THE INTEGRATION OF CASH MANAGEMENT SYSTEMS TO IMPROVE CUSTOMER SERVICE AT THE FIRST NATIONAL BANK, SOUTH AFRICA

by

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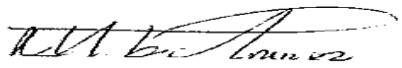
Declaration of Authenticity

I Themba Richard Mabena declare that the research project entitled "The integration of cash management systems to improve customer service: a First National Bank (FNB) case study", is my work and that each source of information used has been acknowledged by means of a complete Harvard Referencing System. This dissertation has not been submitted before for any other research project, degree or examination at any university.



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Acknowledgments

May the name of the mighty God of Abraham, Isaac and Jacob be gloried for ever.

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Modise Glayton Modise, thank you for introducing me to a values-based leadership system called abundance and life not defined by materialism. You raised me from ashes and today I am obedient and humble in knowing the word.

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Abstract

This study explored the cost-effective management of First National Bank Cash counting houses relative to customer services as well as drivers of competitiveness within cash processing centres owing to daily operational aspects. The motivation for conducting this study was attributable to the role played by cash centres in the cash supply chain in South Africa. Examining operational challenges that are experienced within the industry that impact on customer service; simultaneously highlighting position of service and customer service in bulk cash processing centres.

An interpretivist philosophical stance was deployed in this study. The researcher adopted a complementary qualitative research methodology leading to the use of a semi-structured face-to-face interviews as the primary data collection technique. Research participants were drawn from various departments within the cash centre space. Interview transcriptions were analysed using a thematic data analysis method. Findings from the study revealed that technological optimisation of processes, machine performance, flow management have an impact on improving customer service. In addition, the study established that the optimization of cash centres through cash solutions contributes towards the reduction of costs. Given the research findings, this study recommended that cash centres should invest in technology and digitisation to stay relevant and to capture the market through improved customer service by managing and leading the integration of cash management systems by means of process optimisation.

Keywords: Cash management, Customer services, First National Bank, technology, optimisation, process, digitisation.

Table of Contents

List of acronyms

ACDP	Automated Commercial Deposit Processing
ADB	African Development Bank
ATM	Automated Teller Machine
CCM	Cash Coin Machine
CMS	Cash Management Solutions
CPS	Cash Processing Solutions
CRM	Cash Recycling Machine
CVM	Cash Verification Machine
CIT	Cash-in-Transit
ECM	Enterprise Cash Management
FNB	First National Bank
G and D	Giesecke and Devrient
ISA	Inventory Systems and Accounting
LHD	Load Haul Dump
PPM	Parts per Million
QDP	Quick Delivery Program
SARB	South African Reserve Bank
STATS SA	Statistics South Africa
VMS	Vault Management System

List of Tables

List of Figures

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1. Introduction

First National Bank is the only bank that has retained bulk cash processing centres in South Africa. According to Abioro (2013), cash management refers to the administration of cash inflow and outflow to amplify liquidity and to reduce the cost of funds. Cash management is, therefore, important for both individuals and businesses as a key measure of financial stability and is regarded as the essential current asset in business (Pandley, 2010).

From the years 2010 to 2019, three South African big banks outsourced their bulk cash facilities to external counting houses due to high costs associated with bulk cash and treasury management. First National Bank keeps and maintains cash centres by enhancing cash processing efficiencies in a risky industry. In addition, the industry demands speedy cash flow and the running of secure counting facilities where cash deposits consisting of bulk notes and coins are processed and sorted for cash recycling.

This study examines how the integration of cash management systems impact day to day activities and challenges in respect of efficient processing and the streamlining of workflow in line with automated processes. The study focuses at how the above-mentioned aspect align and impact customer expectations.

1.1.1. Defining key concepts

Bresendale (2021) states that cash is the backbone of payment tender in South Africa preferred by most consumers and informal businesses. Even though most banks prefer to use technology to convert the unbanked, customers still trust and rely on using hard cash.

Cash: legal tender in a form of notes or coins used in exchange for goods, services and debt.

Cash centre: a central secure facility where notes and coins are counted and sorted for recycling and redistribution at Automated Teller Machines (Monyaka, 2015).

Cash management: Mugambi (2019) states that cash management relates to effective financial management, relative to the true cost of service delivered by the counting house.

Customer service: According to Levitt (1983), a customer is anyone who buys products and services; customers can either be internal or external clients and serve as the foundation of any business. The purpose of business is to find and keep customers that will sustain the business, while service refers to understanding and giving support given to customers before and after purchasing and utilizing products and services (Kurashige *et al.*, 1994).

Integrated systems: The Collins dictionary defines an integrated system as a system that blends different functions to work as one entity.

Optimisation: The process of turning cash processing centres to a state of optimal performance in maximising day-to-day operational efficiencies.

1.2. Research Context

The research context gives historical and geographical background with which the study can be viewed.

The World Bank estimates that there is up to 5.88 million micro, small and medium sized enterprises that are predominantly cash based, which equates to surplus cash in circulation (Smith, 2018). It is in this regard that South African banks need and make use of bulk cash processing centres called cash centres to cater for bulk cash deposits that are banked by informal traders, start-ups, medium and micro enterprises as well as deposits from low-income earners who rely heavily on cash transactions (Neves & Du Toit, 2012).

The relevance of cash processing centres is due to South Africa being a cash driven society owing to a widening digital divide (Ikdal, 2017). While electronic payments such as debit and credit cards are accepted by progressive and larger businesses, many South Africans utilise and rely on cash transactions with 19% of the population including those with bank accounts who trust cash, resulting in a growth of 8.23% of cash in circulation year on year (Rumney, 2019).

To appreciate the relationship between cash management and customer service, the study follows a funnel pattern by ascertaining the status globally, societal level (the African continent, South Africa, regionally), community level (Banking community), and the enterprise level (First National Bank) as illustrated in figure 1. From the top, the description looks at what happens at global level, followed by the societal level, community level and lastly the enterprise level.

