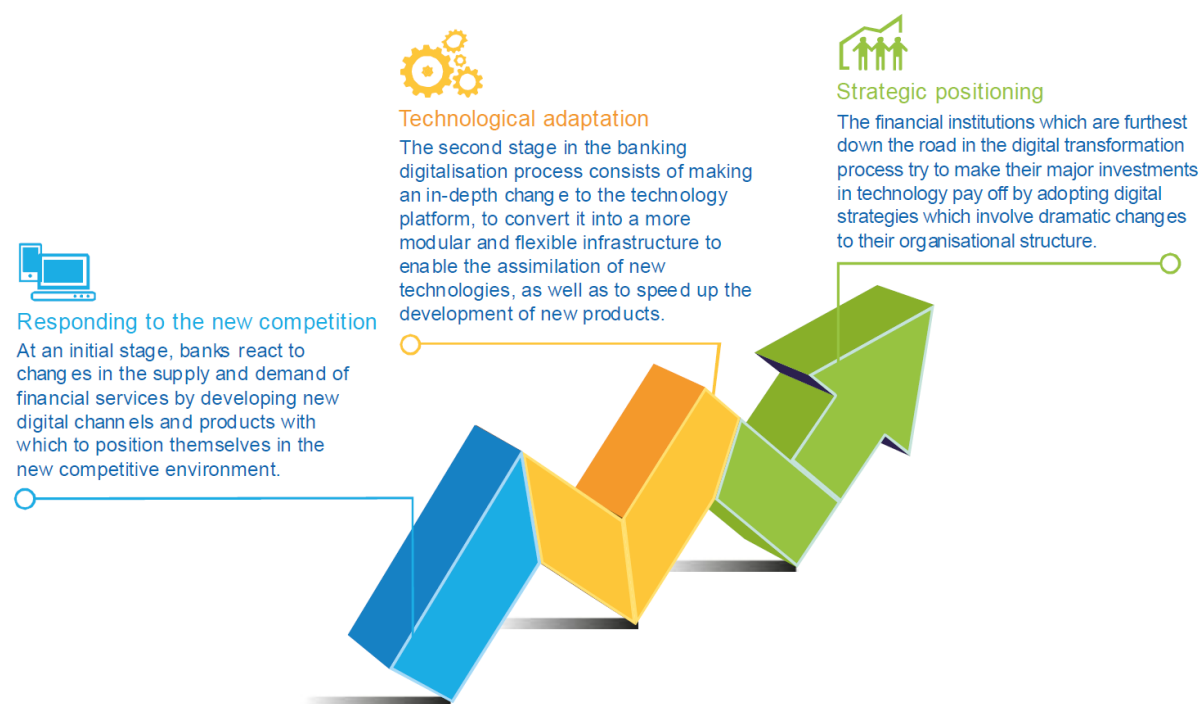
While banks are seen attempting to urgently digitalize their processes due to pressure exerted on them by the ever-changing consumer buying behaviours and the new competitive environment, not all banks know what it means to digitally transform (Cuesta *et al.*, 2015:4). It appears that some banks have focused their attention on adopting digital technologies to become customer-centric, in the process failing to consider an important aspect, the employee experience (Andrus *et al.*, 2016:3).

According to Cuesta *et al.* (2015:4), the banks are currently responding to the increased demands of digital by using various approaches and at different speeds, as there is no one size fits all approach to digital transformation.

Various traditional banks are pursuing digital transformation to position themselves with the new digital ecosystem (Cuesta *et al.*, 2015:4), depending on each bank's circumstances and needs. Cuesta *et al.* (2015:4) provide a diagrammatic representation of the process that is currently followed by traditional banks in their pursuit of digital banking, see Figure 2.8 below.

Figure 2.8: The process of transformation towards digital banking

The process of transformation towards digital banking



Source: Cuesta *et al.* (2015:4)

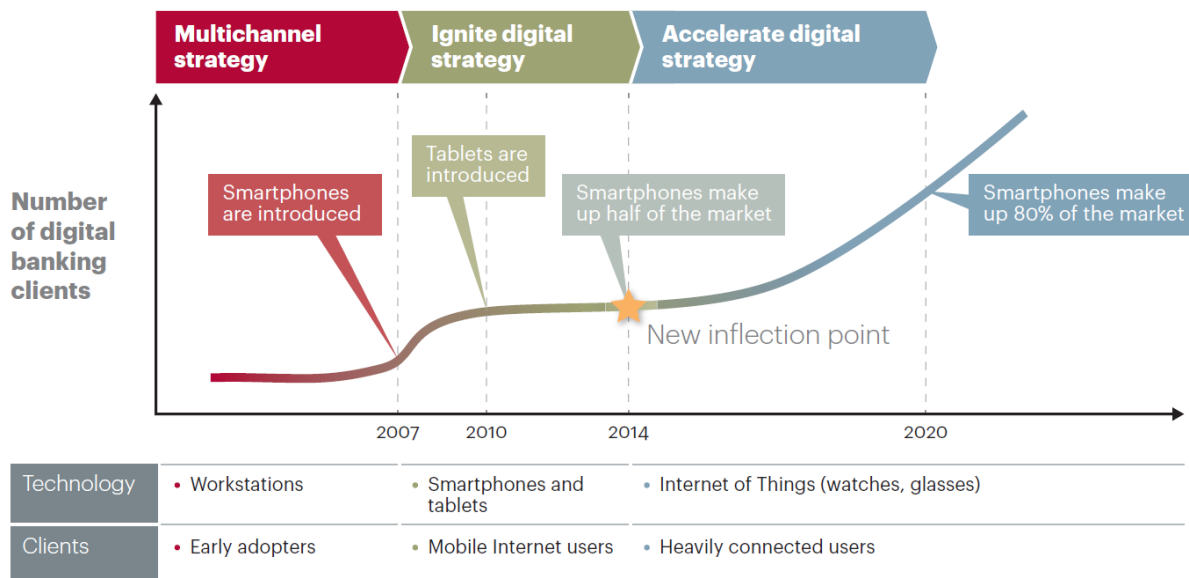
Research by McDonald *et al.* (2014:3) points out that banks are on a mission to drive digital transformation and run ahead of their peers. Being the front-runners in the digital banking, they not only focus on client-centricity, but are inclusive, and fundamentally change to deliver the best results (Jaubert *et al.*, 2014:1). Their intentions, investments, and actions are now at a point where it is no longer practical to wait (McDonald *et al.*, 2014:3). These leaders, according to McDonald *et al.* (2014:3), see growth potential where the followers do not. They do this by accelerating their digital strategies, as depicted in Figure 2.9 below.

South African banks have long realized the value of digital technologies in improving client-centricity (Harito, 2017). As predicted by Businesstech (2017), the South African banks' focus areas in 2017 included the implementation of disruptive technologies aimed at replacing the legacy systems; resilience to cyber-attacks; automation of front and back processes; and lastly, improving electronic channels for a positive client experience.

The Bank's journey to becoming a digitally mature bank is continuing with some legacy systems having been decommissioned over the course of 2017.

Figure 2.9: Banks are accelerating their digital strategies

Most banks are now accelerating their digital strategies



Source: Jaubert *et al.* (2014:2)

This section discussed the banking environment from the global perspective. The section below expands on what is currently happening globally, with specific reference to the South African banking sector.

2.4.2. The South African banking industry currently

South Africa's banking system is currently well developed and actively controlled in comparison to the other more industrialised countries (The Banking Association South Africa, n.d.). This has seen international banks investing in acquisitions of some major South African banks and some foreign banks establishing offices in South Africa. Although primarily a concentrated sector, the South African banking sector continues to be competitive with most banks diversifying their products and services within the context of global best practices (The Banking Association South Africa, n.d.).

The sector comprises a central bank (the South African Reserve Bank), and financially major banking institutions in the retail market, namely; Standard Bank, ABSA, FNB, Nedbank and Capitec (Brand South Africa, 2017). In spite of the economic headwinds that hit the South African banking industry in the past financial year, major banks were able to produce a credible set of financial results (Harito, 2017).

Four of the major banks recorded a cumulative R73.2 billion in earnings, 8.4% up from 2015 financial year. Capitec (excluded from the reported earnings above) on the other hand is on-boarding 120 000 new customers every month, distrusting the banking environment and overtaking Nedbank as the fourth big bank in South Africa, and being named the best bank in the world by the Lafferty Group's 2017 Global Bank Quality Benchmarking study (Ismail, 2017).

While the aforementioned banks have in the past maintained their relationships with their clients, the emerging digital disruptions in the industry would erode profitability if they do not respond quickly enough (Harito, 2017). The banks have not realized any returns from the efficiency and the scale benefits point of view despite substantial investments in information technologies. In terms of cost to income ratio, the major banks are currently at 55% (Harito, 2017). The reason for this high cost to income ratio could be attributed to the cost to hire and retain staff, slowing revenue growth, increasing compliance costs and high costs to maintain legacy systems.

The industry is evolving, however, in response to all the challenges identified above. Disruptive technologies coupled with high customer expectations and start-ups companies have placed a massive amount of pressure on the industry to digitally transform (PwC, 2017). The four major traditional banks are finding new ways of operating to remain competitive (Camarate and Brinckmann, 2017).

According to Camarate and Brinckmann (2017), undergoing digital transformation would allow banks to become better in serving their customers and also to compete with the new entrants. The banks do possess a slight advantage in that they serve a more significant share of the market as opposed to challenger banks. To maintain this competitive advantage, however, the banks would need to create data analytics capabilities, to develop new solutions to meet their rising customer expectations, and also to make efficient use of their legacy systems and invest the funds in digital transformation (Camarate and Brinckmann, 2017).

2.4.3. Retail banking in 2020

Retail banks are challenged to make the age of engagement a fundamental imperative, given the demands of tech-smart customers for personalized engagements (Latimore, 2017:21).

According to Latimore (2017:21), these customers require banks always to be ready to provide relevant solutions whenever they, the customers, need assistance. Banks stand to gain competitive reach by engaging their customers on a daily basis using their digital channels (Latimore, 2017:21). Banking in 2020 will require enhanced data analytics to target and make offerings to customers in an efficient manner (Latimore, 2017:21).

Several information sources within the enterprise will need to be integrated to offer personalized services in facilitating customers' buying decisions, in the process, proposing relevant products and services to customers at the right moment of engagement and ultimately delivering an almost smooth customer experience (Latimore, 2017:21). A research article by Bharathi *et al.* (2016:5) found that 59% of respondents expect the significance of branch banking to diminish as customers move to digital channels.

Despite the banks' efforts, the change is happening at increasing speeds and more effort is required from the banks to position themselves for success in 2020 (Sullivan *et al.*, 2014:6). Sullivan *et al.* (2014:6) identified 6 priorities that could enhance success for banks in 2020; they are as follows:

- Developing a customer-centric business model;
- Optimising distribution;
- Simplifying business and operating models;
- Obtaining an information advantage;
- Enabling innovation, and the capabilities required to foster it; and
- Proactively managing risk, regulations and capital.

The section below provides a South African perspective of retail banking in 2020.

2.4.4. South African retail banking in 2020

There have been widespread predictions of the downfall of the traditional banks primarily because of the new disruptive entrants (PwC, 2014). These disruptive startups are claiming a more significant share of the market by offering better customer experience through new products and channels. This has forced banks to change their business models to maintain relevance (PwC, 2014).

As such, the South African retail banking industry is anticipated to appear entirely different to how it looks currently (PwC, 2014). According to PwC (2014), the retail banking industry is expected to evolve as follows by the year 2020:

- Physical presence will no longer be as significant as it was in the past. This will give the massive opportunity to challenger banks to build their brands with only a banking license, technology, and marketing budget.
- Surviving banks will produce at a low cost with almost all products and services profitable on an individual basis.
- Customer centricity will be a key focus due to technological advances and low switching costs.

Banks across the globe are bracing themselves for a new era of banking. Customer demands are putting massive pressure on the banks to transform digitally. South African banks are maintaining their competitiveness with Capitec as a reference point after being named the best bank in the world by the Lafferty Group's 2017 Global Bank Quality Benchmarking study.

The Bank has also joined other banks in preparing for a digital era expected to happen in 2020. A transformation programme is in progress with the primary strategic objectives being the customer-centric approach. This approach will replace the product-centric approach which is currently in place in the Bank. The primary issue with the current product-centric model is the negative customer experience. Legacy systems in the Bank are also impeding the Bank from offering tailor-made services and products. These issues among others are expected to be solved by the year 2020.

The following sections look at big data and how it can be used to make meaningful insights into banks' customers.

2.5. Big data

The banking industry has, for many years, been driven by data (Patano & Rizzotto, 2016:5). Digital transformation has brought a broader perspective of data-driven decisions in the banking industry (Patano & Rizzotto, 2016:5). According to Patano & Rizzotto (2016:5), the decisions are enabled by the new capabilities, applications, and infrastructure technologies for a large number of banks in the industry. These are seemingly leveraging the emerging opportunities in various areas like customer engagement and acquisition, market intelligence, fraud prevention, and risk management.

The earliest adopters of big data, Google, and Apache respectively, put a significant focus on the storage, processing, and analysis of high volumes of data, which then became big data (Dumitru, 2016). According to Deloitte (cited by Dumitru, 2016), big data refers to 'the set of problems, and subsequent technologies developed to solve them, which are hard or expensive to solve in traditional relational databases'. ISO/IEC JTC 1 (cited by Dumitru, 2016) defines big data as 'dataset with characteristics like volume, velocity, variety, variability, and veracity'. For a particular problem domain at a given point in time, these data cannot be efficiently processed using current or existing technologies and techniques to extract value'.

Digital transformation empowers new business models that are reliant on automated decision making based on data analytics (Roedder *et al.*, 2016). Most banks in the banking industry are currently undergoing digital transformation to adjust their business models to address demands coming from customers and the innovative technology companies, such as the Fintechs (Roedder *et al.*, 2016). Because of the role big data plays in enabling businesses to make meaningful decisions that minimize costs and maximize profits, it is a primary driver of digital transformation (Roedder *et al.*, 2016).

2.6. The business case for digital transformation

Research conducted by Microsoft (2016:1) found that almost half of all business leaders believe their business models are nearly extinct, and will not last for the next five years. The above is unsettling; it is not surprising that firms are looking at ways to maintain a competitive advantage.

Legacy systems, on the other hand, are hampering banks' ability to satisfy their customers' digital expectations (Tandulwadikar, 2014:5). To remediate, some firms have taken a stop-gap approach, implementing new technologies instead of total transformation leading to hard-to-manage silo systems which bring with them long-term implications including operational costs and inefficiencies (Tandulwadikar, 2014:5). Research shows that digital transformation comes with many benefits, as discussed below.

2.6.1. Benefits of digital transformation

This section outlines the typical benefits of digital transformation identified in the literature.

2.6.1.1. Enhance productivity and creativity

The primary goal of digital transformation is to enhance productivity and creativity of employees and the enterprise as a whole (Demirkan *et al.*, 2016). According to Demirkan *et al.* (2016), when executed successfully, digital transformation can enable banks to address market needs more rapidly than they used to, and in so doing increasing levels of collaboration. Tandulwadikar (2014:6) argues that having access to a data management system that provides a consolidated view of client data across the enterprise can enhance productivity and revenue generation.

Research by OECD (2017:1-165) looked at the relationship between digital technologies and productivity growth. This study found that there exists a high correlation between new and emerging digital technologies, as well as productivity growth. The following examples showing the relationship between digital technologies and productivity were chosen from OECD (2017:14):

-  Robots have increased productivity immensely on assembly lines; they do so by being faster, stronger, extra accurate and consistent than human beings.
-  When combining new sensors and actuators, big data analytics, cloud computing and the IoT, autonomous productivity-enhancing machines and intelligent systems get enabled.
-  Advancement in computation will allow for a simulation-driven approach, and therefore reducing time and cost as banks carry out less repetitive analysis.

2.6.1.2. Higher quality advice

For banks to provide high-quality advice every time they are called upon, they need to be aware of their clients' preferences and buying patterns; this will enable banks to predict what their customers require and also to tailor their advice accordingly (Tandulwadikar, 2014:6).

2.6.1.3. Customer experience and loyalty

Self-service applications and planning tools made possible by digital channels can empower clients, increasing clients' satisfaction (Tandulwadikar, 2014:6). Latimore (2017:18) argues that digital transformation not only benefits the firm but clients as well; this is achieved by providing clients with easy-to-use digital experiences that help the firm satisfy the ever-changing customer expectations. Through the use of mobile channels, customers can be presented with timely portfolio performance signals as well as new features and services via short online visits. Social networks can be used to connect banks' customers to consultants (Tandulwadikar, 2014:6).

2.6.1.4. Reduced risk

Detailed analysis can be performed on large data sets from various information systems and processes, as well as the monitoring of client activities using big data analytics tools (Tandulwadikar, 2014:6). According to Tandulwadikar (2014:6), through tracking of client activities using big data analytics tools, suspicious events can be detected, proactively lowering operational and compliance risk.

2.6.1.5. Improved compliance and monitoring

Having capable digital systems can make available to banks a view of the risk exposure, enhancing the chances of satisfying compliance requirements by banks (Tandulwadikar, 2014:6). Tandulwadikar (2014:6) argues that digital systems will, also, enable banks to monitor and avoid regulatory non-compliance dynamically. Latimore (2017:20) supports the above statement, adding that in the event of suspicious activity and an audit, digital systems play a role in providing a consolidated view of a customer's activity.

Research by Cisco (2017:6) identifies the benefits associated with digital transformation. Table 2.4 below illustrates what banks can expect to benefit from digitally enabled operating models. These benefits are consistent with those identified by Tandulwadikar (2014:6). One of the benefits defined by Cisco (2017:6) is that digital transformation enables cost reduction. Latimore (2017:20) recognized the same benefit, stating that a digital transformation platform that is sufficiently advanced and flexible will allow to banks to accomplish a highly efficient end-to-end processing, substantially reducing costs and leaving a bank's staff with more capacity.

The benefits in Table 2.4 are cited from Cisco (2017:6) and briefly discussed below.

- **Enables**

Technology has a high impact and has become part of the value that the banks deliver. This it achieves by creating efficiencies and supporting revenue growth. Also, it is an enabler of innovative capabilities by facilitating mobile engagement, analytics, and the delivery of services.

- **Differentiates**

A digitally transformed bank is characterised by differentiated digital capabilities which include: new user experience, accelerated products and services, and also distributed connectivity and intelligence.

- **Defines**

Lastly, the last benefit that can be expected to be realized when transforming to become a digitally enabled business model includes defined business model innovation, machine to machine decisions and self-learning analytics.

Table 2.4: Digital transformation benefits



Source: Cisco (2017:6)

Stief *et al.* (2016) conducted an empirical study to establish the benefits and challenges of digital transformation. The results are summarized in Figure 2.10 below. Stief *et al.* (2016) clearly illustrates the opportunities and challenges associated with digital transformation initiatives and further categorizes the opportunities and challenges into market-orientation, process-orientation, technology-orientation, product-orientation, and company-orientation. Interrogating current business activities to establish their optimisation potential presents an excellent opportunity to firms. An interactive and strengthened relationship with customers and strong position in the market presents further opportunities to banks. Furthermore, a significant opportunity lies in streamlined processes and higher quality throughout the entire firm's value chain

Figure 2.10: Challenges and opportunities for digital transformation

CHALLENGES AND OPPORTUNITIES OF DIGITAL TRANSFORMATION		
Category	Opportunities	Challenges
Market-orientation	<i>Customers</i> - increase in customer loyalty - strengthened customer relationships - possibility to create better (contextual) offers	<i>Customers</i> - adapting to customer requirements to ensure long-term survival on the market - targeting customers through the adequate communication channel
	<i>Market position</i> - increase in attention and awareness - increase in market visibility - tap new market potentials - development into entirely new markets - strengthened competitive position	<i>Competitor</i> - new competitors (with new business models) arise <i>Market position</i> - radical transformation of industries possible
Process-orientation	- faster processes - streamlined processes - more flexible processes - optimization of internal workflows - improved resource allocation - fully-integrated value chain - increase in efficiency	- increased complexity - need for continuous development - established processes must be transformed as soon as possible - breaking up old structures - comprehensive knowledge of the process landscape is needed - managing and matching multiple interfaces between information systems
Technology-orientation	- higher quality throughout the value chain - comprehensively optimized business activities	- missing know-how concerning the application of information systems - benefit of new technologies is not predictable - high initial effort to build up IT infrastructure - internal organization of diverse IT systems - high investment costs - development of a legal framework for use and exchange data - development of standards and a common language between companies - non-intuitive, high quality products need to be explained - reduced life cycle of products - simultaneously managing the interconnection of product's hardware and software
Product-orientation	- individualization (lot size one) - improved product-service	
Company-orientation	- business models improvement will lead to higher profitability - intensified collaboration among employees - increase in transparency - reduced resource-input - achievement of both monetary and time savings	<i>People</i> - corporate culture and transformation must interlock - informing employees about digital transformation and its consequences - foster acceptance among employees - face resistance and fear among employees - changing the digital mind-set of employees

Source: Stief *et al.* (2016:1810)

More benefits banks stand to enjoy in digitally transforming are cited by Bharathi *et al.* (2016:9) as depicted in Figure 2.11 below. Standardisation of business processes presents benefits to firms in that it eliminates duplication of work across the enterprise and fundamentally improves efficiency. Through digital transformation, firms are able to globalise their processes and shared services, increasing visibility to management resulting in improved quality of services.

Figure 2.11: Benefits banks can achieve by digitally transforming



Source: Bharathi *et al.* (2016:9)

Despite the well-documented opportunities related to digital transformation, the journey is not without challenges. The section below presents potential barriers that banks must be aware of when undergoing a digital transformation journey.

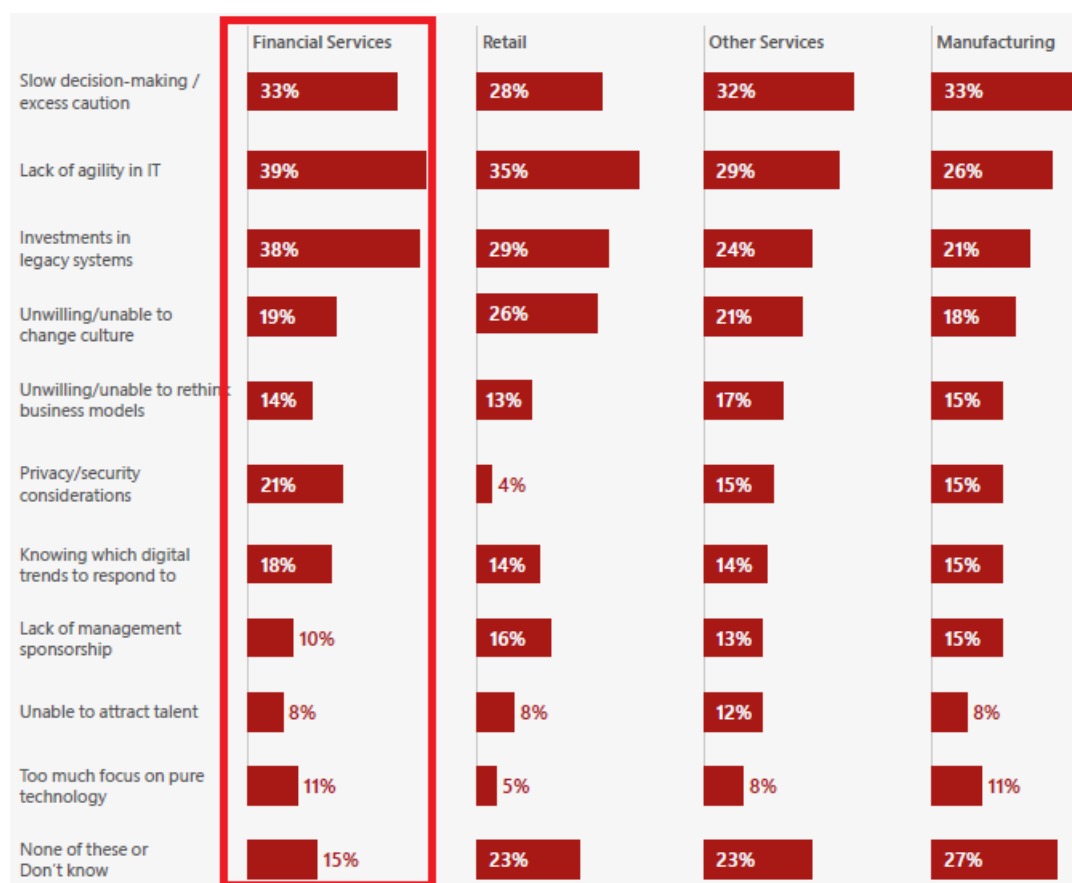
2.6.2. Challenges facing traditional banks

The latest technology advancements coupled with growing customer expectations have put retail banks under massive pressure to modernize their IT and digitally innovate (Intel and Red Hat, 2016:2). Despite all potential benefits, digitally transforming will inevitably bring challenges to banks and its employees (Demirkan *et al.*, 2016). In their research, Demirkan *et al.* (2016) stated that while many jobs involve structured, codified, routine, and predictable tasks and can be efficiently performed by computers, other jobs include emotions, creativity, judgment, trust, empathy, ethics, and human intuition.