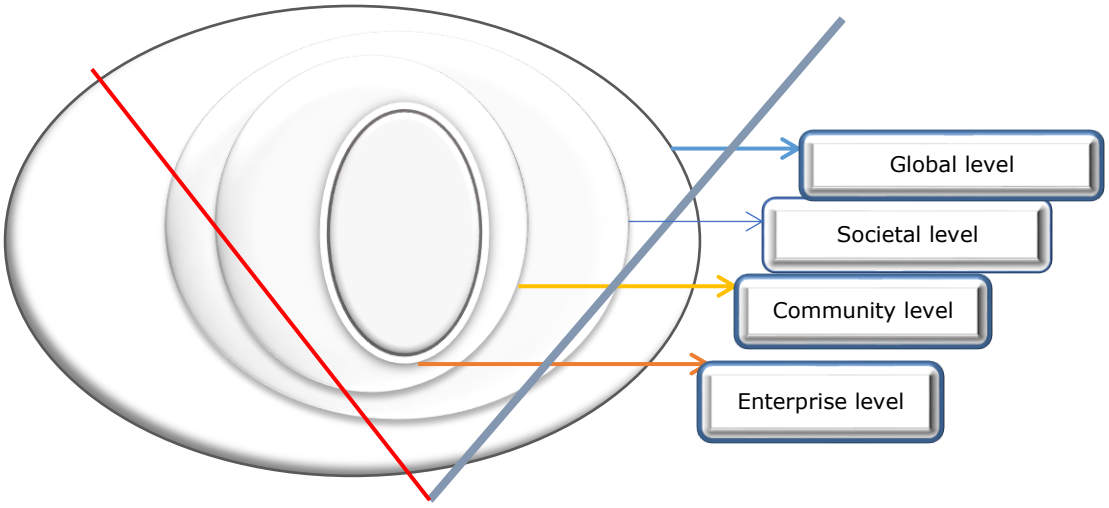

Figure 1: A funnel perspective of the research context (Hlophe, 2022)

1.2.1 Global perspective

According to Land and Tyson (2018), European countries are still at the front when it comes to banking systems. European countries keep physical cash flowing from banks, businesses and the public with less physical risks. The management of cash in countries like Romania is no longer based on manual forecasting and spreadsheets, instead optimised systems and applications are used to manage the amount of cash in the network and the generation of forecasts for cash centres and Automated Teller Machine (ATM) replenishment (Land & Tyson, 2018).

1.2.2 Societal perspective

The demand and supply of banking and financial services in Africa is affected purely by the lack of development and industrial advancements (Chen, 2009). The essentials of business banking in the African context are dependent on the customer's ability to make choices in terms of banking product or package, quality of service, relationships, support and pricing. While access to banking for Small Medium Micro Enterprises depends on a bank business account which is a requirement to access financial services (Chen, 2019)

1.2.3 Community level

Banks operate in a very competitive environment where clients are exposed to broad choices as most banks offer similar products. According to Damesetz (1973), competition and efficiency are the main variables in monopolising the banking space. South Africa has a well-functioning banking sector that contributes to economic growth and enables secure and efficient movement of funds (Simbanegavi, Greenberg & Gwatidzo, 2015).

The South African banking sector plays a significant role in the economy. At domestic and individual levels, the banking sector is responsible for creating a culture of savings amongst communities and businesses. The South African banking system is regulated by the South African Reserve Bank (SARB), the Banking Ombud as well as the Financial Sector Conduct Authority [FSCA] together with the Prudential Authority (PA) fall under the Financial Service Regulation Act 9 of 2017 (FSR Act), a system of financial regulation. The FSR Act confers certain powers on these entities and the South African Reserve Bank (Moyo, 2018). In the African context, both banks and businesses need extraordinary security and efficiency in managing high volumes of cash that can lead to customer satisfaction and cash flow improvement (Gopane & Mmotla, 2019).

1.2.4 Enterprise level

With the exception of First National Bank, other major banks in South Africa outsource bulk cash and wholesale banking to private counting houses such as Standard, Barclays and Volkskas (SBV), Fidelity Group and Group 4 Securicor. First National Bank holds on to the cash component using the cross-subsidisation model that manages revenue streams between cost centres and profit centres with the view of retaining and maintaining customer relationships between retail banking and wholesale banking (Kendrick, 2009).

Cash remains the favourite method of payment among South Africans and its relevance and evolution is decided by the public who are the users. The management and sustainability of cash centres requires assured performance, cost effective maintenance, technology and value creating customers (Kriel, 2016).

1.2.4.1 Cash centre services

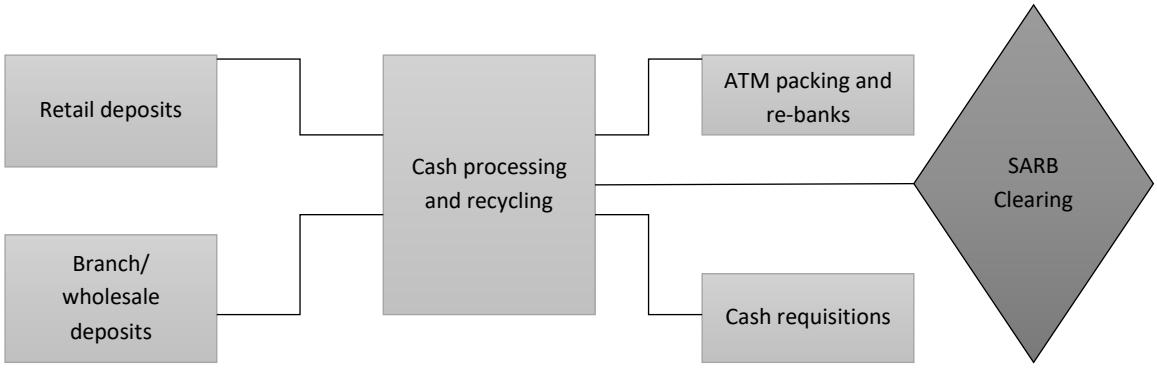

Figure 2 Cash centre operations and services (Mosaka, 2022)

Cash is regarded as the important means of payment due to the nature of the economy and living standards of most South African consumers. Cash centres are a means of wholesale cash distribution and cash recycling that enable banks, businesses and the public at large to use bank notes and coins as prescribed by the SARB (Bresendale, 2021). The South African Reserve Bank regulates the distribution of cash from bank branches and cash centres as seen on Figure 2 above.