Because of the extent to which a variety of jobs can be automated, a large number of workforce is in danger of losing their jobs. (Demirkan *et al.*, 2016). Figure 2.10 above and Figure 2.12 below list various challenges that banks will potentially face when undergoing a digital transformation journey. Only barriers relating to the financial services industry are highlighted below as they fall under the scope of this study. Lack of agility in IT has the highest percentage (39%), followed by investments in legacy systems (38%). Legacy systems are a significant challenge to banks.

The Bank has not been able to move as fast as possible to transform digitally, mainly because of the legacy systems. Slow decision making (33%) has also affected the pace of change from product-centric business model to customer-centric business model.

Figure 2.12: Potential barriers to successful digital transformation



Source: Microsoft (2016:37)

Despite the challenges discussed above, digital disruptions do not show any signs of stopping and the banks are forced to act. The section below presents a discussion on digital disruption and the associated disruptive technologies.

2.7. Digital disruption

The banking industry is more prone to digital disruptions from new competitors entering the market (Microsoft, 2016:11). However, the threats coming from innovations like Blockchain and the Fintechs are significantly higher than the threat of new entrants (Microsoft, 2016:11).

A report by Efma & Backbase (2015:11) supports the above claim, pointing out that the main threat to the industry is coming from tech companies and Neobanks. The disruption occurs typically at a much faster pace than the market anticipates (Efma & Backbase, 2015:11).

Defined as capabilities and strategies that alter the terms of competition and value via technology-enabled solutions (McDonald *et al.*, 2014:5), digital disruption is not a new debate according to Tapestry Networks (2014:1). A report by Tapestry Networks (2014:1) adds that technology started disrupting banks as far back as 1991, and continues to challenge banks to do better (Efma & Backbase, 2015:13).

A report by Efma & Oracle (2016:4) points out that digital disruption is not an isolated event, and that it has been happening over the past 30 years. The effects of disruption not only causes the affected players in that particular market to change but also end up in a significant financial impact on that specific market (Efma & Oracle, 2016:28).

In South Africa, non-traditional banking players are challenging traditional banks by exploring opportunities that could change the state of financial services in the country. This form of disruption has forced retail banks to find new ways of banking in order to stay relevant (Businesstech, 2017). The need for physical branches has come under intense scrutiny as consumers do not need to go to a physical branch to access loans, or transact, resulting in disruptions to the traditional bank (Lefifi, n.d.).

2.7.1. Fintechs

Fintechs are start-ups and established companies that make use of digital technologies to improve efficiency and effectiveness in the financial services (Dietz, *et al.*, 2016). Recent years have seen these start-up companies burst into the financial services industry, exploiting the gap that exists between tech-smart customer demands and the current offerings of retail banks (Cuesta, *et al.*, 2015:2).

Known as Fintechs, these innovative companies are changing the value chain of conventional banks by specializing in various areas, such as payments, forex, lending, access to capital markets, and financial advisory services (Cuesta *et al.*, 2015:2). The reasons Fintechs are primarily operative in areas stated in the latter statement are, according to an article by Efma & Oracle (2016:8):

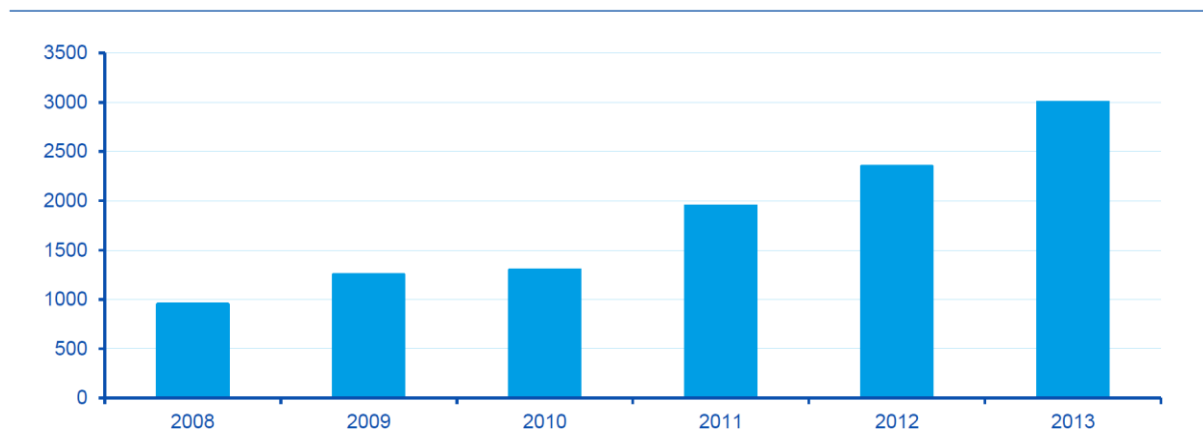
- Those are the areas with high fees and a strong push towards a digital interaction; and
- Fintechs attempt to operate cheaper, faster, and more explicit.

According to Cuesta *et al.* (2015:2), Fintechs are flexible and adept at incorporating changes and are characterized by the low-cost structure. Another characteristic exhibited by Fintechs is in their redefined business models which are in nature, highly disruptive to traditional banks (Cuesta *et al.*, 2015:2). The Fintechs pose a significant threat to traditional banks and continue to take business from traditional banks (Efma & Backbase, 2015:12). In 2014, Fintech companies raised approximately \$3 billion, more than triple what was initially invested globally in Fintechs in 2008 (Efma & Backbase, 2015:11).

Prodigy Finance, a South African based Fintech has developed the first borderless credit card model in the world, raising R43.74 billion in the process. These Fintechs have spotted an opportunity to disrupt the banks due to their ability to do digital ten times better than traditional banks can, forcing banks to increase their innovation efforts and digital investments (Efma & Backbase, 2015:11).

Figure 2.13 below, extracted from Cuesta *et al.* (2015:3), shows that in recent years, Fintechs have attracted a growing investor interest which summed up to approximately \$3 billion.

Figure 2.13: Global investment in Fintech companies



Source: Cuesta *et al.* (2015:3)

The section below presents another disruptor to banks called Blockchain technology.

2.7.2. Blockchain technology

Traditional banks have felt the disruptive nature of digital technologies. Innovations like Fintechs and Blockchain pose the most significant threats to conventional banks (Microsoft, 2016:11). The blockchain is defined as a 'distributed, decentralized transaction ledger, saved by each node in the network, which is owned, maintained and updated by each node' (Morrison, 2016). Blockchain can keep each transactional record taking place across a fully distributed or peer-to-peer network (Morrison, 2016).

As a decentralized peer-to-peer instrument, Blockchain has been gaining much reputation in recent times, with some authors suggesting it could play a massive role in the banking environment (Dapp, 2015:1). According to Morrison (2016), the integrity of Blockchains is due to its robust cryptography that validates and chains together blocks of transactions; this makes it practically impossible to alter any individual transaction record without detection.

Dapp (2015:2) points out that Blockchain technology looks set to make key contributions to the forthcoming banking environment, putting massive pressure on the banking environment in the medium to long-term. Major players in the banking environment, most notably Fintechs have also started adopting Blockchain technology as a strategic driver to achieving market readiness of business models (Dapp, 2015:2).

Due to its ability to enable organisation of various transactions economically, Blockchain technology will present banks with opportunities and challenges, as they look to create a new fabric for payments transfer and financial markets (Lee, 2015:44).

While proponents of Blockchain technology argue that this technology provides massive opportunities for banks, including creating a new internet of money, according to Lee (2015:44), sceptics see it as hype. The scepticism around Blockchain could be attributed to the bitcoin media buzz, which most banks find that it misses the point as it does not paint an accurate picture of the benefits banks could realize (Morrison, 2016). Blockchain technology, on the other hand, has demonstrated the ability to permanently eliminate inefficiencies in banks administrative processes (Morrison, 2016).

In adapting to disruptive changes, banks are to craft and execute strategies that will enable them to carry out digital transformation initiatives successfully. The section below presents a discussion on digital transformation strategies.

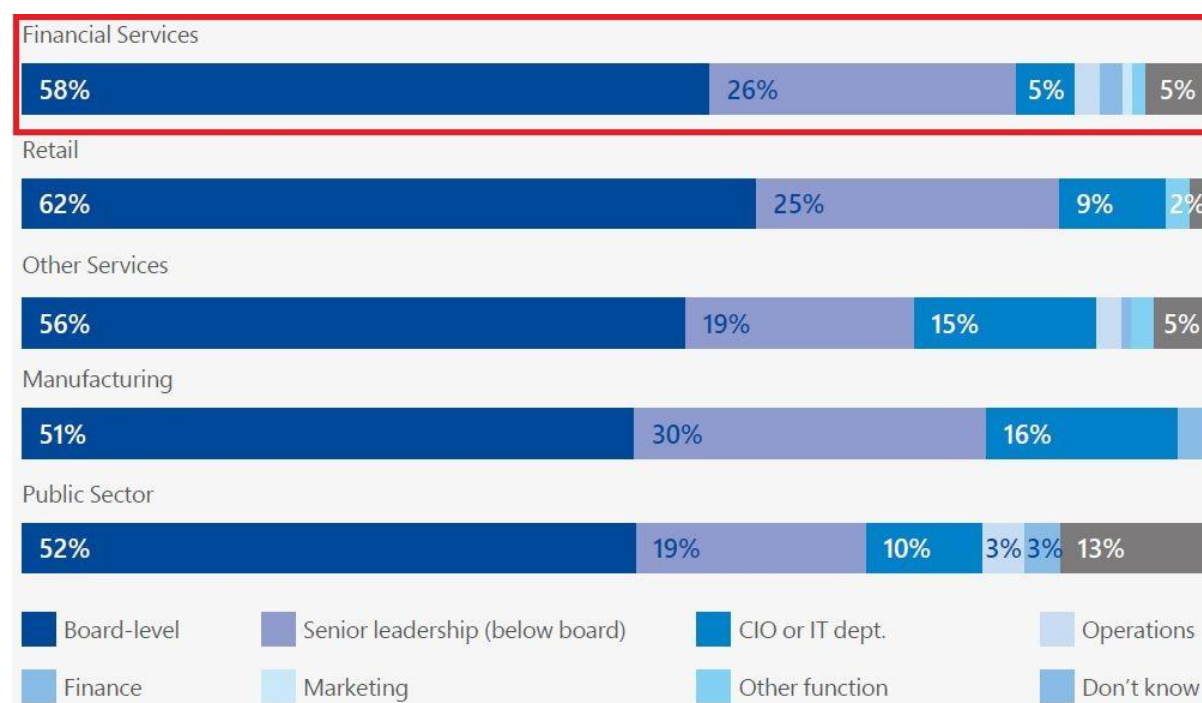
2.8. Digital transformation strategy

Disruptive innovations happening across the banking industry in recent years have prompted banks to conduct various initiatives to adopt technologies to exploit their benefits (Matt *et al.*, 2015); this would typically involve transformations in key business areas and affects products and services (Matt *et al.*, 2015). Matt *et al.* (2015) add that transformations of this nature are very complicated, however, and requires banks to develop governance strategies called digital transformation strategies, to enhance transformation success.

Digital transformation strategy serves as an approach that models the enterprise-wide integration of the coordination, prioritization, as well as the execution of digital transformations within an enterprise (Matt *et al.*, 2015). Hess *et al.* (2016) argue that this strategy indicates the approach to digital transformation for the whole enterprise and guides all involved in the transformation process which comes as a result of the integration and use of digital technologies. The crafted strategy must reflect what needs to be done, and is understood and also supported by all relevant stakeholders for it to successfully achieve the enterprise vision (Microsoft, 2016:16).

Although digital transformation strategy originates from business, an article by Microsoft (2016:17) claims that the IT influence on the strategy is a source of disputes. Matt *et al.* (2015) say that these strategies mainly focus on the transformation of products and processes from an enterprise-wide view due to new technologies. Figure 2.14 below shows where the digital transformation strategy originates from. Specific reference in Figure 2.14 is given to the financial services section highlighted red. 58% of the time, a digital transformation strategy comes from the board-level, followed by 26% of the time in which senior leadership craft a digital transformation strategy. CIO or the IT department is only responsible for crafting a digital strategy 5% of the time.

Figure 2.14: Origins of digital transformation strategy



Source: Microsoft (2016:17)

In driving the digital strategy, banks have focused on approaches as depicted in Figure 2.15 below (Efma & Oracle, 2016:10). The structured approach to digital transformation enables firms to engage customers, partners, and employees at every step of the transformation roadmap (IBM, 2011:13). According to Efma & Oracle (2016:10), the approach represents strategies that enable the delivery of new digital capabilities by banks.

The Bank employs a top-down approach where a digital strategy is approved at the board level where the Chief Executive of the Bank sits, the strategy then is driven Chief Digital Officer who reports to the Chief Information Officer. This is consistent with approaches by Microsoft (2016:17) illustrated in Figure 2.14 above.

Figure 2.15: Approaches driving digital strategies



Source: Efma & Oracle (2016:10)

The four strategies identified in Figure 2.15 above enable banks to implement innovative digital capabilities. A description of each of the four strategies was adapted from Efma & Oracle (2016:10) and elaborated below:

Launching a digital brand

Several banks have launched a digital brand as the first approach. The banks have taken this approach as a way to simplify customer on-boarding. This has resulted in participating banks enjoying a generally wide-range adoption.

Digitising processes

Banks that are pursuing new digital processes typically follow a digitisation approach. This allows the banks to compete from a digital platform.

Modernising the digital experience

This approach involves improving the digital experience as it is often outdated.

Launching a new digital capability

Banks look at delivering new digital capabilities, e.g. eWallet in the case of FNB, as the final approach. The Bank currently has a facility where a client with an internet banking profile or mobile application is able to send funds to a cell phone. The facility only allows the recipient to withdraw the entire amount sent, and not a portion.

The Bank has plans to enhance the facility to become a wallet facility in which the recipient will not be obliged to withdraw the entire amount received.

The section below provides a discussion on the current state of digital transformation strategies.

2.8.1. The current state of digital transformation strategies

‘Virtually every firm in every industry is being shaken up by the digital revolution’ (Minton-Beddoes cited by The Economist Intelligence Unit Limited, 2015:5). While the above statement seems to be the case, the current state of digital transformation strategies appears to be in their infancy, if they exist at all (Microsoft, 2016:19). In a research conducted by Microsoft (2016:40), it was found that although many organisations have taken on a digital transformation journey, those institutions are currently not ready to fully embrace the changes that come with this journey. A contributing factor to this is that most digital transformation initiatives are mainly internally focused and are not driven by data (Microsoft, 2016:19). It seems that people falsely attach the term digital transformation strategy to Information Technology departments and therefore fail to focus on digital transformation in a digital world (Microsoft, 2016:19).

Some firms have made more progress than others with regards to digital maturity (The Economist Intelligence Unit Limited, 2015:2). In its study, the Economist Intelligence Unit Limited (2015:2) found that the firms that are ahead of the curve concerning digital transformation are significantly more advanced than the firms that are behind the curve. According to Stief *et al.* (2016), the firms that are ahead of the curve are highly motivated to improve their processes (making them better and faster), cut overheads, make better use of their resources, and to always take the lead in their respective markets.

The banking environment does not exhibit a different picture to the one in the last two paragraphs as the state of digital transformation in that industry is itself not where it needs to be to allow banks to maintain their competitiveness (Latimore, 2017:6). According to a report by Latimore (2017:6), 61% of the executives across different banks would like a customer-centric business model, although a mere 17% believe they are ready for that change.

2.8.2. Strategic decisions

The current state of digital transformation in the banking industry requires informed choices from banks. In light of the current situation in the banking industry, CEOs should, according to Broeders & Khanna (2015:6), evaluate the six digital dilemmas listed below in deciding which is best for their banks.

2.8.2.1. Decision 1: Disrupt, or defend?

When a bank does not have much to lose in its geographic location or product segment, the best decision would be to disrupt. To demonstrate, Broeders & Khanna (2015:6) uses mBank (a Polish banking institution) as an example. Due to its success as a direct bank in Poland, its parent company, BRE Bank changed its name to mBank.

Defensive strategies, on the other hand, could be better suited to incumbents, for example, to avoid cannibalisation and margin erosion. Defending the market position could mean substantial investments in the next generation technologies and digital channels while simultaneously transforming old channels, experimenting with new branch setups, and making use of ATMs for cross-selling and up-selling.

2.8.2.2. Decision 2: Cooperate or compete with new attackers?

While new entrants can be stopped, it is easier to cooperate from time to time; this could provide the following benefits to the bank: 1) exposure to new clients, and 2) offer new capabilities to the existing customers. Turkey's Garanti bank decided to compete with Google Wallet by introducing its iWallet while Citibank opted to cooperate with Google on the same offering to get more rapid access Google's capabilities.

2.8.2.3. Decision 3: Diversify or double down?

Although digital initiatives can cut the risk through diversification, real game changers demand more time, money, and leadership drive. It is normal for banks to time and again run several projects and later double down on scaling up the ones that deliver more value to the bank. In 2012, Westpac bank revealed their mobile strategy that included multiple projects.

Its mobile and online banking platforms flourished, resulting in Westpac introducing a new integrated online and digital platform resulting in the amalgamation of their digital investments.

2.8.2.4. Decision 4: Keep digital businesses separate or integrate them?

Integration of digital operations can swiftly provide a multichannel capability to clients. Lloyds group decided to integrate its digital business with the traditional business, while Millennium bcp separated their digital business by setting up ActivoBank as a separate digital bank with its own commercial and operating functions.

2.8.2.5. Decision 5: Business-led or operations- and IT-led digital transformation?

Having the CEO direct the digital agenda can yield a successful digital transformation. The CEO of Ping An took a bold move by digitally transforming a large insurer into a prominent Chinese financial institution. Similarly, although rarely, IT and operations can lead a digital transformation journey. Reference can be made to Banco Bilbao Vizcaya Argentaria (BBVA), it developed an IT and operations led state-of-the-art technology platform, which the business then used to transform the rest of the business.

2.8.2.6. Decision 6: Buy or sell businesses in the portfolio?

Digital transformation can occasionally lead a bank to shuffle its businesses by buying other companies. BBVA bought Simple, a technology leader, thereby acquiring talent and enhancing its marketing and digital culture. Similarly, it is sometimes sensible to sell a business, as is the case with ING which instead of continuing to invest in process and transaction automation, decided to sell its Eastern European securities-services businesses to Citi.

The strategic decisions above show that digital transformation is not an easy endeavour, it is complicated and requires a lot to deliver it successfully. Broeders & Khanna (2015:6) argue that to enjoy the benefits that come with digital transformation involves investment, meticulous planning, as well as coordinated decision making across the entire bank.

The banks stand to gain, however, should CEOs manage to address the multiple strategic challenges that come with digital advances.

2.8.3. Determining the digital transformation strategy

In addition to the strategic decisions above, Hess *et al.* (2016) propose that firms adopt a systematic approach to formulating a digital transformation strategy, proposing that managers answer the 11 questions, summarized in Table 2.5: Key decisions in defining a digital transformation strategy, which will guide them in formulating their digital transformation strategy. According to Hess *et al.* (2016), the summarized questions below provide an overview of fundamental decisions that have to be made when crafting a digital transformation strategy.

Table 2.5: Key decisions in defining a digital transformation strategy

Use of technologies					
1. Strategic role of IT?	Enabler			Supporter	
2. Technological ambition?	Innovator		Early adopter		Follower
Changes in value creation					
3. Degree of digital diversification?	Electronic sales channels	Cross-media	Enriched-media	Content platforms	Extended business
4. Revenue creation?	Paid content		Freemium	Advertising	Complementary products
5. Future main business scope?	Content creation	Content aggregation	Content distribution	Management of content platforms	Other
Structural changes					
6. Responsibility for digital transformation strategy?	Group CEO	CEO of business unit		Group CDO	Group CIO
7. Organizational positioning of new activities?	Integrated			Separated	
8. Focus of operational changes?	Products and services		Business processes		Skills
9. Building of competencies?	Internally	Partnerships		Company takeovers	External sourcing
Financial aspects					
10. Financial pressure on current core business?	Low		Medium		High
11. Financing of new activities?	Internal			External	

Source: Hess *et al.* (2016:35)

More relevant to this study are the fundamental questions the Bank will need to answer regarding the use of technologies, responsibility for digital transformation strategy, the positioning of new activities, building competencies such as staff skills, financing of new digital initiatives.

An article by IBM (2011:13) supports the structured approach, adding that for firms to determine the best strategy for digital transformation, a structured approach which enables businesses to engage customers, partners, and employees at every step along the transformation roadmap should be adopted. The structured approach as proposed by IBM (2011:13) is as follows:

2.8.3.1. Identify transformation opportunities

This stage is based on detailed understanding of digital transformation in the industry. This step depends on the degree to which the products or services could be digitized as well as the extent to which competitors are responding to changing customer expectations.

2.8.3.2. Redefine the value proposition

Customer behaviour should be used to anticipate what products or services customers are likely to pay for in the future; the firm should then redefine the value proposition based on the findings.

2.8.3.3. Design the optimized operating model

The operating model should be designed to combine organisational capabilities and technology requirements. Detailed understanding of current capabilities and opportunities will help in developing how the firm will deliver value.

2.8.3.4. Execute the strategy

The operating model should then be designed to support the new value proposition. Processes should be optimized for online channels as well as face to face interactions.

2.8.3.5. Continuously evolve

Big data analytics and customer insights should be used to evolve continually. As customers start using new technologies, such as location-based applications and stop using old channels, such as e-mail, their requirements and preferences change and the firm should evolve accordingly.

In the banking industry, compliance is a big focus area. The past few years have seen the South African Reserve Bank applying strict measures to ensure banks are compliant with regulations such as AML and FATCA/CRS. The section below gives an overview of the compliance landscape and challenges that banks are facing with regards to compliance.

2.9. Compliance

The banks are faced with difficult challenges of balancing their digitalisation initiatives and at the same time satisfying the regulatory requirements; this is both complex and sometimes unclear (Liew *et al.*, 2016:15). The constant change of regulations is challenging to traditional banks as their legacy systems were not built to address the many regulations imposed on them today. The provisions include the following: Know Your Customer (KYC), Anti-Money Laundering (AML), Foreign Account Tax Compliance Act (FATCA), and the Common Reporting Standard (CRS) (Latimore, 2017:4).

Further to constantly changing regulations, the dynamism and the ever increasing pace of innovations have resulted in rising legal uncertainty for banks (Dapp, 2015:4). Banks have in the past added more staff to meet the compliance demands of regulators; this has resulted in redundancies in their processes. According to Liew *et al.* (2016:15), digitalisation can enhance regulatory control by increasing transparency together with audibility. Latimore (2017:4) supports the latter statement, adding that digitalisation makes it easier for banks to be compliant with regulatory guidelines and also helps banks maintain litigation readiness.

Specific to the Bank, implementation of digital technologies to enhance regulatory compliance has been a slow process. The SARB and the FIC do not prevent the Bank from using third-party companies to carry out compliance processes. However, this has not encouraged the Bank to take full advantage of the opportunity. The slow pace of digitalisation has somewhat led to non-compliance with regulations imposed on the Bank by the regulators.

The cost of non-compliance is rising, and the Bank must increase the pace of digital transformation. Latimore (2017:4) points out that in recent times banks have seen substantial penalties instituted against them for failing to comply with regulations. Although the Bank was only charged approximately R25 million for non-compliance on client identity and verification, the cumulative fines for non-compliance have, according to Latimore (2017:4), run into billions of dollars.

The passing of the FIC Amendment Act in South Africa provides another challenge to the Bank, and although the Bank is making strides to ensure it stays compliant, the pace of digitally transforming needs to move up a gear or two.

South African retail banks have been disrupted and are now looking to grow in terms of digital maturity level. The section below deliberates on the 3 digital maturity level.

2.10. Digital Maturity: early vs developing vs maturing digital banks

The digital transformation of banks remains a phenomenon that is yet to be fully explained and one that no bank can claim to have reached its end state (Kane *et al.*, 2015:14). Research conducted by Kane *et al.* (2015:14) shows that the contours of the end state are becoming more evident. Kane *et al.* (2015:3) argue that while the digitally maturing institutions are focusing on integrating digital technologies such as social, mobile, big data analytics and cloud in transforming how their businesses operate, laggards are focused on coming up with solutions to discrete business problems with siloed digital technologies.

In assessing the digital maturity of companies, in a study conducted by Kane *et al.* (2015:5), respondents were asked to rate their firms against what they perceive as a digitally ideal organisation or one that has been digitally transformed. On a scale of 1-10, the results show three categories, early (1-3), developing (4-6), and maturing (7-10).

To understand what separates the early, and developing digital banks with the digitally maturing banks, this study surveyed the current literature. Table 2.6 below provides a summary of the typical distinguishing factors.

The Bank prides itself on providing secure banking sessions protected by top-level security. A report by Global Finance provides a different view, however, with the Bank coming in fourth place behind three other South African banks (Businesstech, 2017). The Bank will need to manage its security and work towards regaining customer trust in this regard.

Table 2.6: Early vs developing vs maturing

	EARLY	DEVELOPING	MATURING
Barriers	<i>Lack of strategy</i> More than half cite "lack of strategy" as a top-three barrier	<i>Managing distractions</i> Nearly half indicate "too many competing priorities" is a top-three barrier, "lack of strategy" still a challenge for one-third	<i>Security focus</i> Nearly 30% cite security as a top-three barrier; managing too many competing priorities remains a top concern for 38%
Strategy	<i>Customer and productivity driven</i> Approximately 80% cite focus on customer experience (CX) and efficiency growth	<i>Growing vision</i> CX and efficiency growth; over 70% cite focus on transformation, innovation and decision making	<i>Transformative vision</i> Over 87% cite focus on transformation, innovation and decision making
Culture	<i>Siloed</i> 34% collaborative; 26% innovative compared to competitors	<i>Integrating</i> 57% collaborative; 54% innovative compared to competitors	<i>Integrated and innovative</i> 81% collaborative; 83% innovative compared to competitors
Talent Development	<i>Tepid interest</i> 19% say their company provides resources to obtain digital skills	<i>Investing</i> 43% say their company provides resources to obtain digital skills	<i>Committed</i> 76% say their company provides resources to obtain digital skills
Leadership	<i>Lacking skills</i> 15% say leadership has sufficient digital skills	<i>Learning</i> 39% say leadership has sufficient digital skills	<i>Sophisticated</i> 76% say leadership has sufficient digital skills

Source: Kane *et al.* (2015:14)

The Bank is going through the process of transformation with the primary objective to become a digitally enabled bank characterised by a customer-centric business model. It should therefore always be driven by a clear transformative strategy.

The section below provides a summary of the findings of the literature review conducted.

2.11. Summary

The disruptive nature of digital technologies coupled with high-pressure from technology-smart customers has caused turmoil in the banking industry. Although well developed and controlled, the South African banking industry is facing significant challenges and must go through the digital transformation journey to stay relevant.

The benefits of digital transformation are well-documented. Some of them include enhanced productivity, higher quality advice, better customer experience, reduced risk, and improved compliance and monitoring.

Digital technology trends such as big data and Fintechs are causing disruptions to retail banks' business models. Fintechs, in particular, are providing traditional banks with massive challenges; this is because they are able to extend same offerings that the traditional banks offer at a much lower fee and ten times better than the retail banks can.

Despite the potential benefits of digital transformation, there is no clear approach on the implantation of digital initiatives. Some strategic decisions will have to be made by the banks in order digitally transform.

3 levels of digital maturity are used in this study; early, developing, and maturing. Integrating the core digital transformation practices to influence digital maturity will present yet another challenge to banks. This is an exercise that must happen however to ensure digital maturity.

CHAPTER 3 : EMPIRICAL INVESTIGATION

3.1. Introduction

The objective of this chapter is to provide an analysis of empirical data received from respondents in assessing the influence of digital transformation core practices on digital maturity within a large corporate bank, referred to in this study as the Bank. Efforts are directed at creating linkages between the findings of the study with the current literature.

Organisations in the financial services industry have turned their focus to digital transformation. Defined as the use of technology to radically improve the performance or reach of enterprises (Nieminen, 2014:1), digital transformation is a focus area for many corporations around the globe for many reasons, including capturing the new market and staying in business.

The Bank is no different to other corporations and has now begun its digital transformation journey with the hope of becoming an entirely digital bank with customer-centric business model enabled by digital technologies. The digital transformation in the Bank remains a phenomenon that is yet to be fully explained. Kane *et al.* (2015:5) identified 3 levels of digital maturity; early (1-3), developing (4-6), and maturing (7-10).

Influenced by digital transformation core practices, digital maturity level 7-10 is what the Bank is trying to achieve with its 2020 strategy. To establish where the Bank is in terms of digital maturity, and to assess the influence of the core practices of digital transformation on digital maturity, an empirical investigation was conducted. This chapter outlines the results of the investigation.

The statistical analysis consists of 3 parts: the research methodology adopted which includes a discussion of the research approach, the measuring instrument, the description of the population and the sample, the method of data collection, and validity and reliability testing. The next part of the report following the methodology is the discussion of the results.

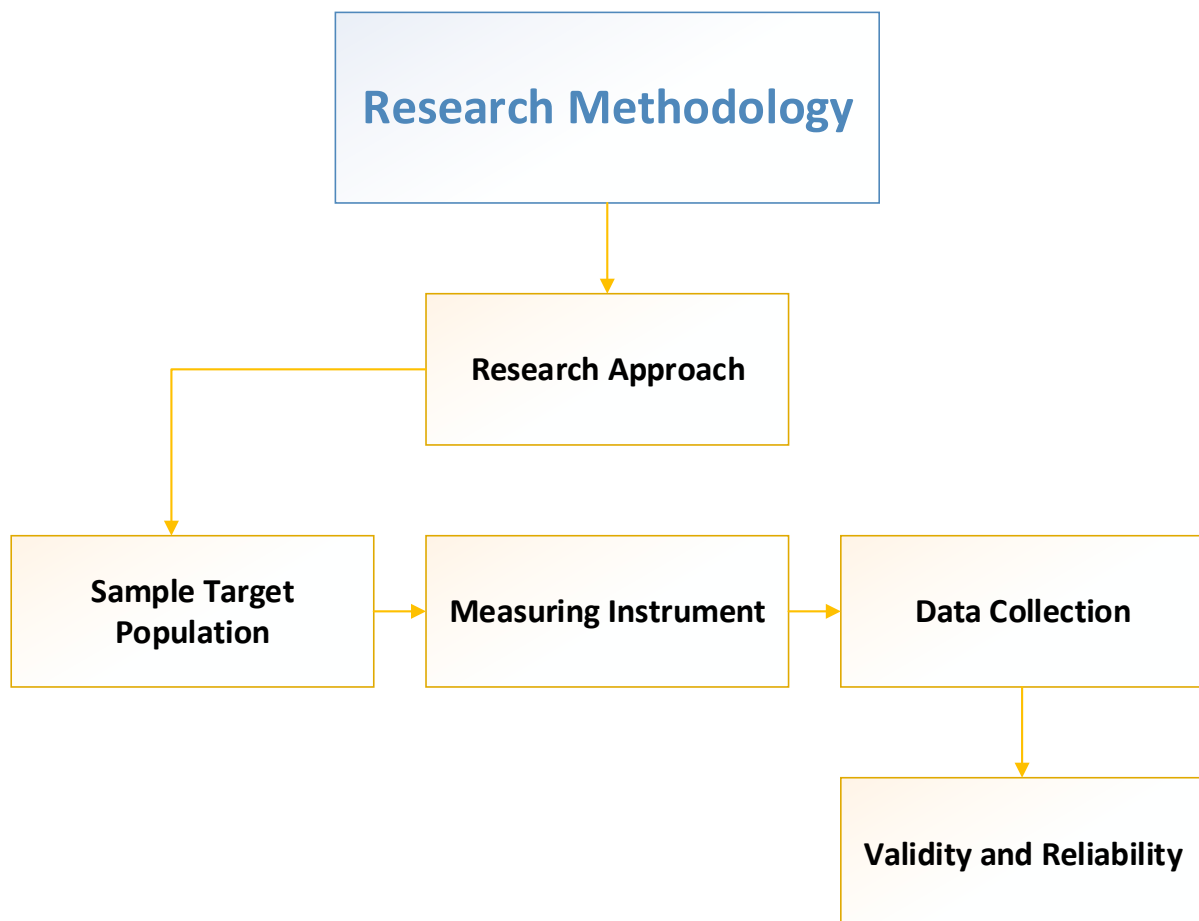
This section comprises missing data section, recoded values, a univariate data analysis and the bivariate analysis which mainly assessed the relationships between pairs of variables, and lastly, the report provides a summary.

3.2. Research methodology

This section of the chapter presents a discussion of the research methodology that was followed in this study. It includes a discussion on the research approach followed, a detailed discussion on the measuring instrument circulated, data collection procedures, a description of the sample and target population, reliability and validity of the data collected, and lastly the research procedure. Considerations relating to ethical issues that could arise during and after the completion of the study are also discussed in this section.

Figure 3.1 below is a graphical depiction of the sequence of stages of the research procedure followed in this study.

Figure 3.1: Research procedure



3.2.1. Research approach

This study followed a quantitative research approach. This type of approach entails the use of a survey to gather trends, attitudes, and opinions of a population by studying the sample of that population (Creswell, 2014:2). Creswell (2014:2) defines a quantitative research approach as:

A means for testing scientific theories by examining the relationship between variables. These variables can be measured, typically on instruments, so that numbered data can be analysed using statistical procedures.

According to Bryman *et al.* (2016:31), the quantitative type of research can be described as a distinctive type of approach that entails collection of data, where the relationship between theory and research is deductive.

Extensive literature study on the topic of digital transformation in chapter 2 was conducted and later used to inform the research measuring instrument discussed in section 3.2.2 below.

3.2.2. Measuring instrument

The measuring instrument was compiled and distributed to the participants. This instrument was mainly adapted from the literature and refined based on recommendations of a research expert and further modified to meet objectives of the study. The research instrument was created using an online survey tool called eSurvey creator (See <https://www.esurveycreator.com/>).

The original instrument was previously used by MIT Sloan Management Review, in collaboration with Deloitte, in which more than 4,800 business executives, managers and analysts from organisations around the world were surveyed to understand the challenges and opportunities associated with the use of social and digital technologies.

The modified instrument used in this study was structured to include seven sections listed below (See Appendix A.2. for the questionnaire):

- Section A which was used to elicit the participants' demographical information;
- Section B which included the response variable and the question on employees' perception of the Bank compared to its main competitors;

- Section C which focused on digital technologies and the influence they have on digital maturity within the Bank;
- Section D which assessed digital strategies and the influence they have on digital maturity within the Bank;
- Section E which looked at skills required for a successful digital transformation journey;
- Section F which assessed the current digital trends that have potential to aid the Bank in their quest to transform digitally; and
- Section G which looked at the leadership in the Bank as a core practice to successful digital transformation.

The instrument was structured to include ordinal variables in the form of a 5-point Likert scale, and nominal variables. In addition to the above variables, participants were asked to provide a brief justification in terms of the response provided in question number G4 which ask the question “How do you feel about digitalisation in the Bank?”.

Having reviewed and piloted the instrument, where relevant subject matter experts including senior quantitative analysts were conducted the instrument was ready to be distributed to the participants for data collection process to begin. The following section discusses the data collection process followed.

3.2.3. Data collection

The online tool called eSurvey Creator which was introduced above was used to compile the questionnaire and later stored the questionnaire on the server. The online tool assigned a link to the questionnaire which was later distributed to the participants via email, i.e. the link was included in an email which was sent to a list of participants. This instrument was in the form of a self-completion questionnaire and participants were able to access the questionnaire by clicking on the link provided.

Survey data which takes the form of quantitative data was collected and stored on eSurvey Creator where the researcher was able to monitor the responses. When the sample size (number of respondents) reached 200, the stored data was exported to a Microsoft Excel sheet for preparation.

As it is expected in any research, the data had missing values (*See section 3.3.1 on missing data*) and therefore needed to be cleaned before any form of analysis could be performed on it.

3.2.4. Sample & target population

As of December 2016, the total headcount in the Bank equalled 29860. The population of the study consisted of all the employees of the Bank who were deemed to possess sufficient knowledge regarding the research topic. The motive behind selecting participants possessing sufficient knowledge of the topic under study was primarily to avoid making incorrect conclusions that could potentially be made when the data were randomly collected. A pre-analysis of potential participants was conducted to establish the subject matter experts or people with sufficient knowledge about the topic under study.

A randomly stratified sampling technique was used to select business units to participate in the study. This is the probability sampling technique and the type of random sampling where the population is divided into strata or groups based on respective attributes (Research Methodology, n.d.). All business units in the Bank were initially drawn and selected to participate in the study. The conditions below were applied to select business units:

- Business units taking part in the transformation of the Bank; and
- Analysts, project managers, managers, senior managers, heads of business area, executives, and chief level executives from those business units.

Using the help of the Head of Retail Human Resources, a list of 6300 employees consisting of analysts, project managers, managers, senior managers, heads of business area, executives, and chief level executives was pulled from the Bank's database. Of the 6300 respondents, 200 was deemed sufficient for the purposes of this study. The list was further reduced to 163 respondents using two methods; Listwise Deletion, and Imputation. Of the 163 participants, 71 were male and 92 were female.

3.2.5. Validity & reliability

Quantitative research requires that the researcher improves data quality through the validity and reliability measurement (Heale & Twycross, 2015). The first measure of quality in quantitative studies is called validity defined as the extent to which a concept is accurately measured (Heale & Twycross, 2015). The second measure of quality is reliability which refers to the extent to which a measuring instrument reports the same results in a consistent manner.

3.2.5.1. Validity

There are various categories of validity which include content validity, construct validity and criterion validity. Heale & Twycross (2015) describe these categories as below:

Content validity - the degree to which a measurement instrument precisely measures all aspects of a construct

Construct validity - the degree to which a research tool measures the envisioned construct

Criterion validity - the degree to which a research tool is related to other instruments that measure the same variables

To ensure the validity of the concept being tested, two methods were used; a) face validity in which statistical experts including an Actuary, a University Professor with years of experience, and a Senior Quantitative Analyst, and b) pilot study where a subset of the intended population in the Bank was consulted.

3.2.5.2. Reliability

In confirming the consistency of the research instrument, a reliability test was conducted using Cronbach's α . Cronbach's α measures internal consistency or reliability; this refers to how carefully a test measures what it should (Glen, 2014). Table 3.1 below provides a principle guideline for interpreting Cronbach's α .

Table 3.1: Rule of thumb for interpreting alpha

Cronbach's α	Interpretation
$\alpha \geq 0.9$	Excellent
$0.8 \leq \alpha < 0.9$	Good
$0.7 \leq \alpha < 0.8$	Acceptable
$0.6 \leq \alpha < 0.7$	Questionable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha < 0.5$	Unacceptable

Source: Glen (2014)

The raw and the standardised Cronbach's α coefficients were computed using a Statistical Analysis System (SAS), the coefficients are displayed in Table 3.2 below.

Table 3.2: Cronbach test for testing reliability

Cronbach Coefficient Alpha	
Variables	Alpha
Raw	0.912839
Standardized	0.900405

Notice that Cronbach's $\alpha = 0.912839$ and by the principles of Table 3.1, the measuring instrument has excellent reliability. Table 3.2 shows both the raw and summarised alphas. The raw α is based on the correlation between variables, the stronger the association between variables the higher the likelihood that the test is consistent (Yu, 2015). The standardised α on the hand is based on the covariance of the variables under analysis, i.e. a measure of the spread between two variables (Yu, 2015).

3.3. Statistical analysis and discussion of results

3.3.1. Missing Data

Data collected from participants might have lack of answers, which are generally considered missing values (Statistics Solutions, n.d.). This typically occurs when a respondent does not answer specific questions owing to an array of reasons, some of which include stress, exhaustion, lack of understanding, or sensitive questions (Statistics Solutions, n.d.). Missing values require accurate analysis to aid successful data management and to circumvent incorrect inference about the data which could result when missing values are not adequately handled in research (Joseph, 2016). A breakdown of all responses received is illustrated in Table 3.3 below.

Table 3.3: Summary of fully completed responses and responses missing data

Total responses	200
Fully completed responses	116
Responses containing missing data	84
Responses containing extensive missing data, i.e. $\geq 10\%$ of the questionnaire (Listwise deletion method applied to the records)	37
Responses containing small missing data, i.e. $<10\%$ of the questionnaire	47
Responses included for data analysis	163
<i>Fully completed responses</i>	116
<i>Imputed data</i>	47
Response rate	3%

This survey had a total of 200 responses, where 116 responses were fully completed while the remaining 84 responses had missing data. The 84 responses containing missing data was analysed and found to contain a type of randomly missing data called MCAR (missing completely at random). This type of missing data shows no pattern in the missing data on any of the variables under study (Sauro, 2015). In managing the identified missing data without significantly affecting the statistical power of the tests, the following steps were taken:

3.3.1.1. Listwise deletion

Of the 84 responses containing missing data, 37 responses were identified as missing data considered to be large enough (i.e. 10% of the total questionnaire). A method of listwise deletion was applied to the 37 responses. This method constitutes a deletion of records with missing data (Thompson, 2016). This was done so based on the MCAR assumption (i.e. the assumption that the missing data is entirely at random, and that there exist no pattern of missing data on any of the variables) to prevent any bias in the data findings (Anesthesiol, 2013).

3.3.1.2. Imputation

Having excluded 37 responses in the data for analysis, 47 responses which contained missing values remained. Although the responses had missing data, it was not significant enough to be considered for deletion, hence the method of educated guessing imputation and average imputation were applied.

3.3.1.2.1. Educated guessing imputation

Although arbitrary and at times not preferred, this method allowed for inference of missing values (Sauro, 2015). To illustrate, the matrix in Table 3.4 below was observed, and in this specific instance, the participant responded with 2s (see section 3.3.2 on recoded variables) in the first 3 questions of the matrix, and then failed to capture a response in the 4th and last question of the matrix, and therefore an assumption was made that the missing value is 2.

Table 3.4: Barriers impeding the Bank from taking advantage of digital trends

F8. The barriers below are impeding the Bank from taking advantage of digital trends					
	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
F8.1. Too many competing priorities due lack of strategy	☐	☒	☐	☐	☐
F8.2. Lack of organizational agility	☐	☒	☐	☐	☐
F8.3. Lack of management understanding	☐	☒	☐	☐	☐
F8.4. Lack of employee incentives	☐	☐	☐	☐	☐

3.3.1.2.2. Average imputation

Another method of data management used in this study is called the average imputation method. This method uses the mean value of the responses from the other respondents to fill in the missing data (Sauro, 2015). To elaborate, consider question *G1. The Bank's leadership has sufficient skills and experience to lead our organisation's digital strategy.* Average responses from 162 respondents equated to 2.228 which was then approximated to 2. The value 2 was then used as the imputed value.

In total, 163 responses will be used to perform various analyses. The first analysis to be carried out is a Univariate analysis discussed in section 3.3.3 below, before that, see a discussion of recoded values below.

3.3.2. Recoded values

The original values assigned to variables were replaced with newly defined values. This was done so that they could be used in both Microsoft Excel and SAS Enterprise Guide and to align with the desired analysis. See Appendix A.3. for a complete questionnaire showing original values alongside the recoded values.

3.3.3. Univariate data analysis

This section of the study focuses on univariate analysis. This type of analysis involves one variable at a time (Bryman *et al.*, 2016:318). Unlike regression, causes or relationships will not be dealt with. Data is described, summarized and patterns in the data will be identified. Statistical software namely; Microsoft Excel and its add-in program called PHStat, and SAS are used to analyse data, including creating frequency tables showing the frequency and percentages of each of the categories of the identified variables.

In addition to frequency tables, Pareto chart, histogram, and pie charts are included in the report to aid in visualising quantitative data, the reason for their inclusion is that they enhance interpretation. The first part of the univariate analysis section looks at the respondents' demographic information.

Section A - Demographic information

As mentioned above, section A of the questionnaire relates to participants' demographic information. The information collected includes respondents' gender, age, the highest level of education obtained, job function, and experience. This information is considered important to the study as it gives the statistical data about the characteristics of the population under study. Even more important about this information is that it aids the researcher in assessing the influence of demographics on the survey results. This section of the study presents respondents' data in tables (frequency tables) and diagrams (pie chart and Pareto chart).

[A1: Respondents' gender](#)

The first demographic information to be discussed is respondents' gender, see Table 3.5 below. Out of the 163 responses included for analysis in this study, 71 were males, 44% and 92 were females, about 56%.

The higher percentage of female respondents compared to male respondents as stated above could indicate that the Bank is predominantly female dominated. This finding is not particularly surprising, and this is why:

- The total headcount in the Bank as of December 2016 equated to 29860.
- Of the 29860 employees, 18565 are female (62%).

This dominance of female employees in the Bank is reflected in the number of female responses received.

Table 3.5: Frequency table summarizing gender of respondents

Gender	Frequency	%
Male	71	44
Female	92	56
Total	163	100%

A2: The age group

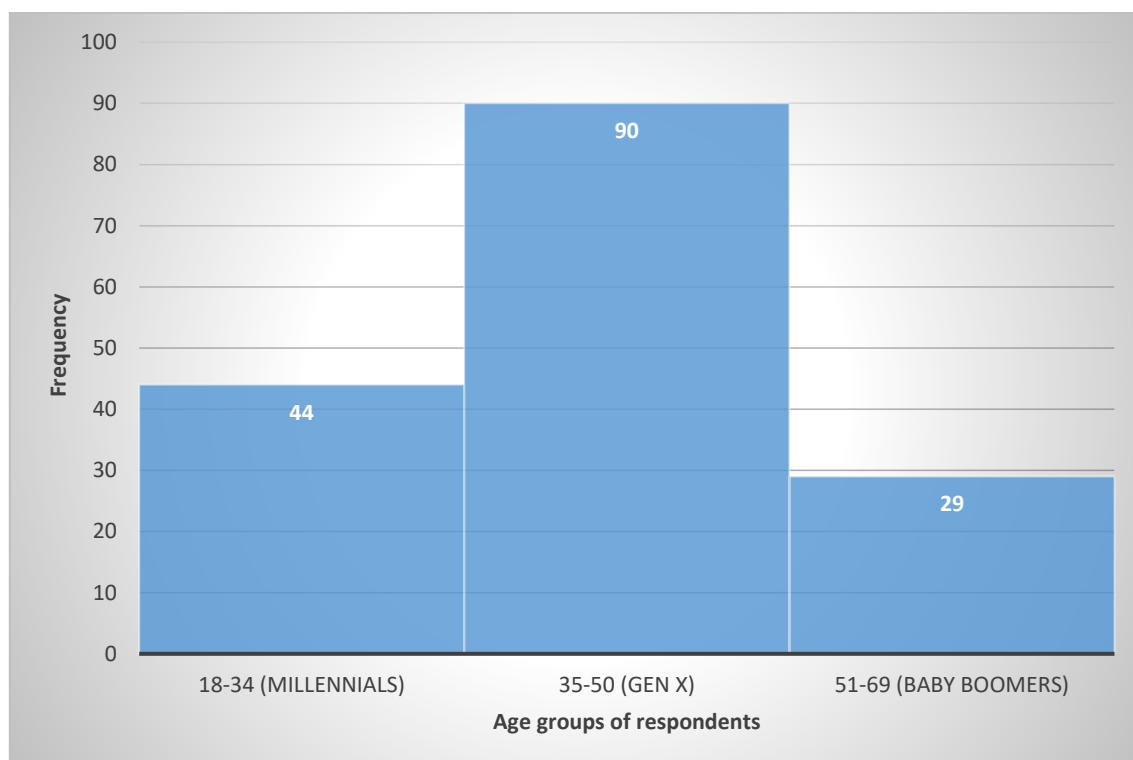
The second demographic variable to be discussed is participants' age group; see Table 3.6 below. It is evident from Table 3.6 below that the majority of the respondents are in the Generation X category (i.e. between the ages of 35 and 50); 55% of the respondents. This age group has more than twice the number of respondents of the closest age group (Millennials) with 27% of the total responses in total. Baby Boomers had the lowest response rate with 18% of the total responses, about 3 times fewer responses than responses in Generation X category.

Table 3.6: Frequency table showing age groups of participants

Age	Frequency	%
18-34 (Millennials)	44	27
35-50 (Gen X)	90	55
51-69 (Baby Boomers)	29	18
Total	163	100%

Figure 3.2 below provides a different dimension to the respondents' age groups. It is visibly clear from the histogram below that the majority of the responses come from Gen X age group. This raises some concerns given the Bank's attempts to transform digitally.