Bulk cash deposits collected from retail and wholesale stores, malls, distribution points, large corporations and branches are transported by Cash in Transit (CIT) companies to cash centres or counting houses for verification and are deposited into various accounts. Some clients require cash requisitions in the form of notes and bulk coins. The bulk of the cash is sorted, fit notes are used to replenish Automated Teller Machines and unfit notes are sent to the reserve bank.

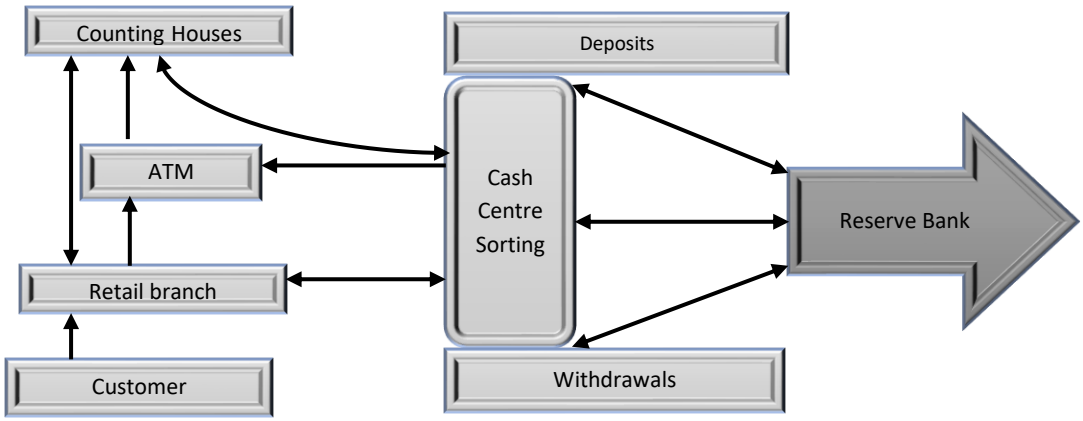

Figure 3: Cash supply network and flow of cash (Ndle, 2022)

Figure 3 above depicts the cash supply network that epitomises the function of cash centres within the banking environment. While branch banking has seen significant changes in response to market trends and the operational mode that evolves around same key services. Cash centres on the other hand focus on bulk banking services devoid of sales and investment products, the cash is recycled for re-use by ATM channels after bulk deposits are credited into customer's accounts with fit money going back into circulation and the unfit notes and coin is then dispatched for destruction.

1.3. Research problem

The integration of cash management systems by cash centres is a sustainable organisational approach for effectiveness, relevance and impacting change within the cash space. However, difficulties and failures to implement and integrate cash management systems present a drawback in fulfilling strategic goals such as turning cash into a competitive advantage and continuous improvement.

The integration of cash management systems depends on several factors such as organisational complexity and the management's willingness to align operational demands and standards without focusing on individual systems. Cash centre facilities and services are not optimised to the level at which they can adapt to future technological changes and the fluctuation of customer demands to realize operational and cash supply chain capabilities. Merholz (2008), stresses the importance of adaptive aptitude to change, a state in which cash centres can reap the rewards of being well-suited to the environment and how cash centres can respond to complexity. First National Bank cash centres are unable to deliver a superior customer experience due to a lack of agility, innovation and operational efficiencies due to a lack harmony between people, digitization, design principles and optimized cash centre processes and procedures (El-Telbany and Elragal, 2014).

1.4. Aims and objectives

According to Grover *et al.*, (2014), aims and objectives are reasonably a case of one leading to the other; the objectives are precise, whereas the aims are tied to the research questions.

Aim: This study examines how the integration of cash management systems impact efficiencies and customer expectations by using a case study analysis.

The following corresponding objectives indicate in more detail and significant, issues that the project plans:

1. To connect cash management systems that impact value through process and production agility.
2. To examine and recommend cash processing solutions to improve cash operations and customer service.

1.5. Research Questions

The research questions are formulated as an important measure and guide to narrow the research aims and objectives to the precise research (Johnson & Christensen, 2014).

The following research question is essential in guiding the research methodology and data collection choices:

1. How can FNB cash centres optimise and adapt to future changes to improve operational performance, meet market demands and gain a competitive advantage?

1.6. Research philosophy

1.6.1. Ontology

The subjective ontological perspective adopted in this research is informed by researcher's experience and involvement in operations management at First National Bank Mayville cash centre. According to Trivedi (2020), ontology is a philosophical approach on what is deemed as reality and supportive in bringing certainty about the nature of the subject that is researched and forming a basis for intersubjective awareness. Sense making and meaning is subjective as the researcher bases one's viewpoints on experience and awareness.

The understanding of the phenomenon hinges on the subjective reality and the conditions within which perceptions are formulated. Having worked in the cash industry and the experienced challenges that relate to daily operational demands within a cash centre formed and developed a perspective of the industry and the

impact it has in the entire cash value chain. The researcher is aware of client and stakeholder expectations and demands as well as operational obligations that are imposed by industry participants.

1.6.2. Epistemology

Cohen *et al*., (2007) affirms that the epistemological position relates to forms of knowledge and meaning. Creswell (2007) asserts that qualitative researchers deem truth to be both complex and forceful and could be tapped into by probing and examining people in their interactions. According to Scotland (2012), an epistemology probes the characteristics of the relationship between what can be known and the prospective knower in relation to the acquisition and generation of knowledge. The researcher relies on findings throughout the investigation as the investigation proceeds and understanding is developed experientially through an in-depth understanding of the problem, the research examines theories such as the future world of work and how this will impact on factory settings such as cash centres. Conditions of epistemology such as truth, beliefs and justification are used to determine the bearing of automation and process flow management in the operational space. An interpretive paradigm serves as a radar for the study as understanding is formulated through historical and subjective experiences, reflection, a creation of abstract concepts and that build personal knowledge and complexity of phenomena (Nickerson, 2022).

1.7. Research Methodology

This study conducted semi-structured, face-to-face interviews to uncover factors that work out the presentation of the problem. A qualitative approach was adopted to extract new knowledge and to present qualitative data as an alternative to quantifiable results (Pathak, Jena & Kalra, 2013). Data was obtained through open-ended face-to-face interviews and conversational communication focusing on people’s perceptions (Bhat, 2018).

Applying systemic observation in the form of in-depth interviews aided in exposing the attitudes and perceptions of the target participants in relation to the topic. This approach yielded effortless results since the process was more expressive and descriptive by looking at the background data, perspectives, practices and paradigms from a small sample size (Shank, 2002) and (Creswell, 2003).

1.7.1 Sampling

It is important to have a fair sample as a safety to guarantee that participants represent what the study is interested in (Davies & Mosdell, 2006). The subjective reality of the participants was targeted to push for an assortment of variations until the level of saturation (Elmusharaf, 2012). The study used purposive sampling to collect data from eleven accessible participants involved in cash centre operations with considerable experience in the cash centre setting. According to Crossman (2020), purposive sampling is a method that is useful in recruiting participants who are likely to provide comprehensive information on phenomenon under investigation.

1.7.2 Data Collection

To provide participants with some form of flexibility where both the researcher and the participants were free to elaborate their responses to the interview questions, the study used semi-structured interviews to gather independent thoughts, full latitude for leads and comprehensive perceptiveness.

1.7.3 Data Analysis

The primary method of data analysis was thematic data analysis that directed the researcher towards the examination of meaningful and representational content of the data. Thematic data analysis encompasses studying data sets and detecting patterns in meaning to develop themes (Sunday, 2018). Transcribed data was noted down and coded into noteworthy features based on its relevance to the research question and organised in order to formulate themes that outline a thematic map using a meticulous approach to select meaningful extracts relation to the research question and the literature in line with (Braun & Clarke, 2006).

1.8 Theoretical Framework

Theoretical framework guides the researcher in addressing the research problem. It acts as a pillar and reason for conducting the study as it provides direction towards the literature review (Grant & Osanloo, 2014):

1. Customer service and innovation: Through innovation, cash centres respond to the market by introducing better processes, performing machinery and cohesive cash devices. Forcadell & Aracil (2019) posit that

innovation impacts service delivery as a proposition for added-value and helpful solutions.

2. Industry evolution and intelligent systems: Taherparvar, Esmaeilpour and Dostar (2014) assert that many sectors are shaped by evolving business models. Technology, digital integration and automation control production finance and services industries (Muscio & Ciffolilli, 2019).
3. Production efficiencies: Banks use market intelligence to measure competitiveness and to attract and retain customers by aligning operational effectiveness with market needs (Wambui, 2012).

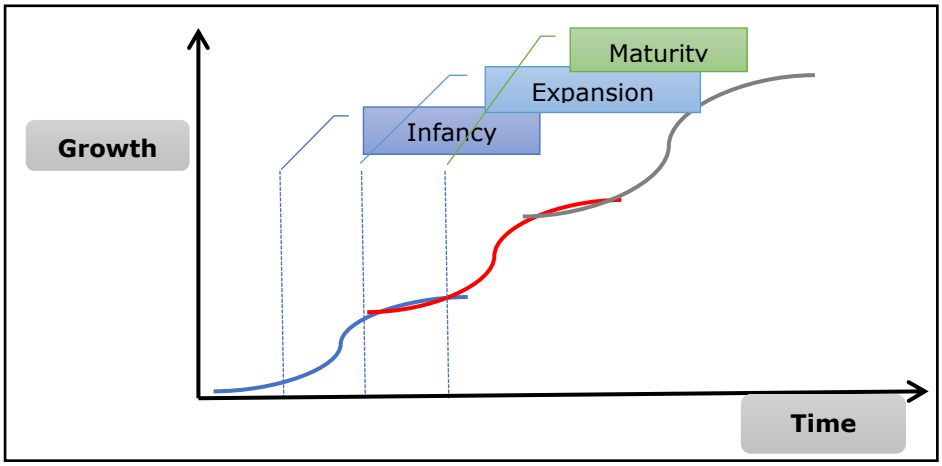

Figure 4 Sigmoid curve (Tyler, 2016)

Cash processing centres require constant reinvention of technology, innovation and systems (LaMarco, 2018). The integration of these elements could result in process enhancements and an innovations culture. Figure 4 above depicts growth over time to remain competitive. In this regard, the survival of cash centres is dependent on the policies, risks, and competition (LaMarco, 2018).

1.8.1 Causal loop diagram of sub-systems with the cash business unit

Causal loops present a visual process of expressing connections between variables that make up a whole by highlighting the impact each variable has in changing the system (Lannon, 2018). Figure 5 below is a snapshot mapping how issues, factors and processes impact on one another and presenting how change can be presented in a cash management system.

The sub-systems and variables within cash operations where variables interrelate, leading to consequential feedback loops within the system. Ideally, in a

production setting such a cash processing centres every action is time and cost based and the main determinant is customer satisfaction. Each variable in the cash centre context is dependent on general efficacy of both equipment and operators to boost quality and yield performance that affects the main outcome which is customer satisfaction. With reference to systems thinking, positive variables are marked with an "s" while negative variables are marked with an "o" to express cause and effect.