Figure 3.2: The ages of respondents

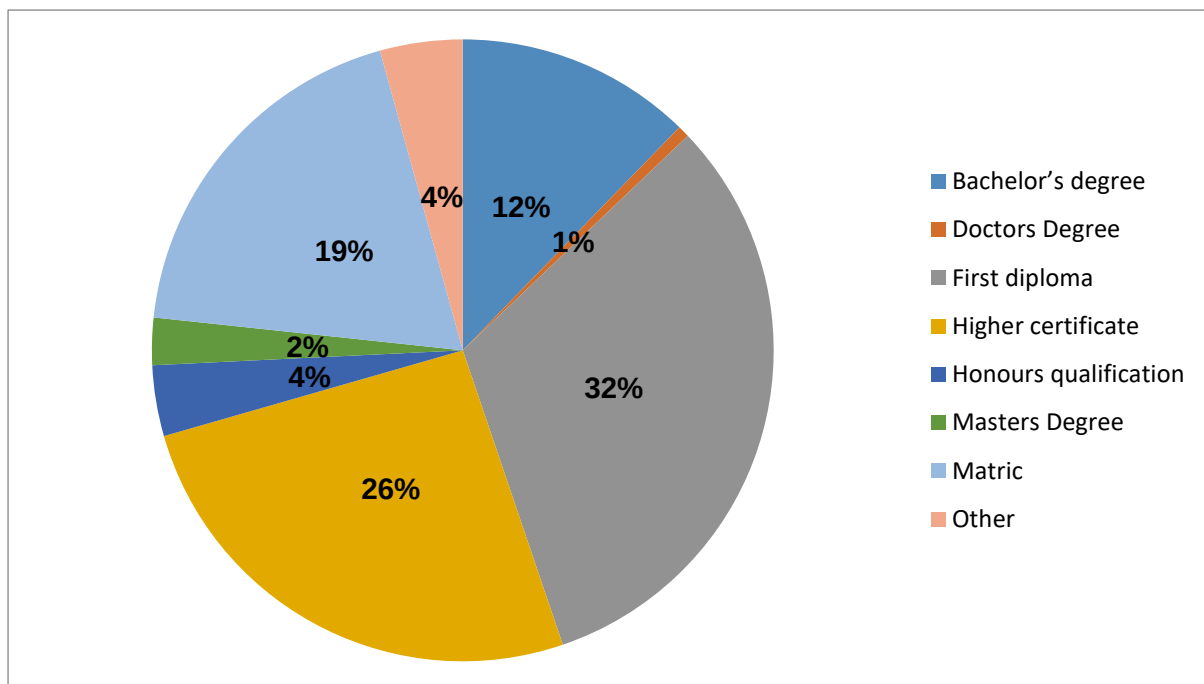


A3: Education Level

Figure 3.3 below depicts the respondents' highest level of education obtained. From the chart below, it is evident that most respondents (32%) have obtained a first diploma, followed by respondents possessing a higher certificate (26%). Respondents with only a matric qualification have the 3rd highest percentage (19%) of the total responses. In fourth place are respondents in possession of a bachelor's degree making up 12% of the total number of respondents. Respondents in possession of honours qualification made up 4% of the total respondents along with those who have indicated the highest level of qualification as other. The remaining 3% of the total number of respondents have indicated they are in possession of a Masters and Doctors degree, about 2% and 1% percent respectively.

From the results, it would appear that whilst there is a high percentage of respondents who have obtained higher level qualifications (i.e. Doctors, Masters, Honours, Bachelors, first diploma, higher certificate, and other certifications) the Bank has not completely closed its doors on people without higher qualifications with 19% of total respondents only in possession of a matric certificate.

Figure 3.3: The education level of the respondents



Overall, the Bank has an educated workforce with about 81% of the total respondents holding a higher level qualification. However, in all of the responses listed as other, none of them appears to be related to digital transformation. The following are qualifications that the respondents listed as other: Certificate, Diploma, Postgraduate Diploma, Credit management 1 and 2, CIS Professional Advanced Qualification: Governance and Administration, NQF 4, and NQF L4.

None of the qualifications that the respondents listed above pertain to digital transformation. This could mean that perhaps the Bank is not doing enough to up-skill its staff for the digital transformation journey. This could be a cause for concern considering the Bank's ambition of winning in the year 2020, by becoming a digitally enabled bank with a customer-centric business model.

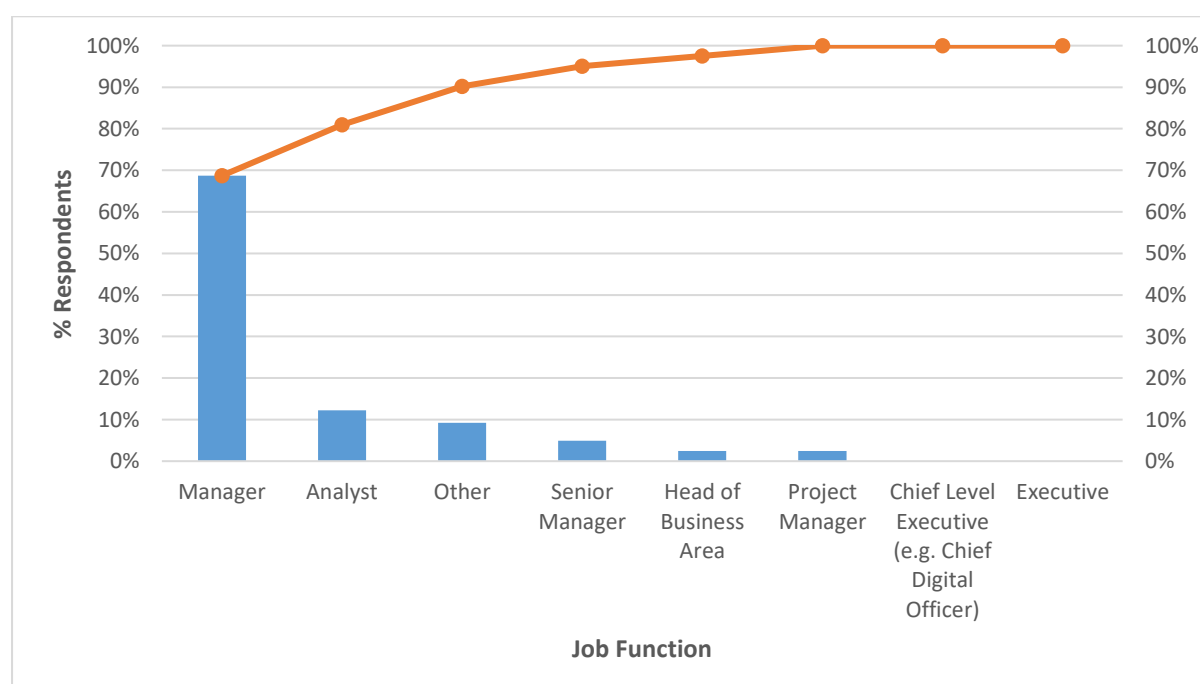
The section below looks at the respondents' job function that closely matches the following identified roles: analyst, project manager, manager, senior manager, head of the business area, executive, and chief level executive (e.g. Chief Digital Officer).

A4: Job function

The Pareto chart below depicted as Figure 3.4 shows the respondents' job functions in the Bank. This chart shows the frequency of occurrence as well as the cumulative percentage of the aggregate amount of occurrences of the level of a category variable (XLSTAT, n.d.). Particularly interesting regarding the Pareto below is the overwhelming responses from managers, about 69% of the total respondents, and 12% of respondents who identified their job function as matching closely to that of an analyst. Both job functions make up just over 80% of the total respondents.

Of concern is the low percentage of senior managers, project managers, and heads of business areas. Even more worrying is the fact that no response was received from any executive, or chief level executive. From a leadership point of view, the digital transformation in the Bank should be driven from the top down, and the lack of interest from executives and chief level executives is of significant concern and possess a high risk of delivering on the 2020 promise of becoming a digitally enabled, customer-centric bank.

Figure 3.4: Pareto chart showing job functions of respondents



The section below assesses respondents' years of experience categorized in the following manner: 0-5, 6-10, 11-15, 16-20, and 20 or more years of experience.

A5: Experience in the Bank

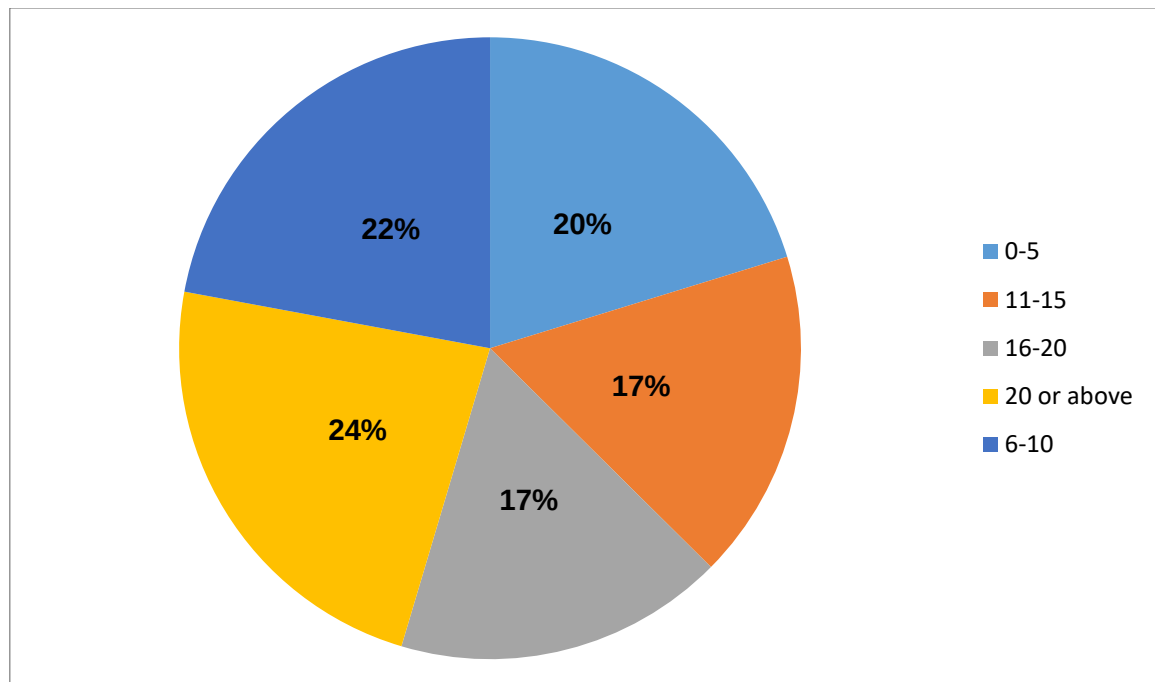
The frequency table below shows information relating to a number of years of experience in the Bank. The category 20 or more years of experience had the most number of respondents summing up to 24% of the total number of respondents.

Table 3.7: Frequency table showing respondents' years of experience

Experience (Years)	Frequency	%
0-5	33	20
6-10	36	22
11-15	28	17
16-20	28	17
20 or more	38	24
Total	163	100%

Figure 3.5 below visually depicts the respondents' years of experience. It can be noted from the pie chart below that employees with 20 years, or more of experience formed a more substantial part of the sample, although not significant with 24%, as compared to the respondents with six to ten years of experience which made up 22% of the total respondents. Closely behind with 20% are respondents who indicated they fall within the zero to five years of experience, while employees with 11 to 15 years made up 17% of the total respondents, the same as employees with 16 to 20 years of experience. Based on the survey data received from respondents, there seems to be a balance of experience in all of the identified experience categories.

Figure 3.5: The respondents' experience in years



Section B to G – Response variable and the core practices

This section of the questionnaire paid specific attention to participants' perception of the Bank's digital maturity (the response variable) level rated on a scale of 1 to 10, where 1 to 3 = 'early', 4 to 6 = 'developing', and 7 to 10 = 'maturing'. Questions regarding the core practices of digital transformation (the independent variable) follow.

Section B: The Bank

In assessing the respondents' perception of the Bank's maturity level, respondents were asked the following question:

On a scale of 1 to 10, where: 1 to 3 = 'early', 4 to 6 = 'developing', and 7 to 10 = 'maturing', rate the Bank's digital maturity against an "ideal" organisation, i.e. an organisation that is transformed by digital technologies and capabilities.

Figure 3.6: The respondents' perception of the Bank's digital maturity level

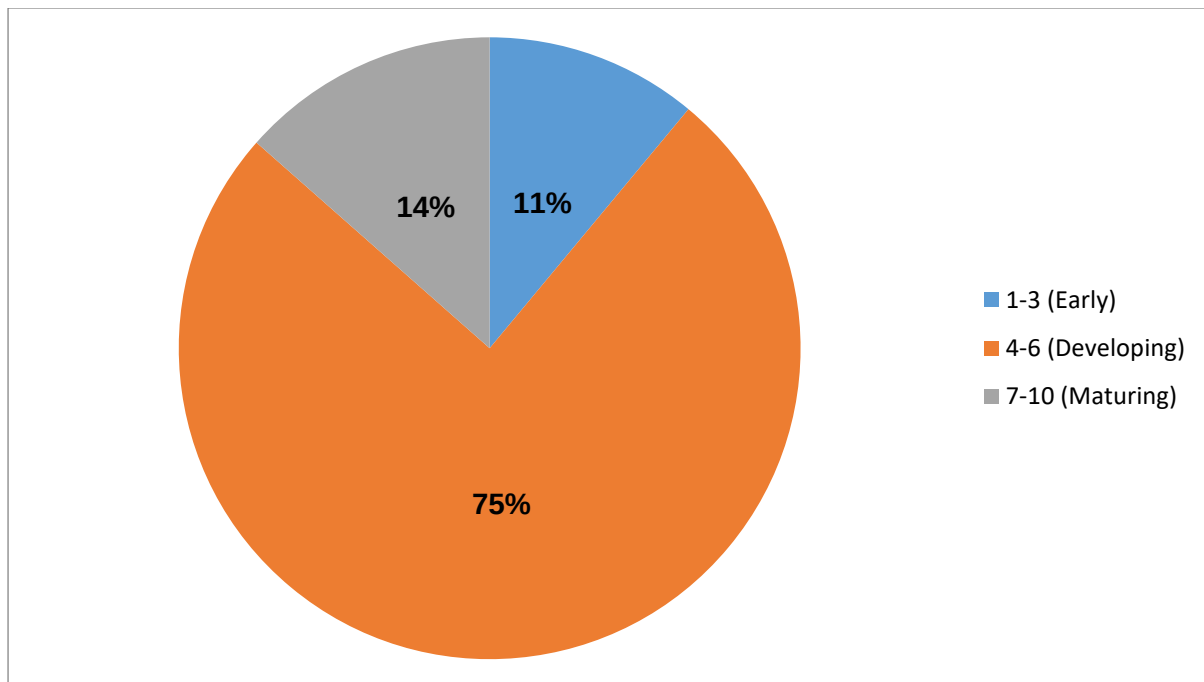


Figure 3.6 above is a visual depiction of the respondents' perceptions. It is clear from the chart above that the majority of the respondents (75%) believe that the Bank's digital maturity level is developing. 14% of the respondents believe the Bank has reached the digitally maturing level, with the remaining the respondents (11%) saying the Bank's digital maturity level is still in its early stages.

The Bank operates in a highly competitive market where other banks are continually improving their internal processes and offerings to capture a significant market share. Kane *et al.* (2015:14) argue that although contours and core practices of digital transformation are becoming more evident, no single company has successfully reached the end state yet. There are distinct characteristics that separate digitally early, developing, and maturing organisations in terms of digital maturity.

Participants were asked to characterize the Bank, on a 5-point Likert scale what their perception is of the Bank compared to its main competitors with respect to being collaborative and Innovative, agility in responding to opportunities and threats, the Bank's support of its employees in providing resources and opportunities to obtain the right skills to take advantage of digital trends, and lastly its customer centricity. The results are summarised in Table 3.8 below.

Table 3.8: Summary of responses to the Bank's environment

Section B: The Bank	5-point Likert Scale										Statistical Analysis	
B2. What is your perception of the Bank compared to its main competitors?	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Median	Mode
B2.1. Collaborative and Innovative compared to our competitors	14	9	87	53	42	26	15	9	5	3	2	2
B2.2. Able to respond quickly to threats or opportunities compared to our competitors	23	14	80	49	36	22	20	12	4	2	2	2
B2.3. Provides my co-workers or me with the resources or opportunities to obtain the right skills to take advantage of digital trends	27	17	82	50	39	24	9	6	6	4	2	2
B2.4. The Bank has a customer-centric, not a channel or product-centric organisational structure	26	16	87	53	36	22	9	6	5	3	2	2

A measure of central tendency is employed in performing analysis of the results table above. This measure refers to a distinct value that is used to describe a particular set of data by identifying a central position within that set (Laerd Statistics, n.d.). Analysis of the results table above using measures of central tendency namely the median and the mode reveals that participants are more positive about the Bank compared to its main competitors.

The median value for all the questions where participants rated on a 5-point Likert scale equated to 2, as is the mode. These two measures of central tendency provide the information as below:

- The median with value 2 indicates that in an ordered array that has been ranked from the smallest to the largest, where 2 = Agree (*see section 3.3.2 Recoded values*), the value 2 is the middle value.
- The mode with a value 2 shows that the value appears more frequently than any other value.

It can, therefore, be inferred that the respondents perceive the Bank as more collaborative and innovative, agile at responding to opportunities and threats, supportive of its employees by providing resources and opportunities to obtain the right skills to take advantage of digital trends, and lastly customer-centric in comparison to its competitors.

Section C: Digital Technologies

According to Kane *et al.* (2015:3), unlike early and developing, maturing digital businesses pay more attention to the integration of digital technologies such as mobile, social, analytics, and cloud in transforming their business models. To understand how the participants feel about digital technologies in the Bank, they were asked to rate the extent to which they agree or disagree with statements in Table 3.9 below.

Table 3.9: Summary of responses to digital technologies

Section C: Digital Technologies	Five-point Likert Scale										Statistical Analysis	
Please state the extent to which you agree or disagree with the below statements	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Median	Mode
C1. Digital technologies are disruptive to the Bank	12	7	26	16	68	42	54	33	3	2	3	3
C2. The Bank views digital technologies as an opportunity	72	44	84	52	5	3	0	0	2	1	2	2
C3. The Bank views digital technologies as a threat	4	2	19	12	69	42	61	37	10	6	3	3
C4. The Bank adopts digital technologies to serve our customers at the earliest opportunity	45	28	83	51	19	12	12	7	4	2	2	2

Analysis of Table 3.9 above shows that the majority of the respondents do not believe that the Bank is affected by the disruptive nature of digital technologies. This can be seen both from visualizing the data where 42% of the respondents indicated that they disagree to the statement '*Digital technologies are disruptive to the Bank*' and 33% indicating they strongly disagree, and by observing the median value and the mode value that are both equal to 3.

Although respondents do not believe digital technologies are disruptive to the Bank, 44% and 52% respectively agree and strongly agree that the Bank views digital technologies as an opportunity and not as a threat (42% and 37% respectively disagree and strongly disagree). Lastly, a high number of responses seem to believe that the Bank adopts digital technologies to serve the Bank's customers at the earliest opportunity with both the median and the mode values equating to 2.

Table 3.10 below is consistent with the results section of Table 3.9 regarding the implementation of digital technologies by the Bank. Respondents have reported that the Bank uses digital technologies as reported in the table below, with one exception, being the use of 'Cloud Computing Services' which the majority of the respondents (46%) indicated they 'Don't know' on the 5-point Likert scale if the Bank uses the service. Observe that the second highest percentage of the respondents have indicated the in the questionnaire that the Bank does, in fact, use cloud computing services. The combined percentage of 34% agree and strongly agree that the Bank uses the cloud computing services as opposed to the aggregated 20% in which the respondents disagree and strongly disagree with the statement.

Notice that the median is not equal to the mode. A challenge in this instance lies in deciding which one of the two is the best estimator of central tendency. This is a typical problem of theoretical statistics (Hochster, 2014), outside the scope of this study. It is visibly apparent however that the data was primarily affected by respondents who selected 'Don't know', making 46% of the total respondents.

Table 3.10: Summary of responses regarding digital technologies used in the Bank

Section C: Digital Technologies	Five-point Likert Scale										Statistical Analysis	
The Bank uses the following digital technologies to a great extent	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Median	Mode
C5. Social Media and Collaborative Technologies	33	20	82	50	33	20	3	2	12	7	2	2
C6. Mobile Technologies	36	22	96	59	20	12	0	0	11	7	2	2
C7. Big data and Analytics	21	13	73	45	18	11	3	2	48	29	2	2
C8. Cloud Computing Services	10	6	46	28	29	18	3	2	75	46	3	5

Section D: Digital Strategies

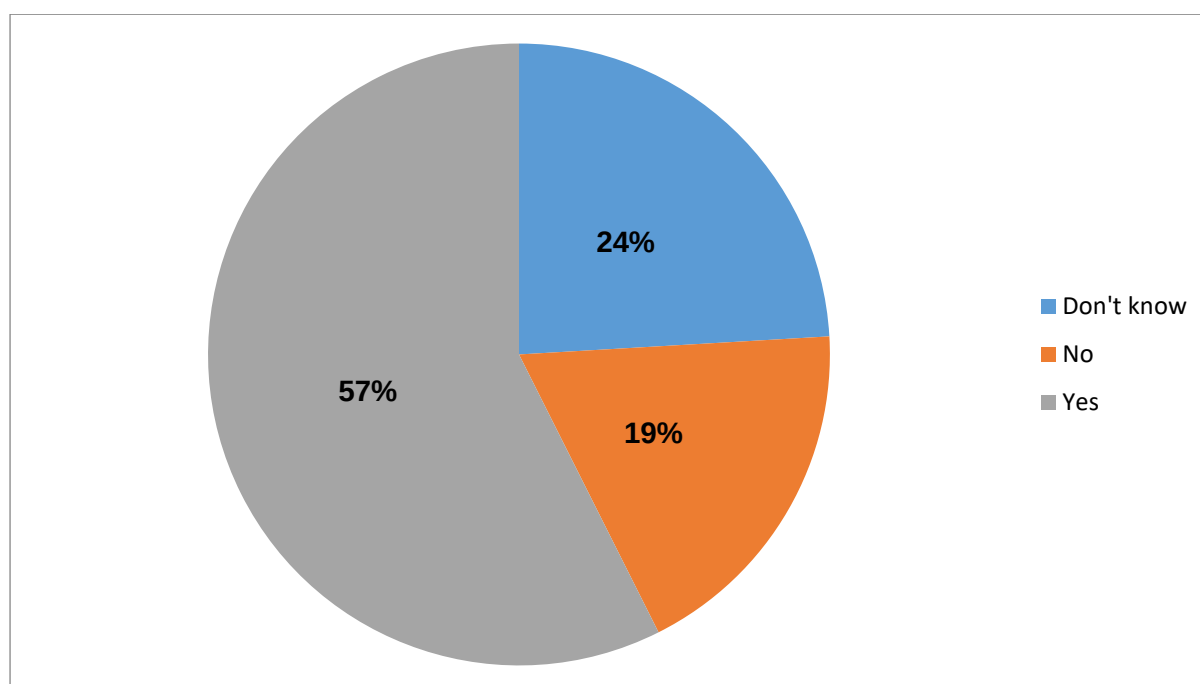
One of the primary drivers of digital maturity is a digital strategy (Kane *et al.*, 2015:3). Kane *et al.* (2015:3) report that in a digitally maturing organisation, more than 80% of staff indicate that their organisation has a coherent digital strategy. It is, therefore, necessary that this is examined in the Bank. Table 3.11 below summarizes the responses from the participants on whether they believe the Bank has a coherent digital strategy. 30% and 53% of the respondents respectively agree and strongly agree that the Bank has a coherent digital strategy in place as opposed to an aggregated 11% that disagree and strongly disagree with the statement. Only 6% of the respondents claim they are not aware of such a strategy in the Bank.

Table 3.11: Summary of responses regarding the Bank's digital strategy

Section D: Digital Strategies	Five-point Likert Scale										Statistical Analysis	
Indicate the extent to which you agree or disagree with the following statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Median	Mode
D1. The Bank has a coherent digital strategy	49	30	87	53	16	10	2	1	9	6	2	2

Figure 3.7 below summarizes the responses to the question of whether any single person or group have the responsibility for overseeing or managing the Bank's digital strategy. 57% of the respondents answered yes to the question, with 19% answering No and a further 24% claiming not to know. At the time when the Bank is in the process of digitally transforming its business model, it is alarming to find a large number of 39 respondents out of the total sample of 163 (24%) claiming not to know if there is a single person or group that have the responsibility for managing the Bank's digital strategy. This could indicate a lack of internal communication which potentially means that the digital transformation strategy has not been communicated to the Bank's employees. Winning in 2020 will require all stakeholders to be aligned in terms of what the Bank is trying to achieve and how each employee can contribute towards this strategic initiative.

Figure 3.7: Responses to whether any single person or group have the responsibility for overseeing/managing the Bank's digital strategy



The winning in 2020 programme that is currently running in the Bank has been communicated through relevant channels as the transformation programme that is meant to change the model from product-centric to customer-centric. Respondents were asked to rate an extent to which they agree or disagree that the objectives listed in Table 3.12 are the Bank's digital strategy. An aggregated 95% of the respondents agree and strongly agree that the Bank has an objective to fundamentally transform business processes and or business model with just 5% of the responses divided among disagreeing, strongly disagree and don't know.

A combined 97% of the respondents agree and strongly agree that the Bank is trying to improve customer experience and engagement. Only 3% of the respondents claim the improving customer experience and engagement is not an objective of the Bank's digital strategy. Lastly, 92% of the respondents believe increasing efficiency is one the Bank's digital strategy. Based on the results in Table 3.12, it is without a doubt that the listed objectives are indeed aligned with the Bank's digital strategy.

Table 3.12: Responses regarding objectives of the Bank's digital strategy

Section D: Digital Strategies	Five-point Likert Scale										Statistical Analysis	
D3. To what extent do you agree that the following are objectives of the Bank's digital strategy?	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Median	Mode
D3.1. Fundamentally transform business processes and/or business model (e.g., grow new lines of business)	53	33	101	62	5	3	2	1	2	1	2	2
D3.2. Improve customer experience and engagement	68	42	89	55	4	2	1	1	1	1	2	2
D3.3. Increase efficiency (e.g., automation)	68	42	82	50	7	4	3	2	3	2	2	2

Respondents were asked about the manner in which the Bank implements digital initiatives. Table 3.13 below summarizes the results from all 163 respondents. There is no one approach to implementation of digital initiatives in the Bank, and the majority of respondents seem to agree and strongly (78%) that some digital initiatives require a top-down approach. While other initiatives may be more suited to a bottom-up approach, the results of Table 3.13 are not as definitive. This approach has a combined 44% of the respondents agreeing and strongly agreeing this is the way the Bank implements digital initiatives, 35% disagreeing and strongly disagreeing this is not the approach the Bank follows, and a further 21% claiming they do not know if the Bank implements digital initiatives in this manner (bottom-up).