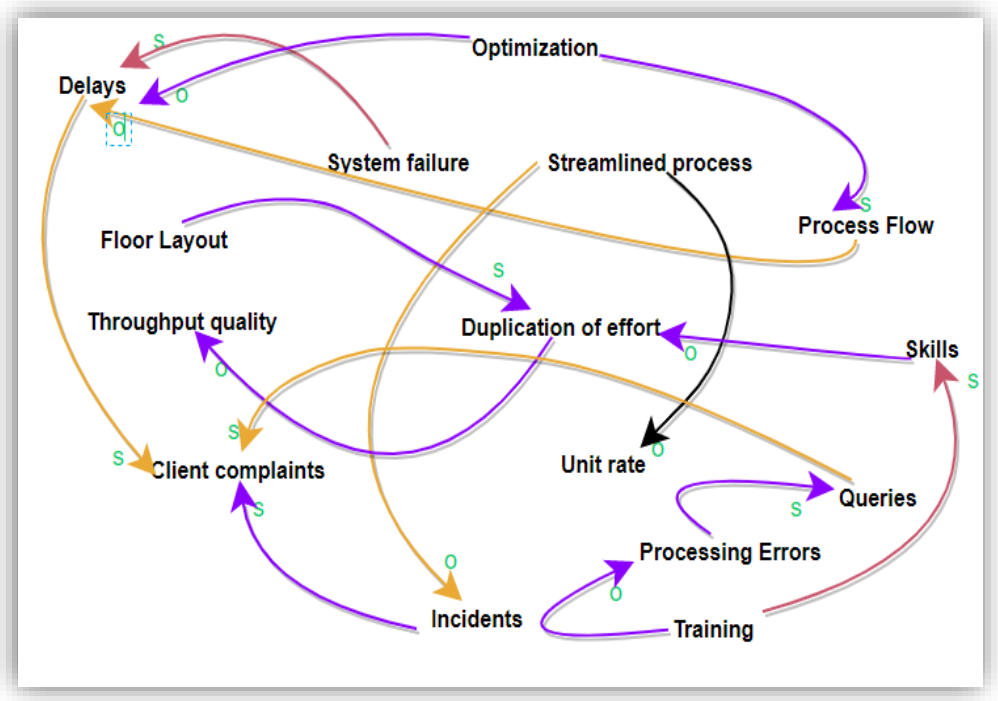

Figure 5: Causal loop diagram depicting cash management variables within a cash centre (de Pinho, 2015)

1.9 Significance of the study

This research emphasises the function of cash centres within the banking and cash management value chain from the societal to individual level as well as to give cash centres much-needed agility to respond to market needs. This investigation serves a call for improved models within cash processing and measures to enhance productivity resulting in comprehensive value (Zhao, 2019). This study highlights production enhancements required in cash centres and measures to improve every area of production and it expresses how each system impacts the next by using better techniques, products and processes. Findings from this study will benefit existing counting houses to create better production plans.

1.10 Scope and delimitations

The study focuses on cash management at First National Bank, the only South African bank that does not outsource its cash operations in South Africa. The study focuses on performance optimisation of cash centres that could lead to better performance that would result in operational effectiveness and efficiencies. The target population of the study is working adults with working experience in the cash environment and the geographical coverage will focus on Pretoria Cash Centre in South Africa.

The research excluded participants from other banks as the participants from outsourced processing cash centres could likely yield conflicting results, a mixed method approach was not considered due to time and resource constraints. In this case the research only focuses on a smaller sample consisting of eleven participants, the rationale in the planning the study granted for the timeframe not to exceed thirty days (Durham, 2019). Eleven participants were deemed to be adequate to achieve theoretical saturation and to enhance rigor and quality. According to Creswell (2014), qualitative studies can yield fruitful results with a total of ten participants when the adopted sample size delivers relevant information on the topic that is under investigation as in this study.

1.11 Structure of the study

Chapter one: outlines background on the history of banking as well as the role of cash centres in South Africa presented in a funnel format, detailing historical and current activities in the financial sector as well as the history and relevance of cash. This chapter also articulates the scope and delimitations of the study and the degree to which the research question will delve into, as well as the aims and objectives

Chapter two: presents a scientific overview of relevant literature that forms part of cash management systems. The literature review establishes relevance of the problem through an in-depth analysis, synthesis as well a critical evaluation of themes, a discussion of strengths and weaknesses of the material on knowledge collected from various sources as well as summary of key sections of the chapter.

Chapter three: presents and describes the research design and research process, procedure and the data analysis strategy, sample size and justification. An interpretivist philosophical stance was adopted and informed the study.

Chapter four: presents, interprets and discusses results on the collected and analysed data through a summary of key themes that emerged from the research questions. Presented results are accompanied by elucidation and a descriptive analysis of text supported by literature that is underpinned by the Technology, Innovation, People and Systems (TIPS) Managerial Framework. A theoretical framework that creates better understanding of how the organisation works through the fusing of different elements that are essential to complete daily tasks where smaller systems coordinate with one another to function better.

Chapter five: presents a summary of findings in relation to the main problem and the research questions in a concise and objective manner. This chapter summarises main findings from empirical study for each research objective. Based on the conclusions, appropriate recommendations are suggested. Implications for future research, policy and practice are presented followed by a discussion on Return on Investment in a form of innovative and strategic actions aimed at short medium and long-term enhancements towards achieving relevance and competitive advantage.

The final conclusion summarises the journey and the idea that led to the conceptualisation of the study, the philosophical position and the choice of method used in conducting the study as well as the outcome of conducting the study.

1.12 Conclusion

This chapter introduced the topic by making a case regarding difficulties and failures to the implementation and integration of cash management systems and the fulfilment of strategic goals of cash centres. The purpose of the study as well as the research questions designated for the investigation were discussed strengthening the motivation for conducting the study. In the next chapter, the study will incorporate a literature review section that is designed to examine multiple cases for the purpose of providing insights into the phenomenon. The literature will be examined to present a clear picture of the state of knowledge and the main questions that relate to the subject area being investigated.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter presents a comprehensive overview of the literature available on the topic as well as a detailed and critical analysis, highlighting gaps and opportunities for additional and future research. The literature review will present a complete review of what was written in previous studies on the topic and related literature as well as a critical assessment to demonstrate an understanding of arguments and theories in the following areas: An overview of the monetary system, banking in the South African context, cash management systems at cash centre level, FNB bulk cash banking and strategy, and automation and process design. This chapter is accomplished to harmonise the study with the research objectives, and thus providing rationale and context for the research.

Ongwuegbuzie *et al*., (2010) contends that the literature review is an important tool to differentiate between what has been done and what needs to be undertaken as well as to ascertain the relationship between concepts and practice, historic methods and blueprint as well as challenges and disagreements of different research approaches. In support of the abovementioned, Chigada (2014) states that it is imperative to look at what others have done and the procedures followed to arrive at their findings.

2.2 Overview of the monetary system

The evolution of the monetary system spans over three thousand years, from the bartering system to crypto currencies of the twenty first century where people advanced systems of trade. Over the years money has developed due to convenience opportunities and innovations such as the iPhone's immediate payment solution and crypto currencies (Burn-Challender, 2019).

Cash remains the primary medium of exchange with some international conglomerates and people in political circles still preferring to put their trust in cash (Dupas *et al.,* 2018). Figure 7 below illustrates how money evolved over centuries (Middelkoop, 2014). People used bartering to trade for goods and services, exchanging commodities based on what was deemed fair. Over the years, there has been a shift from bartering to the adoption of currency. The

introduction of money escalated the speed in doing business and the value of goods and services was later measured in currency which banks used for deposits and credit. According to Wang (2020), the banking of cash attracts interest, and guarantees better security and insurance benefits.

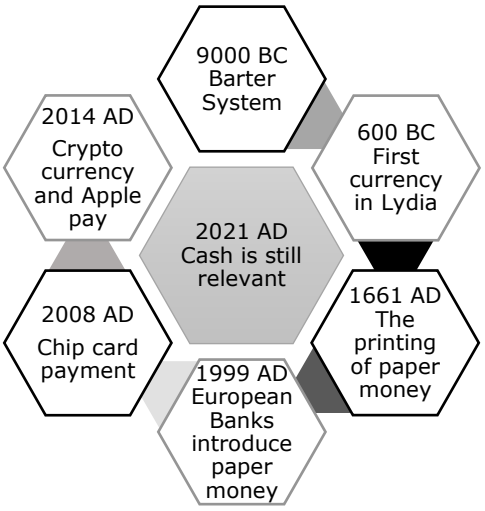

Figure: 6. Money going full circle (Feingolda,2021)

According to Ekne (2018), the world is moving towards more fluid systems of payments, as illustrated in figure 6. Beattie (2015) argues that money gets its value because it is a medium of exchange involving the direct exchange of goods and services. Hans (2018) states that money has evolved amid complex economies and trade frictions.

2.2.1 The South African banking landscape

Banks are shifting from activities performed by employees to machine thinking and other innovations that would assist humans in understanding the impact of technological breakthroughs in changing the world of work. McKinsey Global Institute (2018) notes that precipitous technological progress has a positive impact in boosting economic growth and may result in prosperity in times when productivity is decelerating.

Despite being one of the largest economies in Africa, South Africa is overwhelmed by high levels of unemployment, economic inequality, a schooling system that is trapped in the first industrial revolution and widening digital divide (Ikdal, 2017). Socioeconomic development is one of many challenges that impact financial inclusion in South Africa, leading to a rise in small and informal businesses, start-

ups, medium and micro enterprises that rose because of high unemployment and a dependence on cash usage as a means of transacting (Ikdal, 2017).

According to Devey *et al.,* (2006), black South Africans constituting approximately eighty one percent of the total population of South Africa are the main players in the informal sector. South Africa is a cash driven economy and its chemistry of context and economic activity forms part of the social scope of money with a lot of businesses still only accepting cash.

South Africa is slowly moving away from cash usage due to socioeconomic challenges, gradual economic growth and an increasing number of people who are dependent on social grants (Bachas *et al.,* 2016). According to Statistics South Africa (2015), most sectors rely on cash as a means of payment with 1.8 million South Africans operating businesses in the informal sector. According to the South African Reserve Bank over 11 million South Africans are categorised as unbanked (without bank accounts) and 19% of the population including those with bank accounts still use cash, resulting in a growth of 8.23% of cash in circulation.

2.2.2 The role of the South African Reserve bank

The South African Reserve Bank is responsible for implementing the monetary policy of the country and it has the sole right to control currency production and monitor surpluses and shortages in this this respect. The Reserve Bank is also responsible for the wholesale distribution of coins and banknotes and the supply of currency. The Reserve Bank regulates cash holdings for commercial banks and makes calculated adjustments to control cash circulation (Bachas *et al.,* 2016). Cash Centres are a bridge for cash recycling between the reserve bank, branches, ATMs, wholesale and retail stores (Bekker, 2011). Figure 7 depicts the flow of cash in the economy and the role that played by cash centres in the cash distribution and cash recycling (Aldred, 2019). Abbas (2017), argues that the rise of contactless and digital payments could eliminate the use of cash as it is the case with progressive European countries. Fabris (2019), states that developing countries still value cash and the importance of systems and technological investments that will enhance cash management.

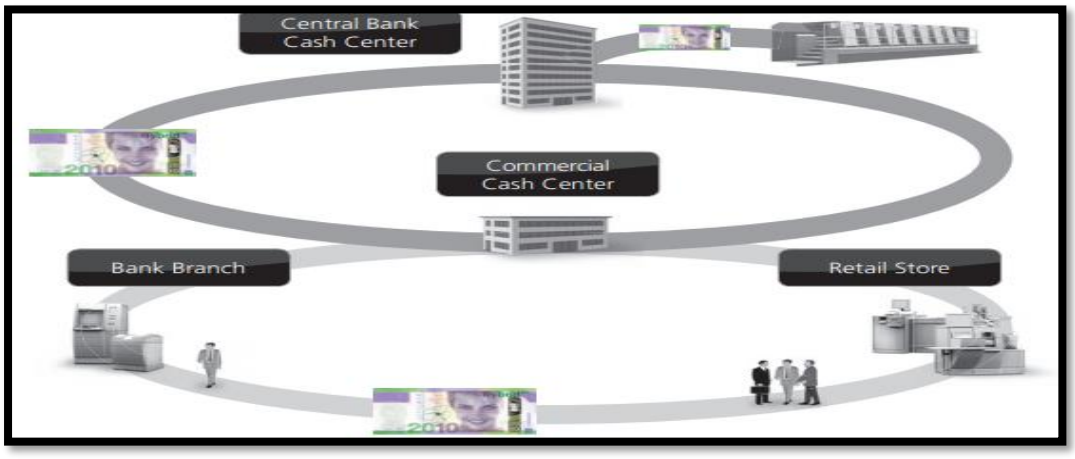

Figure 7: A depiction of a cash cycle (Fibris, 2019)

According to Heilbron (2021), it is important for cash centres to provide end-to-end solutions in the overall management of cash in a cost effective and efficient manner and comply with central bank standards and regulations. Cash centres can realise this through systems and integrated solutions that facilitate seamless processing methodologies such as high-speed processing and verifying of bank notes and coins that are verified and redirected into the deposit system and recycled to ATMs as well as the clearing of unfit notes for disposal (Labuschagne, 2022).

2.2.3 Bulk cash banking and relevance of cash

According to Marwala (2018), the business of banking is a series of activities that involves accepting deposits from customers and lending money. Across South Africa, the demand for cash continues to grow despite the growth in digital and electronic payment methods and innovations toward a cashless society. The growth in cash transactions compels banks to develop and incorporate advanced cash centres with automated cash management systems that will address and cater for bulk cash clients (Castells, 2001). The South African Reserve Bank forecast an increase of 7% in the demand for cash with 90% of cash used in active transactions (Mercadante, 2019).