Table 3.13: Responses regarding the manner in which the Bank implements digital initiatives

Section D: Digital Strategies	Five-point Likert Scale										Statistical Analysis	
D3.4. The Bank implements digital initiatives in the following manner	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Median	Mode
D3.4.1. Top down from a central senior leadership team	32	20	95	58	13	8	2	1	21	13	2	2
D3.4.2. Bottom up from pockets of groups across enterprise	11	7	60	37	43	26	14	9	35	21	3	2

Section E: Digital transformation skills

Kane *et al.* (2015:4) maintain that digitally maturing organisations do not shy away from building employee skills to realize their digital strategy. Adding that these types of organisations are four times more likely to provide employees with the required skills than the laggards. Respondents were asked to indicate on a 5-point Likert whether the Bank's employees have sufficient skills and experience to execute the Bank's digital strategy. A summary of the responses is provided in Table 3.14 below.

Although the majority of the respondents (48%) agree that there are sufficient skills and experience in the Bank to successfully execute the Bank's digital strategy - as confirmed by the value of the mode (=2) and the percentage comparison – a significant number (28%) do not agree with the statement. This gives an indication of a significant amount of work the Bank still needs to do to ensure the 2020 success.

Respondents were then asked to select the skills they agree are lacking in the Bank. Knowing the business and being able to conceptualize how new digital technologies can impact current business processes or models was voted the number one skill that is currently lacking in the Bank with 71% agreeing and strongly agreeing to the lack of this skill. Closely following in second place with 70% is the ability to use digital technologies like social, mobile, analytics, cloud to execute one's job.

Lastly, the ability to manage or work in a distributed, digitally-smart teams in fast-paced environments came in third place with 67% as the skill lacking in the Bank.

Table 3.14: Perception regarding skills possessed by employee to execute the Bank's digital strategy

Section E: Digital transformation skills	Five-point Likert Scale										Statistical Analysis	
Indicate the extent to which you agree or disagree with the following statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Median	Mode
E1. The Bank's employees have sufficient skills and experience to execute the Bank's digital strategy	19	12	78	48	46	28	7	4	13	8	2	2

One would expect Table 3.14 and Table 3.15 to be closely correlated, i.e. the skills and experience required to execute the Bank's digital strategy (which the survey results in Table 3.14 show that the employees in the Bank possess) should logically mean that there is not much skills shortage in the Bank; this is not the case. Having said that, the contrasting results of the two tables could be due to a combination of factors. Firstly, the list in Table 3.15 is not exhaustive; it lists everyday skills which have been found to be essential in the execution of a digital strategy. There could be other skills which the respondents find to be lacking in the Bank which is not included in Table 3.15, hence the contrasting results.

Secondly, although the percentage of respondents agreeing and strongly agreeing with the skills shortage in the Bank is higher (69%), the percentage of respondents who indicated that they do not agree or strongly agree that there is a shortage of the listed skills in the Bank is large enough (22%). Therefore the possibility that there could be a shortage of the skills listed in Table 3.15 in the Bank could be genuine.

Table 3.15: Perception of digital transformation skills lacking in the Bank

Section E: Digital transformation skills	Five-point Likert Scale										Statistical Analysis	
The following skills or abilities are most lacking in the Bank.	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Median	Mode
E2. Knowing the business and being able to conceptualize how new digital technologies can impact current business processes/models	14	9	101	62	32	20	4	2	12	7	2	2
E3. Ability to manage or work in distributed, digitally-smart teams in fast paced environments; flexible	22	13	88	54	33	20	7	4	13	8	2	2
E4. Ability to use digital technologies like social, mobile, analytics, cloud to execute one’s job	19	12	94	58	28	17	6	4	16	10	2	2

Section F: Digital Trends

Over 100 financial services leaders comprising bankers, industry analysts, advisors, authors and Fintechs followers worldwide including Africa, Asia, North America, South and Central America, Europe, the Middle East and Australia were surveyed to establish their thoughts and predictions on the retail banking trends (Marous, 2016). Big Data, Fintechs, and Blockchain were all part of the list of trends.

To assess how the Bank is reacting to the digital trends, the researcher asked the following about digital trends, see Table 3.16 to Table 3.19 and Figure 3.8. Table 3.16 below is a representation of the responses received pertaining to how employees perceive the Bank to be dealing with digital trends.

Table 3.16: Perception regarding how the Bank deals with digital trends

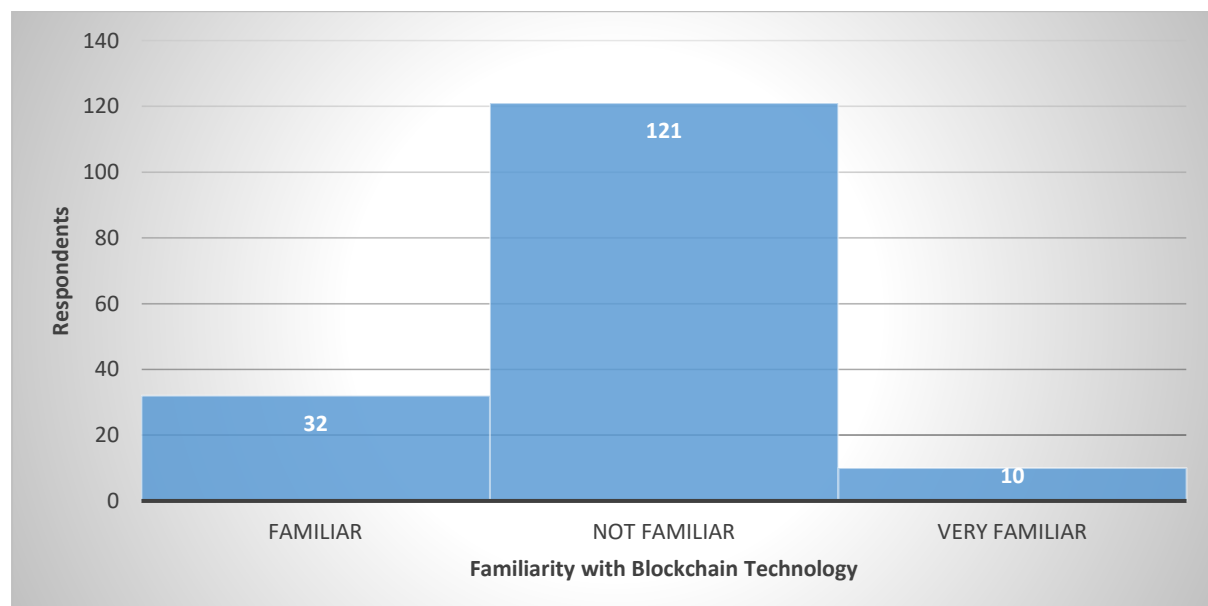
Section F: Digital Trends	Five-point Likert Scale										Statistical Analysis	
Please indicate the extent to which you agree or disagree with the below statements	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Median	Mode
F1. I am satisfied with the Bank's current reaction to digital trends	21	13	88	54	39	24	11	7	4	2	2	2
F2. I am confident in the Bank's readiness to respond to digital trends	25	15	87	53	38	23	8	5	5	3	2	2
F3. The Bank has a strategy on big data or Data analytics	22	13	71	44	11	7	1	1	58	36	2	2
F4. The Bank has experience with big data and Data-driven innovation	19	12	66	40	14	9	6	4	58	36	2	2

In observing the two measures of central tendency; median and mode, one can without a detailed analysis draw conclusion that employees are generally satisfied with the way the Bank is presently reacting to digital trends. A closer look at the responses shows, however, that 31% of the respondents do not find the Bank's reaction to digital trends satisfactory.

28% of the respondents do not have comfort in the Bank's readiness to respond to digital trends. Notice that a significant number of respondents (36%) 'Don't know' if the Bank has a strategy on big data or data analytics, or if the Bank has experience with big data and Data-driven innovation. This is a worrying factor considering the short time frame the Bank is required to transform its business model to align with what is currently happening in the market and to remain competitive. Major players in the banking environment, most notably Fintechs have started adopting Blockchain technology as a strategic driver to achieving market readiness of business models (Dapp, 2015:2).

As one of the top digital trends in the retail banking industry, respondents were asked to indicate familiarity with the technology, see results in Figure 3.8. 121 respondents out the total 163 (74%) indicated their unfamiliarity with Blockchain, versus the 20% that are familiar and the 6% that said they are very familiar. This is an obvious concern for the Bank. It clearly shows the low level of technological knowledge and trends and could be a significant risk to the success of the Bank of 2020.

Figure 3.8: The extent to which respondents are familiar with Blockchain technology



In 2014, Fintech companies raised approximately \$3 billion, more than triple what was initially invested globally in Fintechs in 2008 (Efma & Backbase, 2015:11). These Fintechs have spotted an opportunity to disrupt the retail banks due to their ability to do digital ten times better than retail banks can. Table 3.17 summarizes the responses pertaining to the perception of the manner in which the Bank deals with Fintech companies.

Table 3.17: Perception regarding the manner in which the Bank deals with Fintech companies

Section F: Digital Trends	Five-point Likert Scale										Statistical Analysis	
F6. The Bank deals with FinTech companies in the following manner	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Median	Mode
F6.1. We monitor and engage FinTech in order to respond competitively	11	7	55	34	5	3	2	1	90	55	5	5
F6.2. We buy the services of FinTech companies to improve our operations and services	11	7	47	29	7	4	3	2	95	58	5	5
F6.3. We set up venture funds to find FinTech companies	8	5	36	22	6	4	3	2	110	67	5	5
F6.4. We rebrand purchased FinTech services (white labelling)	8	5	32	20	9	6	2	1	112	69	5	5

Table 3.17 above gives an indication that the Bank is not dealing much with the Fintechs, or there are communication and knowledge sharing deficiencies. The median and mode values (5 for both of them) support this view. It appears that the majority of the employees (63%) do not know what the Bank is doing in reacting to pressures from Fintechs. It follows from Table 3.18 that a significant portion of respondents (43%) do not know what opportunities are related to the rise of Fintechs and how the Bank can leverage them.

Table 3.18: Perception of the opportunities related to the rise of Fintechs within the Bank

Section F: Digital Trends	Five-point Likert Scale										Statistical Analysis	
F7. The following are opportunities related to the rise of Fintechs within the Bank	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Median	Mode
F7.1. Leverage existing data and analytics	20	12	67	41	3	2	0	0	73	45	2	5
F7.2. Respond to competition faster	24	15	61	37	9	6	3	2	66	40	2	5
F7.3. Increase customer base and Improve retention of customers	27	17	61	37	4	2	4	2	67	41	2	5
F7.4. Increase customer base	31	19	60	37	4	2	3	2	65	40	2	5
F7.5. Decrease IT infrastructure costs	23	14	55	34	13	8	3	2	69	42	3	5
F7.6. Reduce headcount	19	12	45	28	19	12	2	1	78	48	3	5

A market mostly occupied by tech-smart customers requires the Bank to take advantage of the digital trends in order to capture it. There could be challenges however associated with taking advantage of digital trends. The respondents were asked to indicate the extent to which they agree or disagree with the barriers as listed in Table 3.19. The barrier with the highest number selections 'Lack of organisational agility' in which 44% of the respondents selected agree.

'Lack of management understanding' has the lowest percentage (35%) of respondents who agree with the statement, in fact, the number of respondents that disagree with the statement are 4% higher than those that agree. As a result of the 39% of respondents that believe lack of management understanding is not a barrier, the median and the mode (both equal to 3) are different to the ones observed from the rest of the statements which all equated to 2.

Table 3.19: Summary of barriers impeding the Bank from taking advantage of digital trends

Section F: Digital Trends	Five-point Likert Scale										Statistical Analysis	
F8. The barriers below are impeding the Bank from taking advantage of digital trends	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Median	Mode
F8.1. Too many competing priorities due lack of strategy	21	13	62	38	48	29	8	5	24	15	2	2
F8.2. Lack of organisational agility	20	12	71	44	48	29	4	2	20	12	2	2
F8.3. Lack of management understanding	13	8	57	35	64	39	10	6	19	12	3	3
F8.4. Lack of employee incentives	23	14	65	40	46	28	7	4	22	13	2	2

Section G: Leadership

A statement made George Colony discussed in Chapter 2 (see bivariate analysis) inspires an introspection from the Bank's leadership. Table 3.20 below provides a summary of the respondents' perception of the Bank's leadership.

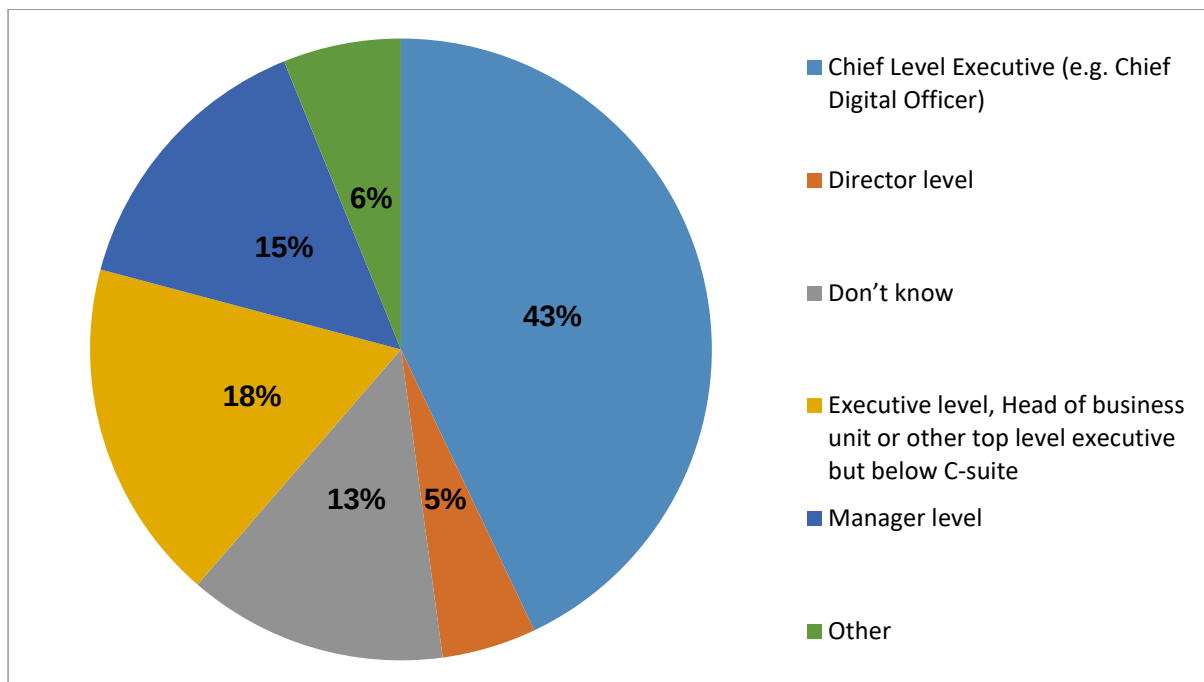
Table 3.20: Perception of the Bank's leadership

Section G: Leadership	Five-point Likert Scale										Statistical Analysis	
Please state the extent to which you agree or disagree with the below statements	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't know			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Median	Mode
G1. The Bank's leadership has sufficient skills and experience to lead the Bank's digital strategy	34	21	94	58	15	9	4	2	16	10	2	2
G2. I am confident in my leadership's understanding of relevant digital trends and emerging technologies	39	24	90	55	20	12	2	1	12	7	2	2

A look at Table 3.20 above would prompt a belief that the Bank's employees have confidence in their leadership. 79% agree and strongly agree that the Bank's leadership has sufficient skills and experience to lead the Bank's digital strategy while an aggregated 11% disagree and strongly disagree with the statement.

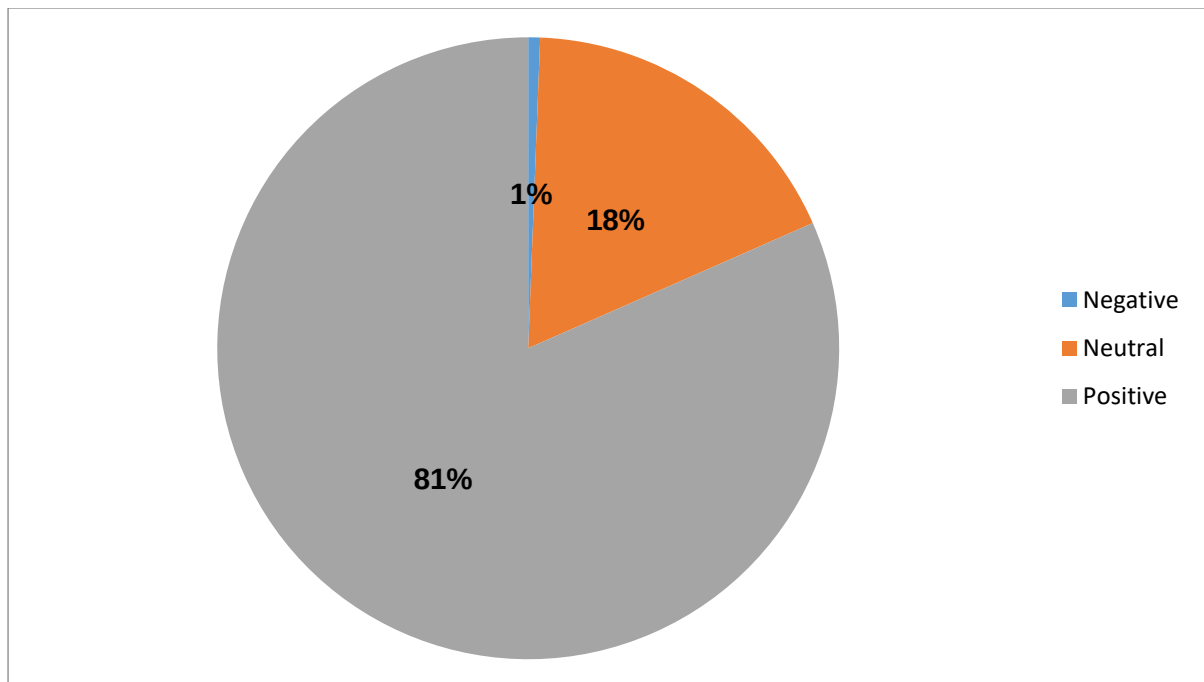
79% of respondents claim to be confident in the Bank's leadership regarding the understanding of relevant digital trends and emerging technologies with 13% indicating they disagree. As Figure 3.9 below suggests, a high number of respondents (43%) believe someone from the chief executive should drive the Bank's digital strategy. Director level has the lowest respondents with only 5%.

Figure 3.9: Responses regarding what the respondents believe is highest ranking official whose job is to manage the Bank's digital strategy



The respondents were asked to rate how they feel about digital transformation in the Bank by voting positive, negative, or neutral. 81% of the respondents expressed their positivity at digitalisation in the Bank, see Figure 3.10 below. 18% indicated their indifference at digitalisation in the Bank, with only 1% stating that they are sceptical about the initiative. Respondents were asked to briefly justify why they feel as they do regarding digitalisation in the Bank.

Figure 3.10: The respondents' perception of digitalisation in the Bank



A review of the literature, see Chapter 2, states that digital maturity level of any organisation is influenced by digital transformation core practices which include the following: digital strategies, digital technologies, digital transformation skills, digital trends, leadership, and culture. This study is interested in finding the relationship between digital maturity in the Bank, and the core digital transformation practices stated above. The analysis will be performed on two variables at a time, a type of analysis called bivariate analysis. This type of analysis is used in this study to uncover any relationships that may exist between any two chosen variables.

3.3.4. Bivariate analysis – a relationship between digital transformation core practices and digital maturity

Chapter 2 of this study established that the level of digital maturity in any organisation is primarily due to specific digital transformation core practices. To find out if there is indeed a relationship between the Bank's digital maturity and each of the influencing factors listed below, the study performed a type of analysis called bivariate analysis. Bivariate analysis refers to the analysis of bivariate data, i.e. data involving two variables (Glen, 2015). This section assessed the Bank's digital maturity level against the influencing constructs in the survey as follows:

- a) Relationship between digital maturity and a coherent digital strategy
- b) Relationship between digital maturity and the leadership
- c) Relationship between digital maturity and the strategy to digital trends
- d) Relationship between digital maturity and digital transformation skills
- e) Relationship between digital maturity and an approach to digital initiative
- f) Relationship between digital maturity and quick implementation of digital technologies
- g) Relationship between digital maturity and a customer-centric approach

The statistical analysis techniques were used to examine whether a change in one variable influences a variation in another variable, e.g. whether the Bank's leadership influence digital maturity, or not. The techniques employed in this section are:

- Contingency tables; and
- Spearman's rho for assessing correlation.

The two methods are only used in this section to analyse the relationships between digital maturity level and digital transformation core practices listed, not causality.

3.3.4.1. Contingency tables

The motive for selecting contingency tables as a statistical technique is due to their flexibility in analysing relationships. According to Bryman *et al.* (2016:322), contingency tables can be used to analyse the relationships between any pair of variables.

Table 3.21 shows a summary of responses received. Of the 163 respondents, 49 (30%) strongly agree that the Bank has a coherent strategy. Of the 49 that strongly agree, 2 (1%) indicated that the Bank is early on the maturity scale while 36 (22%) and 11(7%) believe the Bank is developing and maturing respectively.

Table 3.21: Summary of results (digital maturity vs core factors)

Digital Maturity Level		Digital transformation core factors						
		<i>Coherent strategy</i>	<i>Leadership</i>	<i>Digital trends</i>	<i>Digital skills</i>	<i>Digital initiatives</i>	<i>Digital technologies</i>	<i>Customer-centric</i>
Strongly agree	Early	2	0	1	2	2	1	2
	Developing	36	23	13	11	20	32	16
	Maturing	11	11	8	6	10	12	8
	Total	49	34	22	19	32	45	26
Agree	Early	8	9	2	5	7	6	4
	Developing	69	75	59	59	79	68	70
	Maturing	10	10	10	14	9	9	13
	Total	87	94	71	78	95	83	87
Disagree	Early	5	2	3	5	1	5	7
	Developing	11	12	8	39	12	14	28
	Maturing	0	1	0	2	0	0	1
	Total	16	15	11	46	13	19	36
Strongly disagree	Early	0	0	1	2	1	5	4
	Developing	1	4	0	5	0	6	5
	Maturing	1	0	0	0	1	1	0
	Total	2	4	1	7	2	12	9
Don't know	Early	3	7	11	4	7	1	1
	Developing	6	9	43	9	12	3	4
	Maturing	0	0	4	0	2	0	0
	Total	9	16	58	13	21	4	5
Grant Total		163	163	163	163	163	163	163

For simplicity, data from contingency tables (See Appendix B) were used in this section, with specific attention given to Chi-Square (hereafter denoted χ^2), contingency coefficient (hereafter denoted ϖ), significance level (α), and degree of freedom (DF). The data was then used to test independence through an approach to hypothesis testing. A brief description of H_0 , H_1 , χ^2 , and ϖ is provided in the table below.

Table 3.22: χ^2 and ϖ description

Methods of analysis	Description of the method
H_0	A null hypothesis which represents the current belief in a situation (Levine <i>et al.</i> , 2014:336).
H_1	An alternative hypothesis, the opposite of H_0 (Levine <i>et al.</i> , 2014:336).
χ^2	Used to test whether the variables under analysis are independent (have no relationship) or dependent (relationship). The χ^2 value can only be interpreted in relation to its associated level of significance, denoted as ρ (Bryman <i>et al.</i> , 2016:327).
ϖ	Method of estimating the extent of the association between two variables, i.e. to demonstrate the strength of the relationship. A ϖ takes on the values 0 to 1, i.e. $0 < \varpi < 1$, which means that ϖ is always less than 1. The larger the value of ϖ , the stronger the relationship between the variables. An association between two variables is stronger if ϖ is larger (Nargundkar, 2008:286).
α	The likelihood of committing a Type I error. A Type I error occurs if the null hypothesis, H_0 , is rejected when it should, in fact, have been accepted (Levine <i>et al.</i> , 2014:339).

Methods of analysis	Description of the method
<i>DF</i>	The total number of cells in the two-way table of the categorical variables that can vary, given the restrictions of the row and column marginal sums; consider a table with r rows and c columns, the DF is given by $(r-1)(c-1)$ (Runkel, 2016).
<i>Upper-tail critical value</i>	A point on the scale of the χ^2 statistic derived from the significance level α , beyond which the null hypothesis H_0 is rejected (Christensen, 2013).

The hypothesis tests conducted to assess relationships between digital maturity and constructs in the study are shown below.

a) A coherent digital strategy

H_0 : There is no statistically significant relationship between digital maturity level and a coherent strategy.

H_1 : There is a statistically significant relationship between digital maturity level and a coherent strategy.

$\chi^2 = 21,6785$ (See Table 3.23)

Upper-tail critical value = 15.507 at $\alpha = 0.05$ (α = significance level) and $DF = 8$ (DF = degree of freedom)

Reject the null hypothesis H_0 at α level of significance if the χ^2 statistic value calculated is greater than the χ^2 upper-tail critical value from a χ^2 distribution with $(r-1)(c-1)$ degrees of freedom.

Since the χ^2 statistic of 21.6785 is higher than the upper-tail critical value of 15.507 at the 5% significance level and 8 degrees of freedom, the null hypothesis H_0 is rejected. There is not enough evidence to conclude that there is no statistically significant relationship between digital maturity level and a coherent strategy.

Table 3.23: Relationship between digital maturity and the Bank's coherent strategy

Statistic	DF	Value	α
χ^2	8	21,6785	0,05
ϖ		0,3426	

Note that $\varpi = 0.3426$ in Table 3.23 above confirms the decision to reject the null hypothesis H_0 . Although there exists an association between digital maturity and a coherent strategy, the variables are not strongly associated since $\varpi < 0.5$.

b) Leadership

H_0 : There is no statistically significant relationship between digital maturity level and leadership.

H_1 : There is a statistically significant relationship between digital maturity level and leadership.

$$\chi^2 = 34,3452$$

Upper-tail critical value = 15.507 at $\alpha = 0.05$ (α = significance level) and $DF = 8$ (DF = degree of freedom)

The χ^2 statistic of 34,3452 leads to the rejection of the null hypothesis H_0 since it is higher than the upper-tail critical value of 15.507 at the 5% significance level and 8 degrees of freedom. There is not enough evidence to conclude that there is no statistically significant relationship between digital maturity level and leadership.

Table 3.24: Relationship between digital maturity and the Bank's leadership

Statistic	DF	Value	α
χ^2	8	34,3452	0.05
ϖ		0,4172	

The value of the $\varpi = 0.4172$ in Table 3.24 above confirms the decision to reject the null hypothesis H_0 . Although the association between digital maturity and leadership is also not strong, it is stronger than that of digital maturity and a coherent strategy discussed above.

c) Strategy to digital trends

H_0 : There is no statistically significant relationship between digital maturity level and digital trends.

H_1 : There is a statistically significant relationship between digital maturity level and digital trends.

$$\chi^2 = 32,4202$$

Upper-tail critical value = 15.507 at $\alpha = 0.05$ (α = significance level) and $DF = 8$ (DF = degree of freedom)

The null hypothesis H_0 rejected since χ^2 statistic of 32,4202 is greater than the upper-tail critical value of 15.507 at the 5% significance level and 8 degrees of freedom. There is not enough evidence to conclude that there is no statistically significant relationship between digital maturity level and digital trends.

Table 3.25: Relationship between Digital Maturity and the Bank's strategy to digital trends

Statistic	DF	Value	α
χ^2	8	32,4202	0.05
ϖ		0,4073	

The association between digital maturity and digital trends is not strong with $\varpi = 0.4073$.

d) Digital transformation skills

H_0 : There is no statistically significant relationship between digital maturity level and digital transformation skills.

H_1 : There is a statistically significant relationship between digital maturity level and digital transformation skills.

$$\chi^2 = 20,7394$$

Upper-tail critical value = 15.507 at $\alpha = 0.05$ (α = significance level) and $DF = 8$ (DF = degree of freedom)

The decision here is to reject H_0 . χ^2 statistic of 20,7394 is greater than the upper-tail critical value of 15.507 at the 5% significance level and 8 degrees of freedom. It follows that there is not enough evidence to conclude that there is no statistically significant relationship between digital maturity level and digital transformation skills.

Table 3.26: Relationship between Digital Maturity and digital transformation skills

Statistic	DF	Value	α
χ^2	8	20,7394	0.05
ϖ		0,336	

The $\varpi = 0.336$ above indicates the association between digital maturity level and digital transformation skills is not strong.

e) An approach to digital initiatives

H_0 : There is no statistically significant relationship between digital maturity level and the approach to digital initiatives.

H_1 : There is a statistically significant relationship between digital maturity level and the approach to digital initiatives.

$$\chi^2 = 31,1333$$

Upper-tail critical value = 15.507 at $\alpha = 0.05$ (α = significance level) and $DF = 8$ (DF = degree of freedom)

Reject H_0 since χ^2 statistic of 31,1333 is greater than the upper-tail critical value of 15.507 at the 5% significance level and 8 degrees of freedom. There is not enough evidence to conclude that there is no statistically significant relationship between digital maturity level and the approach to digital initiatives.

Table 3.27: Relationship between digital maturity and the Bank's approach to digital initiatives

Statistic	DF	Value	α
χ^2	8	31,1333	0.05
ϖ		0,4005	

The value of ϖ in the table above indicates the relationship between digital maturity and the approach to digital initiatives is not strong.

f) Implementation of digital technologies

H_0 : There is no statistically significant relationship between digital maturity level and implementation of digital technologies.

H_1 : There is a statistically significant relationship between digital maturity level and implementation of digital technologies.

$$\chi^2 = 30,3426$$

Upper-tail critical value = 15.507 at $\alpha = 0.05$ (α = significance level) and $DF = 8$ (DF = degree of freedom)

Reject H_0 since χ^2 statistic of 30,3426 is greater than the upper-tail critical value of 15.507 at the 5% significance level and 8 degrees of freedom. There is not enough evidence to support the alternative hypothesis H_1 .

Table 3.28: Relationship between digital maturity and quick implementation of digital technologies

Statistic	DF	Value	α
χ^2	8	30,3426	0.05
ϖ		0,3962	

The value of ϖ in the table above indicates the relationship between digital maturity and implementation of digital technologies is not strong.

g) A customer-centric approach

H_0 : There is statistically no significant relationship between digital maturity level and a customer-centric approach.

H_1 : There is a statistically significant relationship between digital maturity level and a customer-centric approach.

$$\chi^2 = 27,5978$$

Upper-tail critical value = 15.507 at $\alpha = 0.05$ (α = significance level) and $DF = 8$ (DF = degree of freedom)

Reject H_0 since χ^2 statistic of 27,5978 is greater than the upper-tail critical value of 15.507 at the 5% significance level and 8 degrees of freedom. There is not enough evidence to support the alternative hypothesis H_1 .

Table 3.29: Relationship between digital maturity and customer-centric approach

Statistic	DF	Value	α
χ^2	8	27,5978	0.05
ϖ		0,3805	

Just as it is the case with other contingency coefficients discussed above, $\varpi = 0.3805$ in the above table indicate the association between digital maturity and a customer-centric approach is not strong.

3.3.4.2. Spearman's rho

Spearman's rho denoted ρ is a nonparametric correlation measure for two ordinal variables (Bryman *et al.*, 2016:323). The value of the Spearman's rho computed is either negative or positive and ranges from -1 to +1 (Minitab, n.d.). While a positive correlation coefficient indicates a positive relationship between the two rank-ordered variables under study (i.e. when variable X increases, variable Y increases), a negative correlation coefficient shows a negative association of the variables (i.e. when variable X increases, variable Y decreases) (Statistics Solutions, n.d.).

The table below presents Spearman's correlation coefficients between pairs of variables, i.e. digital maturity against the listed variables in column 2. The table also shows that the probability of the coefficients being due to chance alone. The correlation coefficients in the table below are all negative, which indicates there is a negative association between digital maturity and the variables listed, this independence is tested.

$H_0: \rho = 0$ (there is statistically no significant correlation)

$H_1: \rho \neq 0$ (there is statistically significant correlation)

At a significant level of $\alpha = 0.05$, for 5 degrees of freedom (number of pairs in the sample minus 2), the correlation coefficient ρ must be 0 for it to be considered a statistically insignificant correlation. All correlation coefficients listed in Table 3.30 are not zero and therefore the null hypothesis $H_0: \rho = 0$ is rejected as there is no evidence to suggest that the alternative hypothesis $H_1: \rho \neq 0$ is false.

Table 3.30: Spearman Correlation Coefficients

Spearman Correlation Coefficients, N = 163 Prob > r under H0: Rho=0		
Variable	Rho	Probability
Customer-centric	-0,34171	<.0001
Digital technologies	-0,36601	<.0001
Coherent strategy	-0,27969	0,0003
Approach to digital initiatives implementation	-0,27661	0,0004
Digital transformation skills	-0,29690	0,0001
Digital trends	-0,31837	<.0001
Leadership	-0,37704	<.0001

This section focused on bivariate analysis; see *bivariate analysis* discussed above. This analysis aimed to establish the association between digital maturity level and digital transformation core practices. It follows from the analysis performed in this section that digital transformation core practices indeed influence digital maturity.

3.3.5. Multivariate data analysis

This section focuses on another form of data analysis called multivariate analysis. This technique of data analysis involves more than one variable (Camo, n.d.). Unlike univariate and bivariate analysis, multivariate analysis technique is primarily for studying complex set of real-life data which the other techniques are unable to handle (Glen, 2017).

Section 3.3.4 above looked at digital transformation core practices and assessed their respective associations with digital maturity; this section takes a holistic approach to establish what relationship exists between digital maturity level and the combined core factors. To achieve the above, a multivariate analysis technique for ordinal variables called ordinal logistic regression, or merely ordinal regression will be used. This type of regression technique is used to predict an ordinal response variable given a set of independent variables (Laerd Statistics, n.d.).

The table below shows the response profile which constitutes the level of digital maturity and the total number of responses associated with each level. It is evident from the table that the majority (76%) of the respondents believe that the Bank is developing regarding digital maturity.

Table 3.31: Response Profile:

Ordered Value	Digital Maturity Level	Total Frequency
1	1 (early)	18
2	2 (developing)	123
3	3 (maturing)	22

The table below illustrates the score test for the proportional odds assumption. The odds test using SAS's PROC LOGISTIC command examines whether all parameters remain identical throughout logistic regression model, this happens concurrently for all predictors (SAS, n.d.). Should it happen that the association between pairs of groups is not the same, resulting in more than one model, different models would be required to describe the relationships (Institute for Digital Research and Education, n.d.).

Table 3.32: Score Test for the Proportional Odds Assumption

Chi-Square	DF	Pr > ChiSq
6.0000	7	0.5398

The likelihood ratio in Table 3.33 below shows the $\chi^2 = 42.6928$ at 7 *DF*; this indicates the model does not contain any predictors' regression coefficient that is equal to zero (Institute for Digital Research and Education, n.d.). The Score and Wald χ^2 also show that there is no predictor coefficient equalling zero.

Table 3.33: Testing Global Null Hypothesis: $\rho=0$

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	42.6928	7	<.0001
Score	37.8132	7	<.0001
Wald	34.2678	7	<.0001

χ^2 , *DF*, and Pr > ChiSq refer to the Chi-Square test statistic, Degrees of Freedom (*DF*) and associated p-value (PR>ChiSq) correspond to a test that all predictor coefficients equal to zero simultaneously (Institute for Digital Research and Education, n.d.). A hypothesis test is carried out below.

$H_0: \rho = 0$ (all of the regression coefficients in the model are equal to zero)

$H_1: \rho \neq 0$ (all of the regression coefficients in the model are not equal to zero)

Notice that none of the estimates in Table 3.34 below is zero. For this reason, the null hypothesis is rejected, and the conclusion is that the digital transformation core practices tested are all predictors of digital maturity .i.e. digital maturity is a function of digital transformation core practices.

Table 3.34: Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	1	-6.8942	0.9526	52.3814	<.0001
Intercept	2	1	-1.8515	0.6621	7.8205	0.0052
Customer-centric		1	0.1105	0.2906	0.1446	0.7037
Digital technologies		1	0.5483	0.2481	4.8817	0.0271
Coherent strategy		1	0.0896	0.2366	0.1434	0.7049
Approach to digital initiatives implementation		1	0.2477	0.1782	1.9312	0.1646
Digital transformation skills		1	0.2417	0.2241	1.1625	0.2810
Digital trends		1	0.2198	0.1467	2.2441	0.1341
Leadership		1	0.3817	0.2385	2.5612	0.1095

The following section provides a summary of the chapter with specific reference to main findings of the empirical investigation.

3.4. Summary

Analysis of the empirical data received from the 163 respondents suggests the Bank is developing in terms of digital maturity. Of the 163 respondents, 123 have a perception that the Bank is developing. 14% of the respondents believe the Bank is digitally maturing, with the remaining the respondents (11%) saying the Bank's digital maturity level is still in its early stages.

79% of the respondents are satisfied that the Bank adopts digital technologies to serve its customers. Of importance perhaps is how the Bank uses those technologies, as using technologies to drive digital transformation instead of enabling the strategic objectives could result in siloed systems which as observed in chapter 2, are hard and costly to manage.

The use of a chi-square test verified the correlations between digital maturity and digital transformation core practices. Contingency coefficients observed revealed that a relationship exists between digital maturity and all selected core practices. According to the data analysed, the most significant contingency coefficient value was that of leadership $\varpi = 0.4172$, 42%. This means that leadership has the strongest relationship with digital maturity.

Of interest, however, is the interrelations among core practices and how they work together to influence digital maturity. None of the regression coefficients in the model equalled zero, which means that the identified core practices are all predictors of digital maturity.

CHAPTER 4 : CONCLUSIONS AND RECOMMENDATIONS

4.1. Introduction

This chapter aims to provide conclusions of the study by firstly outlining the main findings from empirical investigation followed by an overview of the contribution of the study to current literature. An evaluation of the study is then carried out with a specific focus on why and how the study was successful in meeting the set objectives outlined in chapter 1. Recommendations to the Bank are provided and lastly, this chapter closes by providing suggestions for future research.

4.2. Main findings from empirical investigation

This section of the study presents the main findings from the empirical investigation. The first part of the section provides a univariate analysis of the core practices, which includes a discussion on the primary findings of the individual core practices assessed. The second part of this section provides essential findings from the bivariate analysis carried out which looked at the distinct relationships that exist between the Bank's digital maturity level and core digital transformation practices. Lastly, findings from multivariate analysis are presented.

4.2.1. Findings from univariate analysis of the core practices

This section outlines the key findings from the assessment of the core digital transformation practices selected. The findings presented relate to the perception of where the Bank is in terms of digital maturity level and the extent to which the participants agree that the core practices are used in the Bank.

4.2.1.1. Findings 1: Digital maturity level

The findings of the investigation regarding the Bank's digital maturity reveal a general perception from participants that the Bank is developing in terms of digital maturity level (75% of the respondents). Figure 3.6 above demonstrates a summary of the responses from participants of the Bank's digital maturity level. This is a positive response from the respondents as it shows the belief in the Bank's objectives, i.e. digital maturity.

4.2.1.2.Findings 2: A coherent strategy

A summary of the responses in Table 3.11 clearly indicates the respondents' satisfaction with the Bank's digital transformation strategy. 83% of the respondents indicated that the Bank has a coherent digital strategy with 11% indicating their dissatisfaction with the Bank's digital strategy.

4.2.1.3.Findings 3: Leadership

A general perception regarding the Bank's leadership is that they possess sufficient skills and experience to lead the Bank's digital strategy. This can be inferred from the cumulative 79% of the responses in which respondents agreed and strongly agreed with the leadership's skills and experience. Observing table Table 3.21 above shows that 98 respondents from the 123 that believe the Bank is developing in terms of digital maturity are satisfied with the Bank's leadership.

4.2.1.4.Findings 4: Strategy to digital trends

This study found that the majority of the respondents (57%) believe the Bank has a strategy to digital trends such as big data analytics. In general, employees appear to be satisfied with the Bank's approach to digital trends.

Of concern, however, is a significant number of respondents with no knowledge of the Bank's strategy on big data analytics as a digital trend (36%). From this finding, conclusions could be reached that the Bank is not communicating its strategy to digital trends well enough. Otherwise, the percentage of respondents who claim to have no knowledge of the Bank's strategy to digital trends would not be this high.

4.2.1.5.Findings 5: Digital transformation skills

The study found that 60% of the respondents believe that the Bank's employees have sufficient skills and experience to execute the Bank's digital strategy. 72% of the respondents that agreed with the statement above indicated the Bank is developing in terms of digital maturity. 33% of the total respondents are not of the belief that the Bank's employees are equipped with sufficient skills to carry out the Bank's digital stagey. This is apparently worrying given the importance of digital transformation skills; a core factor to the successful implementation of digital transformation initiatives that are well documented in the literature.

4.2.1.6. Findings 6: Approach to digital initiatives

78% of the respondents that on a Likert scale, strongly agree and agree that the Bank has a distinct approach to how it implements digital transformation initiatives is indicative of the perception that the respondents hold of the Bank. A closer look at Table 3.21 reveals that of 78% that agree and strongly agree that the Bank has an approach to digital initiatives, about 78% have indicated the Bank is developing in terms of digital maturity. This is consistent with what is reported in the literature regarding the influences of digital transformation core practices.

4.2.1.7. Findings 7: Quick implementation of digital technologies

An analysis of the results Table 3.9 presents the finding that the Bank is quick in adopting digital technologies to serve its customers; this is evident from the 79% of all responses that seem to agree with the mentioned statement. This finding is not surprising as nearly all respondents (cumulative 96%) have indicated that they agree that the Bank see digital technologies as an opportunity. It follows that the Bank would want to quickly adopt those technologies they perceive as essential and enabling in serving its customers.

4.2.1.8. Findings 8: Customer-centric approach

It can be inferred from Table 3.8 in chapter 3 that there is a perception that the Bank's business model is mainly customer-centric with the majority of responses (53%) indicating on a Likert scale the belief that the Bank has a customer-centric, not product-centric or channel organisational structure. This finding is slightly startling, however, given that the bank presently onboard all its customer based on the specific product the customer requires. A cumulative 28% of respondents disagree and strongly disagree respectively that the bank has a customer-centric model.

4.2.2. Findings from the bivariate analysis

This part of the study presents findings from an examination of the relationships that exist between the selected digital transformation core practices and the digital maturity level.

4.2.2.1.Findings 1: Digital maturity and a coherent strategy

Analysis of Table 3.21 shows a pattern between digital maturity level and a coherent digital strategy. The high number of responses that indicated they agree and strongly agree that the Bank has a coherent strategy also believe the Bank is developing in terms of digital maturity level. A hypothesis test conducted to test the relationship between the two variables found that there is a statistically significant relationship between digital maturity level and a coherent strategy. Although the relationship exists between the two variables, the contingency coefficient computed revealed that the strength of the relationship is not strong.

4.2.2.2.Findings 2: Digital maturity and leadership

Observing Table 3.21 shows that the higher the number of respondents that are satisfied with the Bank's leadership, the higher the maturity level. 79% of the respondents perceive the Bank's leadership as possessing the right digital transformation skills and experience to execute the Bank's digital strategy. The computed χ^2 statistic of 34,3452 led to the rejection of the null hypothesis H_0 given that the χ^2 statistic value was higher than the upper-tail critical value of 15.507 at the 5% significance level and 8 degrees of freedom. This meant that there exists a relationship between digital maturity level and leadership.

4.2.2.3.Findings 3: Digital maturity and a strategy to digital trends

This study conducted a hypothesis test to establish if the digital maturity level is in anyway influenced by a strategy to digital trends, such as the big data analytics. The null hypothesis was rejected due to lack of evidence that supported the hypothesis. Analysis of the contingency coefficient of 0.4073 supports the finding that there exists a relationship between the two variables.

4.2.2.4.Findings 4: Digital maturity and digital transformation skills

The study found that out of the 163 respondents, 97 agree that the Bank has equipped its staff with digital transformation skills. Of the 97 respondents, 70 believe the Bank is developing in terms of digital maturity. To better understand the probable relationship between digital maturity and digital transformation skills, the statistical technique was used to examine the relationship. The computed chi-square value and the contingency coefficient revealed that there is indeed a relationship that exists between the two variables, although not strong given the contingency coefficient is less than 50%.

4.2.2.5.Findings 5: Digital maturity and an approach to digital initiatives

Table 3.21 in chapter 3 shows that 78% of the respondents agree that the Bank has a crafted approach to implementing digital initiatives. Of the 127 participants that expressed their agreement, 78% claim the Bank is developing in terms of digital maturity level, with 15% citing that the Bank has reached the maturing level on the digital maturity scale.

To statistically test the relationship between the two variables under study, a hypothesis test was carried out. The null hypothesis H_0 was rejected, and the conclusion reached that there is a statistically significant relationship between digital maturity level and the approach to digital initiatives at the 5% significance level.

4.2.2.6.Findings 6: Digital maturity and a quick implementation of digital technologies

Table 3.21 in chapter 3 shows the respondents' belief that the Bank is quick to adopt digital technologies to serve its customers. The result of the hypothesis test showed that there is a statistically significant relationship between digital maturity level and implementation of digital technologies. The computed contingency coefficient ($\varpi = 0,3962$) suggest that the relationship is not strong between the two variables.

4.2.2.7. Findings 7: Digital maturity and a customer-centric approach

The Bank is currently transforming its business model from product-centric to customer-centric. To establish if this move would influence its digital maturity, Table 3.21 is observed. 69% of the total respondents believe the Bank is already customer-centric. Of interest, however, is if there exists a relationship between the two variables. A hypothesis test was conducted to establish the relationship. This test confirmed that customer-centric nature of business model has an influence on digital maturity level. The contingency coefficient ($\varpi = 0.3805$) further confirms the relationship that exists between digital maturity level and a customer-centric approach. This finding is not unexpected as according to the respondents, the Bank is developing in terms of maturity level.

This section of the chapter provided findings from analysis of bivariate variables where a relationship between digital maturity level and the identified core digital transformation practices was investigated, and findings were presented. The next section takes a different approach and investigates the relationship between digital maturity level and the identified core practices simultaneously.

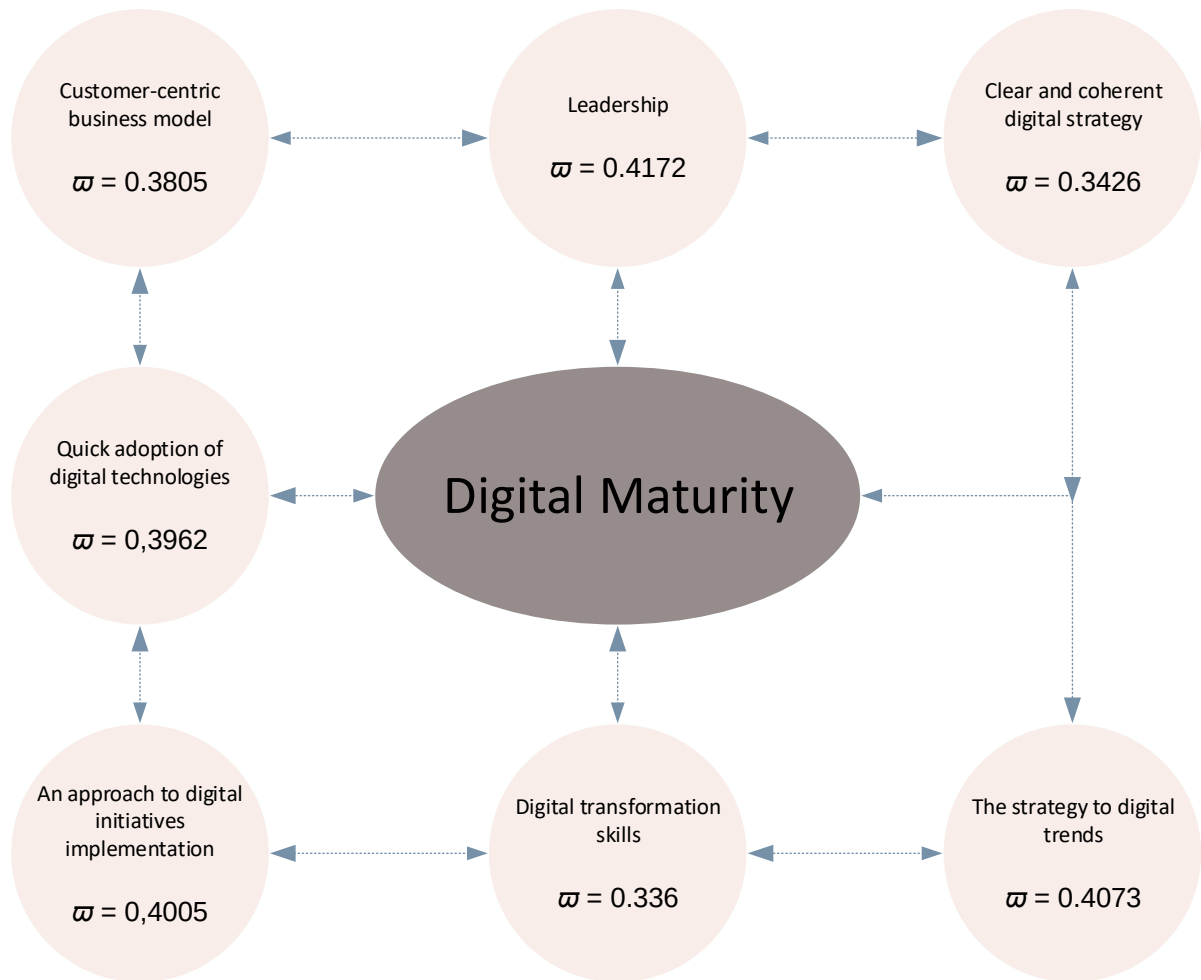
4.2.3. Findings from the multivariate analysis

This section reports on findings from the ordinal logistic regression which took a holistic approach to establish what relationship exists between digital maturity level and the combined core factors. All estimates in Table 3.34 are non-zero. This led to the rejection of the null hypothesis $H_0: \rho = 0$ and therefore a conclusion reached is that the digital transformation core practices are all predictors of digital maturity .i.e. digital maturity is a function of digital transformation core practices.