2.3 Cash management systems at cash centre level

The cash industry is dependent on processes and systems to enable cash centres to operate better, faster, cheaper and safer: leading to an entirely competitive environment (Mercadante, 2019). Zillie (2019) warned that cash operations

should identify challenges, methods and tools needed to accomplish daily responsibilities in order to survive.

According to Gulledge (2006), integration concerns the synchronisation of applications or systems that were sometimes never intended to work together by impacting and passing information resulting in a better end state. First National Bank cash goal and strategy is to turn cash into a competitive advantage by focusing on cash operations, people management, improving finances and refining customer service across the cash value chain (FNB, 2022).

Figure 9 below depicts cash management systems identified by First National Bank Cash operations comprising of people, operations, service and finances. These facets represent a sub system that forms part of a whole. Human resources and finances should not be viewed as distinct areas, finance presents a holistic picture regarding performance, while people help to advance operational goals. A clear understanding of the role of other entities simplifies organizational objectives through collaboration (Milian, 2018).

According to Buttignol (2022), a balanced approach on internal business functions impacts on external outcomes, therefore the collaborations between people, finances and operations has a direct effect on customer service. The integration of sub-systems and facets can prime an upward spiral of innovations of operating processes towards breakthrough performance and return on investment.

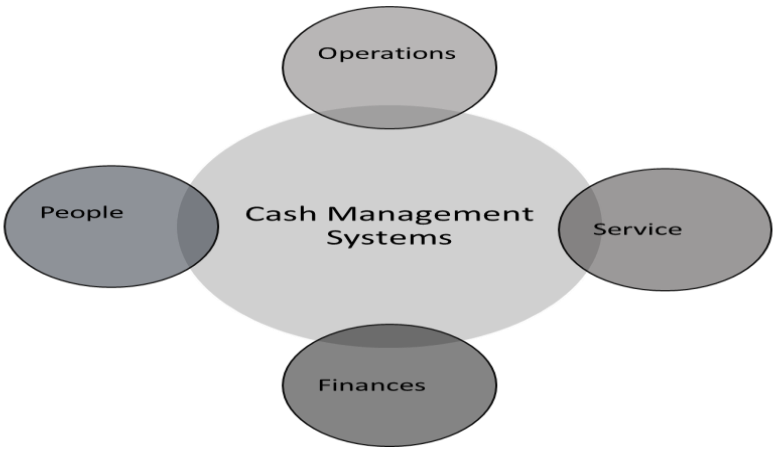

Figure 8: Cash centre management systems (Source: FNB, 2022)

2.3.1 Cash Centre optimisation and customer service

Market changes have had an impact on how commercial banks and cash centres structure cash management and cash circulation from the Central Bank of South Africa (SARB, 2019) to the consumer. The cost of cash represents the largest expense for cash centres, this is followed by operational costs such as employee salaries, stationery and the rental of processing machinery. The migration of cash from branches to cash centres, balancing customer service with the delivery of outbound cash for ATM replenishments requires cutting-edge equipment, collaboration, proper planning, systems and processes that will ensure compliance and efficiency (Dilijonas & Bastina, 2007).

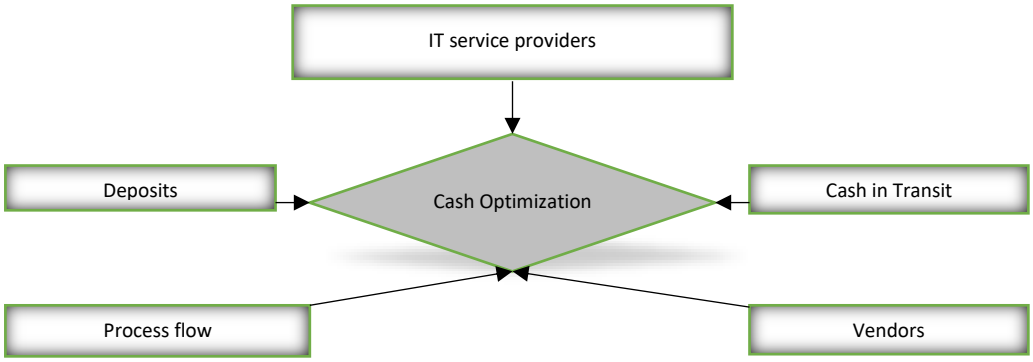

Figure 9: Components of cash centre optimization process

In a study by Dilijonas & Bastina (2007), the findings revealed that the optimisation of ATMs and the circulation of cash focused on optimization scopes of electronic systems concerned with retail banking and cash management. The study was limited to ATM optimisation, by contrast figure 9 above presents a holistic picture that incorporates other variables such as inbound cash, systems and support enablers for processes for process flow. Stakeholders such as Cash in Transit (CIT) companies cannot be ignored as there would be no ATM network or any movement of cash without them. Vendors who supply machinery and maintenance play a pivotal role in the success of the Cash Centres; all components complete a full circle towards good customer experience.

Wu *et al.* (2005) highlight the importance of customer service in building an economy, equally banks appreciate service delivery as a vehicle towards maintaining a competitive status. According to Greenland, Coshall & Combe (2006), developing countries such as South Africa need solid banks with infrastructure aligned product and service delivery that exceeds customer expectations. Whist banks offer similar products, Reichheld (2003) contends that

a principal differentiator is customer satisfaction which has become to be known as customer experience.

Since maintaining a competitive advantage is important for banks, intrinsically; FNB cash centres' strategy is to turn cash into a competitive advantage. It is therefore essential for business units to recognise and accept innovation as an important driver of competitiveness (Ikeda & Marshall, 2016). Vyas & Raitani (2014) attribute the transformation of banking methods to innovation, but due to industry risks; client tend to adopt cash devices as a 'forced adaptation' that compels cash centres to make in-house adjustments to be efficient.

According to Almohaimmeed (2019), there is a parity between technological advancement and customer retention, the latter serves as an effective tool for strategic advantage. According to Cohen *et al.* (2006), the ever changing landscape of banking calls for constant change and dynamic services that will appeal to customers (Bick, 2010).