4.2.4. A model of main findings

Figure 4.1 illustrates a summary of the findings. The contingency coefficient ϖ provides a confirmation of the influence of core practices on digital maturity. The strength of correlations does vary with some variables more closely correlated. This model shows leadership is the most closely correlated with the core practices with the highest contingency coefficient value of 42%.

Figure 4.1: Summary of findings



4.3. Contribution of the study

This section of the study is divided into two subsections; the first subsection discusses the new knowledge that has been added to the field as a result of this study, while the second subsection outlines the theoretical implications of this study.

4.3.1. New knowledge added

The current literature on digital transformation does not explicitly stipulate the importance of the holistic approach, i.e. the combination of all digital transformation core practices and their influence on digital maturity. A systems thinking approach is not emphasised enough; a system is a set of interrelated components working together to achieve a collective whole (Bhise, 2017:1-550).

The study found that the core practices (predictor variables) influence the level of digital maturity (the response variable).

4.3.2. Theoretical implications

Challenges facing banks are identified in the review of literature. These challenges brought about by the latest technology advancements and growing customer expectations have put retail banks under massive pressure to modernize their IT and digitally innovate. Although there challenges, benefits are clearly documented in the current literature. To reap the identified benefits, however, the review of literature list the core practices that the Bank is to follow in its digital transformation journey.

Current literature points out that digital maturity level is influenced by specific core practices. This study selected and reviewed core practices as found in the literature. Having assessed relationships, see bivariate and multivariate analysis findings in the latter section, the findings of the study are in accordance with the current theory.

4.4. Evaluation of the study

This section of the chapter evaluates the success, if any, that the study had in meeting the objectives.

The primary objective of the study was to assess the influence of digital transformation core practices on digital maturity within the Bank with a view to establishing:

- the meaning of digital transformation;
- the challenges found in digitally transforming the Bank;
- if any relationship exists between digital maturity and core practices; and
- if a combination of core factors influence the Bank's digital maturity.

An extensive review of the literature revealed the meaning of digital transformation. The study also uncovered the challenges that the Bank should anticipate in moving towards digital maturity; therefore the objectives of the study was attained.

Contingency tables and Spearman's rho for assessing correlations were used to evaluate any variations in the response variable and the independent variables. The relationship was found to exist, and therefore the primary objective of the study has been attained.

Furthermore, the study aimed to establish if digital maturity was dependent on the selected core practices. An ordinal logistic regression was conducted, and the relationship was found to exist. This also meant the study was successful in meeting its objectives.

4.5. Recommendations

Digital technologies coupled with pressure from technology-smart customers are disrupting the banking industry. Although well controlled, the South African banking industry has also been affected by the disruptions and must go through the digital transformation journey to digitally mature. The Bank is undergoing digital transformation process with a view to becoming a digitally mature bank with a customer-centric business model. Based on the literature and the empirical findings, the study recommends the following to the Bank:

4.5.1. Recommendation 1 - Digital maturity

The Bank has invested heavily in the transformation programme with a vision of becoming a digitally mature bank by 2020. Digital maturity will be an end state of the process of digital transformation. To get to that stage, the Bank needs to ensure that the best practices of digital transformation are implemented successfully.

11% of the total respondents indicated that the Bank is in early stages of digital maturity. This is a perception that the Bank must address. The study recommends that the Bank further validates this finding by getting an external company to conduct a survey with a larger sample size consisting of executives, cluster heads, business heads, managers, and analysts.

The study proposes a qualitative approach with specific objectives of obtaining the view from the participants in terms of the Bank's maturity level. The participants should be asked to justify their rating, i.e. early, developing, maturing, and citing possible ways for the Bank to mature digitally.

4.5.2. Recommendation 2 - A coherent strategy

The study found that 83% of respondents believe the Bank has a coherent digital strategy. Although this percentage is significantly high, the Bank must seek to understand reasons behind the remaining 11% that indicated they do not agree and the 6% that indicated they do not know. A digitally maturing bank is characterised by a clear digital strategy that is successfully communicated to every employee (Kane, *et al.*, 2015:6). Broeders & Khanna (2015:5) suggest putting in place a vision that is both challenging and coherent. This vision should include the steps that assign a board-level digital owner and create a digital profit and loss statement.

4.5.3. Recommendation 3 - Leadership

Leadership had the highest correlation with digital maturity among all core practices; 79% of respondents are satisfied that the Bank's leadership has adequate skills and knowledge to lead Bank's digital strategy. Being able to engage staff actively and learn from them is expected of leadership (Kane, *et al.*, 2015:13). It is thus recommended that the Bank uncover the development areas of its leadership. The reason for this recommendation is to address the concerns of the 11% of the sample that are not satisfied with the Bank's leadership and the 10% that do not know if the Bank's leadership has the abilities to lead the digital journey.

Caudron & van Peteghem (2016:148) argue that a digital transformation success remain nil if there is no digital leadership and thus the study recommends a 7x7 digital leadership assessment devised by Caudron & van Peteghem (2016:126) to establish how digitally capable the Bank's leadership is.

4.5.4. Recommendation 4 - Strategy to digital trends

31% of the respondents find the Bank's reaction to digital trends unsatisfactory. The recommendation is that the Bank partner with the technology companies like the Fintechs; this due to their speciality in areas such as payments, lending, and access to capital markets (Cuesta, *et al.*, 2015:2). Added to that, the Fintechs are able to do digital ten times better than the Bank can (Efma & Backbase, 2015:11).

4.5.5. Recommendation 5 - Digital transformation skills

According to data from respondents, knowledge of the business and being able to hypothesise in what way digital technologies can impact current business processes or models is currently the Bank's biggest problem. A recommendation to the Bank is that the problem of the skills shortage is given a high priority. The Bank should not tolerate skills gaps if digital maturity is an objective. The gaps should be identified, and employees skilled accordingly.

In addition to skilling employees, Broeders & Khanna (2015:5) propose that instead of recruiting employees based on their banking experience, banks should look to employ people with skills required for digital transformation. The reason for this is that the best people to help the company succeed in a digitalisation initiative may not have banking experience, and therefore the Bank should consider employing from adjacent industries possessing skilled resources.

4.5.6. Recommendation 6 - An approach to implementation of digital initiatives

The perception is that the Bank has a top-down approach to implementing digital initiatives. This means that digital initiatives are driven by the Bank's leadership, and therefore recommendation 3 above comes into effect.

4.5.7. Recommendation 7 - A quick implementation of digital technologies

The study recommends that the Bank quickly adopts digital technologies. Digital technologies like mobility, cloud, and big data analytics, are disruptive to the Bank and a slow response to the disruption would likely result in 1) a loss of market share and 2) non-compliance to regulations. The Bank has been slow in implementing digital technologies to enhance regulatory compliance and as a result, was found to be non-compliant by the South African Reserve Bank with respect to identification and verification of clients, as a consequence, R25 million penalty was instituted against the Bank.

The second recommendation is to partner with third-party companies that possess the relevant infrastructure and clients' information required in terms of FICA. A partnership with the Department of Home Affairs, for instance, would benefit the Bank immensely as they are the 'custodian, protector and verifier of the identity and status of citizens and other people resident in South Africa' (Department of Home Affairs, n.d.). Through the use of a biometric system, the Bank will be able to perform identification and verification of a client.

4.5.8. Recommendation 8 - A customer-centric approach

The Bank's vision for the year 2020 is to become a digitally enabled bank with a customer-centric business model. It is thus recommended that the Bank continually improves its customer experience by learning more about its customers in order to provide tailored products and services, which could increase customer satisfaction. All banking channels including online and branch are to be digitally transformed as clients expect excellent experience in all banking channels (Broeders & Khanna, 2015:5).

Chahal (2016:20) stresses that an essential aspect of any transformation venture is continually assessing if it serves the customer needs and therefore technology changes must be aligned with that of the customer. If there is skill shortage regarding customer engagement, the expertise should be acquired from providers outside of the financial services sector (Intel and Red Hat, 2016).

4.5.9. Recommendation 9 - The age

The study found that 27% of the respondents are millennials. Considering the sizeable technology-smart market that the Bank is targeting, there is a good chance that the average age of the Bank's employees is higher than that of the target market. It is for this reason that the study recommends the Bank considers employing a third party company to conduct an age test on staff and the market. For the staff, the test should start with the leadership in the Bank and filter down to operational level employees.

If the average age of the Bank's leadership is larger than that of the market, the Bank will typically fail to react to the way the market operates (Caudron & van Peteghem, 2016). The study proposes that the Bank aligns its average age with that of the market to position itself in a position to quickly respond to all changes in the market.

4.5.10. Recommendation 10 - The legacy systems

The Bank's legacy systems are hampering its vision of becoming a digitally mature bank. There currently is no single system in the Bank with an overall view of a client's information; including products held. This results in negative client experience, impeding the Bank from becoming a digitally mature bank with the client-centric business model. Different business units in the Bank have systems configured to accept a different set of information and documents from a client, e.g. vehicle finance business unit currently accepts driver's licence as proof of ID while the personal loans business unit only accepts green barcoded ID book/smart ID.

The study, therefore, recommends that the Bank builds a system with a single view of a client. Furthermore, the study proposes that processes be streamlined to enhance the positive client experience.

The Bank must decide on a set of documents to request from the client, and business units must follow the standardised guide, e.g. make smart ID and green barcoded ID the standard legal form of identification.

4.6. Suggestions for future research

This section outlines suggestions for future research.

Digital transformation is seen as the potential solution to the challenges faced by banks. The benefits are well documented in the current literature. What is unclear however in literature is how to go about digitally transforming. There are core practices documented in the literature that characterize a digitally maturing organisation, there is not sufficient evidence, however, to show how those organisations went about successfully implementing digital transformation initiatives.

An area of concern is the lack of systems thinking approach discussed in section 4.3.1 above. Banks could make a mistake of focusing on one best practice and failing to implement the rest or implement all best practices without a holistic view; leading to siloed approaches that are currently impeding banks from realizing a competitive edge. Future research should therefore specifically focus on how the core practices can work together as a system, to realize the real potential of digital transformation.

A limitation of this study is that the Bank's customers were not consulted on their experience of digital banking with the Bank. Therefore, future research should look to get a perspective from clients in order to identify the Bank's position from a digital maturity point of view and to strategically implement ideas that the clients disseminate.

LIST OF REFERENCES

- Accenture. 2014. *Digital Transformation: Re-imagine from the outside-in*. s.l.: Accenture.
- Andrus, G., Kejriwal, S. & Wadhvani, R. 2016. *Digital transformation in financial services: The need to rewire organizational DNA*. s.l.: Deloitte University Press.
- Anesthesiol, K. 2013. *The prevention and handling of the missing data*. [Online] Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3668100/> [Accessed 03 11 2017].
- Bastid, V., Hawes, A. & Chitra, T. 2016. *Digital transformation: The challenges and opportunities facing banks*. s.l.: Oracle.
- Bharathi, R., Elamathy, P. & Rajesh, A. 2016. *Banking on Digital Transformation - Surfing the Wave*, Cologne: SQS India BFSI Ltd.
- Bhise, V. 2017. *Automotive product development*. CRC Press, pp.1-550.
- Birkinshaw, J., Robbins, P. & Ryan, J. 2016. Getting to Grips with Digital Transformation. *London Business School Review*, 27(1):40-43.
- Brand South Africa. 2017. *South Africa's financial sector*. [Online] Available at: <https://www.brandsouthafrica.com/governance/south-africas-financial-sector> [Accessed 01 12 2017].
- Broeders, H. & Khanna, S. 2015. *Strategic choices for banks in the digital age*. s.l.: McKinsey & Company.
- Bryman, A., Bell, E., Hirschsohn, P., dos Santos, A., du Toit, J., Masenge, A., van Aardt, I. & Wagner, C. 2016. *Research Methodology: Business and Management Contexts*. Cape Town: Oxford University Press Southern Africa.
- Businesstech. 2017. *Best and worst banks in South Africa for digital experience*. [Online] Available at: <https://businesstech.co.za/news/banking/176639/best-and-worst-banks-in-south-africa-for-digital-experience/> [Accessed 10 11 2017].

Businesstech. 2017. *Four areas SA banks really need to focus on in 2017*.

[Online]

Available at: <https://businesstech.co.za/news/banking/164349/four-areas-sa-banks-really-need-to-focus-on-in-2017/>

[Accessed 07 12 2017].

Businesstech. 2017. *This is South Africa's safest bank*. [Online]

Available at: <https://businesstech.co.za/news/banking/199006/this-is-south-africas-safest-bank/>

[Accessed 07 12 2017].

Camarate , J. & Brinckmann, S. 2017. *The future of banking: A South African perspective*. [Online]

Available at: <https://www.pwc.co.za/en/publications/the-future-of-banking.html>

[Accessed 01 12 2017].

Camo. n.d. *Multivariate Data Analysis*. [Online]

Available at: http://www.camo.com/multivariate_analysis.html

[Accessed 11 11 2017].

Caudron, J. & van Peteghem, D. 2016. *Digital Transformation: A model to master digital disruption*. s.l.: Duval Union Consulting.

Chaffey, D. & Carson, J. 2016. *An introduction to digital transformation*. s.l.: Smart Insights.

Chahal, M. 2016. *The True Meaning of Digital Transformation*. s.l.: Marketing Week.

Christensen, J. 2013. *What is a 'critical value' in statistics?*. [Online]

Available at: <https://math.stackexchange.com/questions/281940/what-is-a-critical-value-in-statistics>

[Accessed 11 11 2017].

Cisco. 2017. *Digital Transformation for the Retail Banking Industry: Defining and Delivering Value for Your Next-Generation Business*. s.l.: Cisco.

Creswell, J. 2014. *Research design: Qualitative, quantitative, and mixed methods approaches*. 4 ed. London: SAGE Publications.

Cuesta, C., Ruesta, M., Tuesta, D. & Urbiola, P. 2015. *The digital transformation of the banking industry*. s.l.: BBVA Research.

Dapp, T. 2015. *Fintech reloaded – Traditional banks as digital ecosystems*. s.l.: Deutsche Bank.

Dapp, T. 2015. *Operation “Digital transformation of the financial sector” (Fintech #1)*. s.l.: Deutsche Bank.

Demirkan, H., Spohrer, J. & Welser, J. 2016. *Digital Innovation and Strategic Transformation*. IT Professional. 18(6):14-18.

Department of Home Affairs. n.d. *About Us*. [Online]
Available at: <http://www.dha.gov.za/index.php/about-us>
[Accessed 07 12 2017].

Desmares, P., Giudici, V. & Vlaar, R. 2012. *Digital Transformation in 10 Building Blocks*. s.l.: EFMA and McKinsey & Company.

Dietz, M., Moon, J. & Radnai, M. 2016. *Fintechs can help incumbents. not just disrupt them*. [Online]
Available at: <https://www.mckinsey.com/industries/financial-services/our-insights/fintechs-can-help-incumbents-not-just-disrupt-them>
[Accessed 07 12 2017].

Dumitru, O. 2016. Big Questions on Big Data. *Revista de Cercetare si Interventie Sociala*. 55:112-126.

Dutton, S. 2015. *3 Ways Digital Transformation Can Protect Your Business*. [Online]
Available at: <http://www.digitalistmag.com/digital-economy/2016/01/07/3-ways-digital-transformation-protect-businesses-amid-economic-instability-03926993>
[Accessed 19 11 2017].

Efma & Backbase. 2015. *Omni-channel banking: The digital transformation roadmap*. s.l.: Backbase B.V.

Elo, S., Kaariainen, M., Kanste, O., Polkki, T., Utriainen, K. and Kyngas, H. 2014. Qualitative Content Analysis: A Focus on Trustworthiness. *SAGE Open*, 4(1).

- Glen, S. 2014. *Cronbach's Alpha: Simple Definition*. [Online]
Available at: <http://www.statisticshowto.com/cronbachs-alpha-spss/>.
[Accessed 03 12 2017].
- Glen, S. 2015. *What is Bivariate Data?*. [Online]
Available at: <http://www.statisticshowto.com/bivariate-analysis/>.
[Accessed 11 11 2017].
- Glen, S. 2017. *Multivariate Analysis*. [Online]
Available at: <http://www.statisticshowto.com/probability-and-statistics/multivariate-analysis/>.
[Accessed 23 11 2017].
- Grosskopf, J. & Natsas, C. 2017. *Major Banks analysis*. [Online] Available at:
<https://www.pwc.co.za/en/publications/major-banks-analysis.html>.
[Accessed 11 11 2017]
- Harito, P. 2017. *How South Africa's Banks Lead in Digital Transformation & How CRM Contributes*. [Online]
Available at: <https://www.financialtechnologyafrica.com/2017/03/03/how-south-africas-banks-lead-in-digital-transformation-how-crm-contributes/>
[Accessed 07 12 2017].
- Heale, R. & Twycross, A. 2015. *Validity and reliability in quantitative research*. [Online] Available at:
https://www.researchgate.net/publication/280840011_VValidity_and_reliability_in_quantitative_research.
[Accessed 11 11 2017]
- Hess, T., Matt, C., Benlian, A. & Wiesböck, F. 2016. Options for Formulating a Digital Transformation Strategy. *MIS Quarterly Executive*. 15(2):103-119.
- Hoberg, P., Krcmar, H. & Welz, B. 2015. *Skills for Digital Transformation*, Garching: Technical University of Munich.
- Hochster, M. 2014. *What is more accurate, the median or mean*. [Online]
Available at: <https://www.quora.com/What-is-more-accurate-the-median-or-mean>
[Accessed 14 11 2017].

IBM. 2011. *Digital transformation: Creating new business models where digital meets physical*. s.l.: IBM Corporation.

IBM. n.d. *Digital transformation: The power of mobile and cloud can be your springboard to growth and change*. [Online]

Available at: <https://www.ibm.com/mobilefirst/nz/en/digital-transformation.html>
[Accessed 01 12 2017].

Institute for Digital Research and Education. n.d. *ORDERED LOGISTIC REGRESSION*. [Online]

Available at: <https://stats.idre.ucla.edu/stata/dae/ordered-logistic-regression/>
[Accessed 02 12 2017].

Intel and Red Hat. 2016. *Digital Innovation in Banks: IT Infrastructure Modernization Accelerates Progress*. s.l.: Intel and Red Hat.

Ismail, A. 2017. *Why SA's Capitec is Best Bank in the World*. [Online]

Available at: <https://www.fin24.com/Companies/Financial-Services/why-sas-capitec-is-best-bank-in-the-world-20170627-2>.

[Accessed 12 11 2017].

Jaubert, M., Ullrich, M., Dela, R., Marcu, S. & Malbate, J. 2014. *Going Digital: The Banking Transformation Road Map*. s.l.: A.T. Kearney Inc.

Joseph, J. 2016. *How to Treat Missing Values in Your Data*. [Online]

Available at: <https://www.datasciencecentral.com/profiles/blogs/how-to-treat-missing-values-in-your-data-1>

[Accessed 15 11 2017].

Kane, G., Palmer, D., Phillips, A., Kiron, D. & Buckley, N. 2015. *Strategy. not Technology, Drives Digital Transformation*. s.l.: MIT Sloan Management Review and Delloite University Press.

Laerd Statistics. n.d. *Measures of Central Tendency*. [Online]

Available at: <https://statistics.laerd.com/statistical-guides/measures-central-tendency-mean-mode-median.php>

[Accessed 09 11 2017].

- Laerd Statistics. n.d. *Ordinal Regression using SPSS Statistics*. [Online]
Available at: <https://statistics.laerd.com/spss-tutorials/ordinal-regression-using-spss-statistics.php>
[Accessed 16 11 2017].
- Lamberti, L. 2013. Customer centricity: the construct and the operational antecedents. *Journal of Strategic Marketing*, 21(7):588-612.
- Latimore, D. 2017. *Banking on a Digital Future: A Guide to Digital Transformation in Banking*. s.l.: Kofax Inc.
- Lee, P. 2015. *Getting to grips with Blockchain*. s.l.: Euromoney.
- Lefifi, T. 2017. *Fintech Companies Disrupt Traditional Banks*. [Online] Available at: <http://businessmediamags.co.za/fintech-companies-disrupt-traditional-banks-2/>.
[Accessed 11 11 2017]
- Levine, D., Stephan, D. & Szabat, K. 2014. *Statistics for Managers Using Microsoft Excel*. 7th ed. Harlow: Pearson.
- Liew, N., Bellens, J. & Webster, I. 2016. *Managing change and risk in the age of digital transformation: The digital journey of financial institutions in ASEAN*. s.l.: EYGM Limited.
- Lumbreras, M. 2017. *How is Mobile Optimization leading Digital Transformation?*. [Online]
Available at: <http://www.opidigitalgroup.com/2017/08/08/digital-transformation-mobile-optimization-reshaping-industries/>
[Accessed 18 11 2017].
- Mannion, J. 2016. *How to select a sample size*. [Online]
Available at: <https://whitecloud-solutions.com/blog/justify-sample-size/>
[Accessed 01 12 2017].

- Manyika, J., Dobbs, R., Chui, M., Bughin, J. & Bisson, P. 2013. *Disruptive technologies: Advances that will transform life, business, and the global economy*. [Online]
Available at: <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/disruptive-technologies>.
[Accessed 13 10 2017].
- Marcum, D. 2014. The Digital Transformation of Information, Education, and Scholarship. *International Journal of Humanities and Arts Computing*, Volume 8:1-11.
- Marous, J. 2016. *Top 10 Retail Banking Trends and Predictions for 2017*. [Online]
Available at: <https://thefinancialbrand.com/62858/2017-top-banking-trends-predictions-forecast-digital-fintech-data-api/>
[Accessed 01 12 2017].
- Matt, C., Hess, T. & Benlian, A. 2015. Digital Transformation Strategies. *Business & Information Systems Engineering*, 57(5):339-343.
- McDonald, M., McManus, R. & Henneborn, L. 2014. *Digital Double-Down: How far will Leaders Leap Ahead*. s.l.: Accenture.
- Mehrotra, M. 2014. *Digital Transaction Banking: Opportunities & Challenges*. s.l.: Deloitte Consulting Pte Ltd.
- Microsoft. 2016. *Digital Transformation: The Age of Innocence, Inertia or Innovation?*. s.l.: Microsoft.
- Minitab. n.d. *Interpret the key results for Correlation*. [Online]
Available at: <http://support.minitab.com/en-us/minitab-express/1/help-and-how-to/modeling-statistics/regression/how-to/correlation/interpret-the-results/>
[Accessed 12 11 2017].
- Morrison, A. 2016. *Blockchains defined*. [Online]
Available at: <http://usblogs.pwc.com/emerging-technology/blockchains-defined/>
[Accessed 23 09 2017].
- Nargundkar, R. 2008. *Marketing Research*. 3rd ed. New Delhi: Tata McGraw-Hill.

Nieminen, J. 2014. Understanding & Managing Digital Transformation – A case study of a large Nordic retailer (Master's). Aalto University.

OECD. 2017. Key Issues for Digital Transformation in the G20. Berlin: Organisation for Economic Co-operation and Development.

Patano, S. & Rizzotto, F. 2016. *The Banking Sector in the Age of Digital Transformation*. s.l.: International Data Corporation.

Pettey, C. 2016. *CEOs Keep Digital Business Transformation on Track*. [Online] Available at: <https://www.gartner.com/smarterwithgartner/ceos-keep-digital-business-transformation-on-track/> [Accessed 18 11 2017].

Pritchard, J. 2017. *What Can a Retail Bank Do For You?*. [Online] Available at: <https://www.thebalance.com/what-is-a-retail-bank-315209>. [Accessed 11 11 2017]

PwC. 2014. *Retail banking industry entering a dynamic era of change*. [Online] Available at: <https://www.fanews.co.za/article/banking/35/general/1223/retail-banking-industry-entering-a-dynamic-era-of-change/15840> [Accessed 23 11 2017].

PwC. 2017. *SA's banks are finding new ways to stay relevant in the market*. [Online] Available at: <https://www.fanews.co.za/article/banking/35> [Accessed 23 11 2017].

Quick, J. and Hall, S. 2015. Part three: The quantitative approach. *Journal of Perioperative Practice*, 25(10):192-196.

Rashid, B. 2017. *Digital Transformation and Innovation in Today's Business World*. [Online] Available at: <https://www.forbes.com/sites/brianrashid/2017/06/13/digital-transformation-and-innovation-in-todays-business-world/#3be7c5524905>. [Accessed 13 11 2017]

Research Methodology. n.d. *Simple Random Sampling*. [Online]
Available at: <https://research-methodology.net/sampling-in-primary-data-collection/random-sampling/>
[Accessed 04 12 2017].

Rindfleisch, A., Malter, A., Ganesan, S. and Moorman, C. 2008. Cross-Sectional Versus Longitudinal Survey Research: Concepts, Findings, and Guidelines. *Journal of Marketing Research*, 45(3):261-279.

Roedder, N., Dauer, D., Laubis, K., Karaenke, P. & Weinhardt, C. 2016. The digital transformation and smart data analytics: An overview of enabling developments and application areas. *2016 IEEE International Conference on big data (Big Data)*. 2795-2800.

Runkel, P. 2016. *What Are Degrees of Freedom in Statistics*. [Online]
Available at: <http://blog.minitab.com/blog/statistics-and-quality-data-analysis/what-are-degrees-of-freedom-in-statistics>
[Accessed 13 11 2017].

SAP SE. 2016. *How Banks Can Thrive in the Digital Economy with Digital Transformation*. s.l.: SAP SE.

SAS. n.d. *The PROC LOGISTIC proportional odds test and fitting a partial proportional odds model*. [Online] Available at:
<http://support.sas.com/kb/22/954.html>
[Accessed 16 11 2017].

Sauro, J. 2015. *7 Ways to Handle Missing Data*. [Online] Available at:
<https://measuringu.com/handle-missing-data/>.
[Accessed 11 11 2017]

Seufert, S. & Meier, C. 2016. From eLearning to Digital Transformation: A Framework and Implications for L&D. *International Journal of Advanced Corporate Learning (IJAC)*. 9(2):27-33.

Statistics Solutions. n.d. *Conduct and Interpret a Spearman Rank Correlation*. [Online]

Available at: <http://www.statisticssolutions.com/spearman-rank-correlation>
[Accessed 11 11 2017].

Statistics Solutions. n.d. *Missing Values in Data*. [Online]

Available at: <http://www.statisticssolutions.com/missing-values-in-data/>
[Accessed 15 11 2017].

Stief, S., Eidhoff, A. & Voeth, M. 2016. Transform to Succeed: An Empirical Analysis of Digital Transformation in Firms. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, 10(6):1804-1812.

Sullivan , B., Garvey , J., Alcocer , J. & Eldridge , A. 2014. *Retail Banking 2020 Evolution or Revolution?*. s.l.: PwC.

Tandulwadikar, A. 2014. *Digital Transformation of U.S. Private Banking*. s.l.: Cognizant.

Tapestry Networks. 2014. *Leading the digital transformation of banking*. s.l.: Tapestry Networks.

The Banking Association South Africa. n.d. *Association and Industry Overview*. [Online]

Available at: <http://www.banking.org.za/about-us/association-overview>
[Accessed 01 12 2017].

The Economist Intelligence Unit Limited. 2015. *Digital Evolution: Learning from the leaders in digital transformation*. s.l.: The Economist Intelligence Unit Limited.

Thompson, M. 2016. *How to Handle Missing Data*. [Online]

Available at: <http://www.cicerogroup.com/articles/how-to-handle-missing-data/>
[Accessed 11 11 2017].

Van der Meulen, R. 2017. *How to Integrate IoT-Connected Products*. [Online] Available at: [https://www.gartner.com/smarterwithgartner/as-an-alternative-to-do-it-yourself-integration-many-companies-take-their-first-steps-into-iot-via-preintegrated](https://www.gartner.com/smarterwithgartner/as-an-alternative-to-do-it-yourself-integration-many-companies-take-their-first-steps-into-iot-via-preintegrated-offers/) offers/.

[Accessed 01 12 2017].

Vaughan-Brown, J. 2015. *Why Digital Transformation? Because Your Customers Demand It - Rewrite*. [Online] Available at:

<https://www.ca.com/us/rewrite/articles/digital-transformation/why-digital-transformation-because-your-customers-demand-it.html>

[Accessed 03 12 2017].

Welman, C., Kruger, F. and Mitchell, B. 2005. *Research methodology*. 3rd ed. Cape Town: Oxford University Press, pp.1-318.

XLSTAT. n.d. *Pareto charts*. [Online]

Available at: <https://www.xlstat.com/en/solutions/features/pareto-charts>

[Accessed 16 11 2017].

Yu, C. 2015. *An introduction to computing and interpreting Cronbach Coefficient Alpha in SAS*. [Online] Available at:

https://www.researchgate.net/publication/266456993_An_introduction_to_computing_and_interpreting_Cronbach_Coefficient_Alpha_in_SAS

[Accessed 04 12 2017].

LIST OF APPENDICES

Appendix A.1. Cover letter to questionnaire

Cover Letter to Questionnaire

Dear Participant,

You are invited to participate in this survey which assesses the influence of digital transformation core practices on digital maturity within a large corporate bank, referred to as 'the Bank'. Please note the definitions below:

Digital transformation - The use of new digital technologies to enable significant business improvements.

Fintech - Short form of the phrase financial technology, denotes companies or representatives of companies that combine financial services with modern, innovative technologies.

Blockchain - A distributed, decentralized transaction ledger, saved by each node in the network, which is owned, maintained and updated by each node.

The survey is for academic purposes and is aimed at the Bank's employees who possess sufficient knowledge regarding digital transformation. This survey will ask you some questions about the Bank and will take you approximately 15 minutes to complete. Please be as objective and honest as possible in your answers.

Your participation in this study is entirely voluntary, and you can withdraw from the survey at any point.

Your survey responses will be strictly confidential, and data from this research will be reported only in the aggregate.

Thank you very much for your time and support.

Regards,

The Researcher

Appendix A.2. Questionnaire

Section A: Demographic Information

A1. What is your gender?

☐

Male

☐

Female

A2. What is your age? 

☐

18-34 (Millennials)

☐

35-50 (Gen X)

☐

51-69 (Baby Boomers)

A3. What is the highest level of education you have completed?

- ☐ Doctors Degree
- ☐ Masters Degree
- ☐ Honours qualification
- ☐ Bachelor's degree
- ☐ First diploma
- ☐ Higher certificate
- ☐ Matric
- ☐ Other (please specify briefly)

A4. Which of the following most closely matches your job function?

- ☐ Analyst
- ☐ Project Manager
- ☐ Manager
- ☐ Senior Manager
- ☐ Head of Business Area
- ☐ Executive
- ☐ Chief Level Executive (e.g. Chief Digital Officer)
- ☐ Other (please specify briefly)

A5. Years of working experience at this bank

- ☐ 0-5
- ☐ 6-10
- ☐ 11-15
- ☐ 15-20
- ☐ 20 or above

Section B: The Bank

B1. On a scale of 1 to 10, where: 1 to 3 = 'early', 4 to 6 = 'developing', and 7 to 10 = 'maturing', rate the Bank's digital maturity against an "ideal" organization i.e. an organization that is transformed by digital technologies and capabilities

- ☐ 1-3 (Early)
- ☐ 4-6 (Developing)
- ☐ 7-10 (Maturing)

B2. What is your perception of the Bank compared to its main competitors?

	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
	☐	☐	☐	☐	☐
B2.1. Collaborative and Innovative compared to our competitors					
B2.2. Able to respond quickly to threats or opportunities compared to our competitors	☐	☐	☐	☐	☐
B2.3. Provides my co-workers or me with the resources or opportunities to obtain the right skills to take advantage of digital trends	☐	☐	☐	☐	☐
B2.4. The Bank has a customer-centric, not a channel or product-centric organizational structure	☐	☐	☐	☐	☐

Section C: Digital Technologies

Please state the extent to which you agree or disagree with the below statements

	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
	☐	☐	☐	☐	☐
C1. Digital technologies are disruptive to the Bank					
C2. The Bank views digital technologies as an opportunity	☐	☐	☐	☐	☐
C3. The Bank views digital technologies as a threat	☐	☐	☐	☐	☐
C4. The Bank adopts digital technologies to serve our customers at the earliest opportunity	☐	☐	☐	☐	☐

The Bank uses the following digital technologies to a great extent

Strongly agree Agree Disagree Strongly disagree Don't know

C5. Social Media and Collaborative Technologies

C6. Mobile Technologies

C7. Big Data and Analytics

C8. Cloud Computing Services

Section D: Digital Strategies

D1. The Bank has a clear and coherent digital strategy

Strongly agree

☐

Agree

☐

Disagree

☐

Strongly disagree

☐

Don't know

☐

D2. Does any single person or group have the responsibility for overseeing/managing the Bank's digital strategy?

☐

Yes

☐

No

☐

Don't know

D3. To what extent do you agree that the following are objectives of the Bank's digital strategy?

Strongly agree

Agree

Disagree

Strongly disagree

Don't know

D3.1. Fundamentally transform business processes and/or business model (e.g., grow new lines of business)

☐
☐
☐
☐
☐

D3.2. Improve customer experience and engagement

☐
☐
☐
☐
☐

D3.3. Increase efficiency (e.g., automation)

☐
☐
☐
☐
☐

D3.4. The Bank implements digital initiatives in the following manner

Strongly agree

Agree

Disagree

Strongly disagree

Don't know

☐
☐
☐
☐
☐

Section E: Digital Transformation Skills

Indicate the extent to which you agree or disagree with the following statement

	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
E1. The Bank's employees have sufficient skills and experience to execute the Bank's digital strategy	☐	☐	☐	☐	☐

The following skills or abilities are most lacking in the Bank.

	Strongly Agree	Agree	Disagree	Strongly disagree	Don't know
E2. Knowing the business and being able to conceptualize how new digital technologies can impact current business processes/models	☐	☐	☐	☐	☐
E3. Ability to manage or work in distributed, digitally-savvy teams in fast paced environments; flexible	☐	☐	☐	☐	☐
E4. Ability to use digital technologies like social, mobile, analytics, cloud to execute one's job	☐	☐	☐	☐	☐

Section F: Digital Trends

Please indicate the extent to which you agree or disagree with the below statements

	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
F1. I am satisfied with the Bank's current reaction to digital trends	☐	☐	☐	☐	☐
F2. I am confident in the Bank's readiness to respond to digital trends	☐	☐	☐	☐	☐
F3. The Bank has a strategy on Big Data or Data analytics	☐	☐	☐	☐	☐
F4. The Bank has experience with Big Data and Data-driven innovation	☐	☐	☐	☐	☐

F5. Please describe the extent to which you are familiar with Blockchain technology

- ☐ Not familiar
- ☐ Familiar
- ☐ Very familiar

F6. The Bank deals with FinTech companies in the following manner

	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
F6.1. We monitor and engage FinTech in order to respond competitively					
F6.2. We buy the services of FinTech companies to improve our operations and services	☐	☐	☐	☐	☐
F6.3. We set up venture funds to find FinTech companies					
F6.4. We rebrand purchased FinTech services (white labelling)					

F7. The following are opportunities related to the rise of Fintechs within my industry

	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
F7.1. Leverage existing data and analytics	☐	☐	☐	☐	☐
F7.2. Respond to competition faster	☐	☐	☐	☐	☐
F7.3. Increase customer base and Improve retention of customers	☐	☐	☐	☐	☐
F7.4. Increase customer base	☐	☐	☐	☐	☐
F7.5. Decrease IT infrastructure costs	☐	☐	☐	☐	☐
F7.6. Reduce headcount	☐	☐	☐	☐	☐

F8. The barriers below are impeding the Bank from taking advantage of digital trends

	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
F8.1. Too many competing priorities due lack of strategy	☐	☐	☐	☐	☐
F8.2. Lack of organizational agility	☐	☐	☐	☐	☐
F8.3. Lack of management understanding	☐	☐	☐	☐	☐
F8.4. Lack of employee incentives	☐	☐	☐	☐	☐

Section G: Leadership

Please state the extent to which you agree or disagree with the below statements

	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
G1. The Bank's leadership has sufficient skills and experience to lead our organization's digital strategy	☐	☐	☐	☐	☐
G2. I am confident in my leadership's understanding of relevant digital trends and emerging technologies	☐	☐	☐	☐	☐

G3. What is the highest level/rank of the individual(s) whose job it is to oversee/manage the Bank's digital strategy?

- ☐ G3.1. Chief Level Executive (e.g. Chief Digital Officer)
- ☐ G3.2. Executive level, Head of business unit or other top level executive but below C-suite
- ☐ G3.3. Director level
- ☐ G3.4. Manager level
- ☐ G3.5. Don't know
- ☐ G3.6. Other (please specify briefly)

G4. How do you feel about digitalization in the Bank?

- ☐ G4.1. Positive
- ☐ G4.2. Negative
- ☐ G4.3. Neutral

G5. Briefly justify your answer to G4

You have completed the survey.

Thank you very much for your participation.

The Researcher

Appendix A.3. Recoded values

A1. What is your gender?

Male

»

1

Female

»

2

A2. What is your age?

18-34 (Millennials)

»

1

35-50 (Gen X)

»

2

51-69 (Baby Boomers)

»

3

A3. What is the highest level of education you have completed?

Doctors Degree

»

1

Master's Degree

»

2

Honours qualification

»

3

Bachelor's degree

»

4

First diploma

»

5

Higher certificate

»

6

Matric

»

7

A4. Which of the following most closely matches your job function?

Analyst

»

1

Project Manager

»

2

Manager

»

3

Senior Manager

»

Head of Business Area

»

Executive

»

Chief Level Executive (e.g. Chief Digital Officer)

»

A5. Years of working experience at this bank

0-5

»

6-10

»

11-15

»

15-20

»

20 or above

»

B1. On a scale of 1 to 10, where: 1 to 3 = 'early', 4 to 6 = 'developing', and 7 to 10 = 'maturing', rate the Bank's digital maturity against an "ideal" organization i.e. an organization that is transformed by digital technologies and capabilities

1-3 (Early)

»

4-6 (Developing)

»

7-10 (Maturing)

»

B2. What is your perception of the Bank compared to its main competitors?

Strongly agree

Agree

Disagree

Strongly disagree

Don't know

B2.1.
Collaborative
and
Innovative
compared to
our
competitors

B2.2. Able to respond quickly to threats or opportunities compared to our competitors

1	2	3	4	5
---	---	---	---	---

B2.3. Provides my co-workers or me with the resources or opportunities to obtain the right skills to take advantage of digital trends

1	2	3	4	5
---	---	---	---	---

B2.4. The Bank has a customer-centric, not a channel or product-centric organizational structure

1	2	3	4	5
---	---	---	---	---

Please state the extent to which you agree or disagree with the below statements

Strongly agree Agree Disagree Strongly disagree Don't know

C1. Digital technologies are disruptive to the Bank

1	2	3	4	5
---	---	---	---	---

C2. The Bank views digital technologies as an opportunity

1	2	3	4	5
---	---	---	---	---

C3. The Bank views digital technologies as a threat

1	2	3	4	5
---	---	---	---	---

C4. The Bank adopts digital technologies to serve our customers at the earliest opportunity

1	2	3	4	5
---	---	---	---	---

The Bank uses the following digital technologies to a great extent

Strongly agree Agree Disagree Strongly disagree Don't know

C5. Social Media and Collaborative Technologies

C6. Mobile Technologies

C7. Big Data and Analytics

C8. Cloud Computing Services

D1. The Bank has a coherent digital strategy

Strongly agree

Agree

Disagree

Strongly disagree

Don't know

D2. Does any single person or group have the responsibility for overseeing/managing the Bank's digital strategy?

Yes

»

No

»

Don't know

»

D3. To what extent do you agree that the following are objectives of the Bank's digital strategy?

Strongly agree

Agree

Disagree

Strongly disagree

Don't know

D3.1.
Fundamentall
y transform
business
processes
and/or
business
model (e.g.,
grow new
lines of
business)

1

2

3

4

5

D3.2. Improve
customer
experience
and
engagement

1

2

3

4

5

D3.3. Increase
efficiency
(e.g.,
automation)

1

2

3

4

5

D3.4. The Bank implements digital initiatives in the following manner

Strongly agree

Agree

Disagree

Strongly disagree

Don't know

D3.4.1. Top
down from a
central senior
leadership
team

1

2

3

4

5

D3.4.2.
Bottom-up
from pockets
of groups
across
enterprise

1

2

3

4

5

Indicate the extent to which you agree or disagree with the following statement

Strongly agree

Agree

Disagree

Strongly disagree

Don't know

E1. The
Bank's
employees
have
sufficient
skills and
experience
to execute
the Bank's
digital
strategy

1

2

3

4

5

The following skills or abilities are most lacking in the Bank.

Strongly Agree

Agree

Disagree

Strongly disagree

Don't know

E2. Knowing the business and being able to conceptualize how new digital technologies can impact current business processes/models

1

2

3

4

5

E3. Ability to manage or work in distributed, digitally-savvy teams in fast-paced environments; flexible

1

2

3

4

5

E4. Ability to use digital technologies like social, mobile, analytics, cloud to execute one's job

1

2

3

4

5

Please indicate the extent to which you agree or disagree with the below statements

Strongly agree

Agree

Disagree

Strongly disagree

Don't know

F1. I am satisfied with the Bank's current reaction to digital trends

1

2

3

4

5

F2. I am confident in the Bank's readiness to respond to digital trends

1

2

3

4

5

F3. The Bank has a strategy on Big Data or Data analytics

1

2

3

4

5

F4. The Bank has experience with Big Data and Data-driven innovation

F5. Please describe the extent to which you are familiar with Blockchain technology

Not familiar

»

Familiar

»

Very familiar

»

F6. The Bank deals with FinTech companies in the following manner

Strongly agree

Agree

Disagree

Strongly disagree

Don't know

F6.1. We monitor and engage FinTech in order to respond competitively

F6.2. We buy the services of FinTech companies to improve our operations and services

F6.3. We set up venture funds to find FinTech companies

F6.4. We rebrand purchased FinTech services (white labelling)

F7. The following are opportunities related to the rise of Fintechs within my industry

Strongly agree

Agree

Disagree

Strongly disagree

Don't know

F7.1.
Leverage
existing data
and analytics

F7.2.
Respond to
competition
faster

F7.3.
Increase
customer
base and
Improve
retention of
customers

F7.4.
Increase
customer
base

F7.5.
Decrease IT
infrastructure
costs

F7.6. Reduce
headcount

F8. The barriers below are impeding the Bank from taking advantage of digital trends

Strongly agree

Agree

Disagree

Strongly disagree

Don't know

F8.1. Too
many
competing
priorities due
lack of
strategy

F8.2. Lack of
organizational
agility

F8.3. Lack of
management
understandin
g

F8.4. Lack of
employee
incentives

Please state the extent to which you agree or disagree with the below statements

Strongly agree

Agree

Disagree

Strongly disagree

Don't know

G1. The Bank's leadership has sufficient skills and experience to lead our organization's digital strategy

G2. I am confident in my leadership's understanding of relevant digital trends and emerging technologies

G3. What is the highest level/rank of the individual(s) whose job it is to oversee/manage the Bank's digital strategy?

G3.1. Chief Level Executive (e.g. Chief Digital Officer)

G3.2. Executive level, Head of business unit or other top-level executive but below C-suite

G3.3. Director level

G3.4. Manager level

G3.5. Don't know

G4. How do you feel about digitalization in the Bank?

G4.1. Positive

G4.2. Negative

G4.3. Neutral

Appendix B: Contingency tables

Appendix B.1. Digital Maturity Level by Clear and Coherent Digital Strategy

		Clear and Coherent Digital Strategy					Total
		1	2	3	4	5	
Digital Maturity Level		2	8	5	0	3	18
1	Frequency						
	Percent	1	5	3	0	2	11
2	Frequency	36	69	11	1	6	123
	Percent	22	42	7	1	4	76
3	Frequency	11	10	0	1	0	22
	Percent	7	6	0	1	0	14
Total	Frequency	49	87	16	2	9	163
	Percent	30	53	10	1	6	100

Appendix B.2. Digital Maturity Level by Leadership

		Leadership					Total
		1	2	3	4	5	
Digital Maturity Level		0	9	2	0	7	18
1	Frequency	0	9	2	0	7	18
	Percent	0	6	1	0	4	11
2	Frequency	23	75	12	4	9	123
	Percent	14	46	7	3	6	76
3	Frequency	11	10	1	0	0	22
	Percent	7	6	1	0	0	14
Total	Frequency	34	94	15	4	16	163
	Percent	21	58	9	2	10	100

Appendix B.3. Digital Maturity Level by Strategy to Digital Trends

		Strategy to Digital Trends					Total
		1	2	3	4	5	
Digital Maturity Level							
1	Frequency	1	2	3	1	11	18
	Percent	1	1	2	1	7	11
2	Frequency	13	59	8	0	43	123
	Percent	8	36	5	0	26	75
3	Frequency	8	10	0	0	4	22
	Percent	5	6	0	0	2	14
Total	Frequency	22	71	11	1	58	163
	Percent	14	44	7	1	36	100

Appendix B.4. Digital Maturity Level by Digital Transformation Skills

		Digital Transformation Skills					Total
		1	2	3	4	5	
Digital Maturity Level		2	5	5	2	4	18
1	Frequency						
	Percent	1	3	3	1	2	11
2	Frequency	11	59	39	5	9	123
	Percent	7	36	24	3	6	75
3	Frequency	6	14	2	0	0	22
	Percent	4	9	1	0	0	14
Total	Frequency	19	78	46	7	13	163
	Percent	12	48	28	4	8	100

Appendix B.5. Digital Maturity Level by Approach to Digital Initiatives Implementation

		Approach to Digital Initiatives Implementation					Total
		1	2	3	4	5	
Digital Maturity Level		2	7	1	1	7	18
1	Frequency						
	Percent	1	4	1	1	4	11
2	Frequency	20	79	12	0	12	123
	Percent	12	48	7	0	7	75
3	Frequency	10	9	0	1	2	22
	Percent	6	6	0	1	1	14
Total	Frequency	32	95	13	2	21	163
	Percent	20	58	8	1	13	100

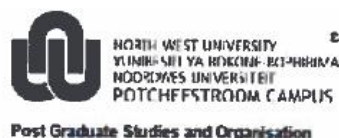
Appendix B.6. Digital Maturity Level by implementation of Digital Technologies

		implementation of Digital Technologies					Total
		1	2	3	4	5	
Digital Maturity Level		1	6	5	5	1	18
1	Frequency						
	Percent	1	4	3	3	1	11
2	Frequency	32	68	14	6	3	123
	Percent	20	42	9	4	2	75
3	Frequency	12	9	0	1	0	22
	Percent	7	6	0	1	0	14
Total	Frequency	45	83	19	12	4	163
	Percent	28	51	12	7	2	100

Appendix B.7. Digital Maturity Level by Customer-centric Approach

		Customer-centric Approach					Total
		1	2	3	4	5	
Digital Maturity Level		2	4	7	4	1	18
1	Frequency						
	Percent	1	2	4	2	1	11
2	Frequency	16	70	28	5	4	123
	Percent	10	43	17	3	2	75
3	Frequency	8	13	1	0	0	22
	Percent	5	8	1	0	0	14
Total	Frequency	26	87	36	9	5	163
	Percent	16	53	22	6	3	100

Appendix C. Solemn declaration



SOLEMN DECLARATION AND PERMISSION TO SUBMIT

1. Solemn declaration by student

I, KOKOTWAVE JOHANNES DITSHEGO

declare herewith that the thesis/dissertation/mini-dissertation/article entitled (exactly as registered/approved title) ASSESSING THE INFLUENCE OF DIGITAL

MAFABITY TRANSFORMATION CORE PRACTICES ON
DIGITAL MATURITY WITHIN A LARGE CORPORATE BANK

which I herewith submit to the North-West University, Potchefstroom Campus, in compliance / partial compliance with the requirements set for the MBA degree, is my own work, has been language-edited in accordance with the requirements and has not already been submitted to any other university.

I understand and accept that the copies that are submitted for examination become the property of the University.

Signature of student

University number

2679 6740

Signed at SANDTON

this

09

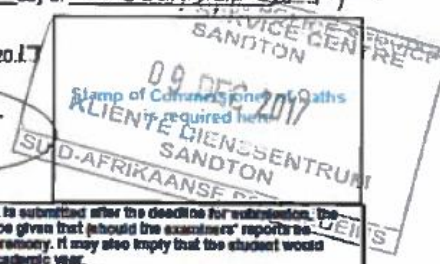
day of

DECEMBER 2017

Declared before me on this 09 day of DECEMBER 2017

Commissioner of Oaths:

71102412



PLEASE NOTE: If a thesis/dissertation/mini-dissertation/article of a student is submitted after the deadline for submission, the period available for examination is limited. No guarantee can therefore be given that should the examiners' reports be positive, the degree will be conferred at the next applicable graduation ceremony. It may also imply that the student would have to re-register for the following academic year.

2. Solemn declaration and permission to submit by supervisor

The undersigned declares

- The student is hereby granted permission to submit his/her mini-dissertation/dissertation or thesis: **YES/NO**
- That the student's work has been tested by me for plagiarism (for example by Turnitin) and a satisfactory report has been obtained: **YES/NO**

Signature/Supervisor/Promoter:

Date:

Original details: Module Antwoord (105 12187) C:\Users\10512187\Documents\DECLARATION AND PERMISSION TO SUBMIT.docx
8 October 2015

File reference: 71111320