2.3.2 Operations in the cash centre setting

Cash centre operations entail the processing of cash deposits that are credited into various accounts. Outbound services are sorted, recycled and cleared as cash requisitions to retail and corporate clients, ATMs and the South African Reserve bank.

According to Van Looy (2021), automating and improving business processes is essential for business units where processes remain a priority with reference to digital innovation. Cash centres need advanced systems, techniques, processing methods and reliable equipment to support and align business results with competitiveness.

2.3.3 Customer service at cash centre level

Customer service is a lifeline to gain a competitive edge within the cash value chain by attracting and retaining clients through relationship management, accurate and efficient counting processes that are on par with market trends (Tien *et al.*, 2021).

2.3.4 Financial stability of cash centres

The processing cost and unity rate serve as the main determinant of cash centre viability, it is in this regard that First National Bank cash centres seek radical models to ensure punctual processing of client deposits and servicing of ATMs and branches to increase the velocity of cash to lower cash holdings. According to Boitan (2009), a business units' stability is based on productivity and effectiveness which is the goal in cash process management.

2.3.5 Human resources at cash centre operations

People play an integral role in the overall management of cash centres and are tasked with management and leadership aspects of each area that leads to the success of the business. Stacey (2007), states that people serve as enablers in accomplishing organizational goals and missions as they oversee the strategic planning and the execution of daily duties towards fulfilling the business plan.

2.3.6 Process flow in a cash centre

The management of cash can be a tedious exercise that incorporates rigid cash management processes and procedures that are underpinned by strict policies and guidelines from the South African Reserve Bank as well as the highest service expectations from product houses and segments (SARB, 2021). Sapuan & Mansor (2014) highlighted the fact that business entities that favour concurrent processes and design can trim down costs and processing lead time. Accordingly, the design and flow should complement the flow of work to avoid waste.

Johnson, Burgess & Sethi (2020) posit that designing a cash centre process flow plan should be based on solutions in existence of uncertainty. This task can be challenging especially in the employment of complex systems with interacting disciplines. The design process involves the composition and decomposition of problems as well as calculative techniques to solve the formulated problems (DeLaurentis & Mavris, 2000). Lyu, Yang & Tang (2015) point out the importance of the planning phase in relation to decision-making during the design phase.

According to Breschi (2022), customer needs should be taken into consideration as well as gaps in the market with specific focus to improved quality and simplification. Process flow in the cash space is dependent on the good design that

is in sync and aligned with realistic processes and procedures that are aimed at simplifying and safeguarding the interest of all stakeholders. This point is accentuated by Wang *et al*., (2013), that the practical examination of an optimised operation should comprise of functional business goals, resources and measurable performance objectives.

Striking the right balance between operational and administrative processes is imperative for bulk cash processing. Both areas should be aligned towards customer satisfaction, but the design relies on people, systems and equipment that work towards meeting desired goals. In cases where there are no proper alignment between the design and tools, the business unit runs a risk of operational inefficiencies and deficient reconciliations and misaligned operational reports (Sivo *et al.*, 2021).

Smith (2011) argues that the flow of work in the cash centre is dependent on lean manufacturing as opposed to mass batch production. Swank (2003), notes that lean management can reduce errors and improve competitiveness and efficiency through streamlined processes comprising of value-adding phases. Womack & Jones (2003), justify the importance of design and optimisation in the management of flow in enhancing operational performance with specific focus to space utilisation during the design phase.

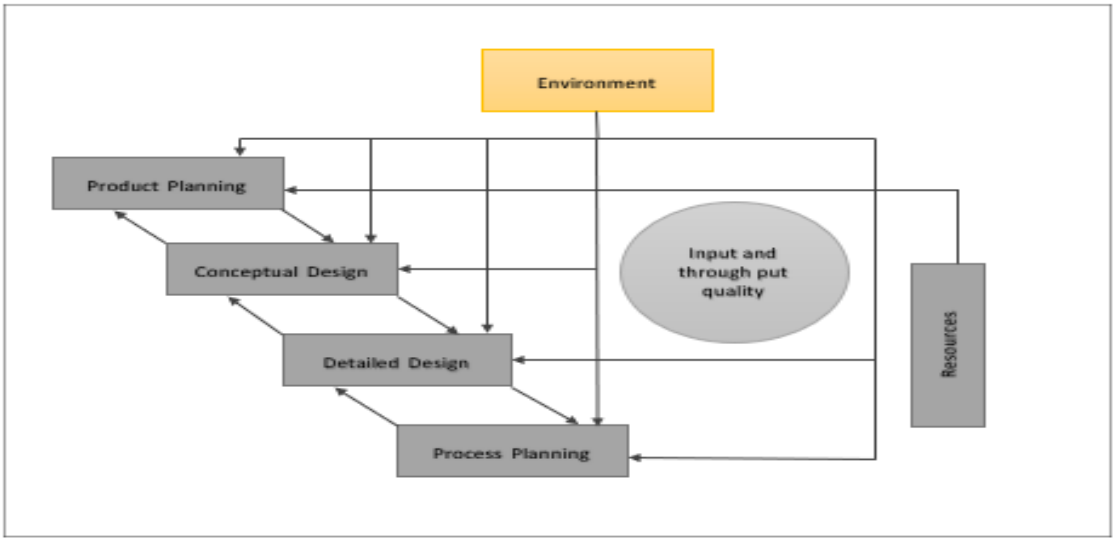

Figure 10: Process design model and its elements (Chang, 2021)

The design and its elements play a critical role towards the success of the business unit and in product development. The environment is dependent on management functions, principal among those is the product planning phase; this phase tends to have a systemic impact in synthesising the conceptual design scheme (Lenglet, 2021).

Feng *et al.,* (1996), emphasize on transforming and completing the geometry of products and undertakings that includes the structure, feature compatibility and materials. Moll *et al.,* (2004), highlight the importance of design in process flow by noting the inevitable possibility of failure to fulfil desired numbers or quality attributes.

In this regard, cash centre operations are constantly challenged by internal and external factors that drive them to re-engineer processes, systems and site structures (Lenglet, 2021). Customer and environmental demands arising from an increase in cash volumes and demands compel cash centres to stay abreast of cash demands within the market. It is therefore crucial that cash centres design and enhance solutions that will stand the test of time in relation to automation solutions that encompass security and processing efficiencies (Breschi, 2022).

2.3.7 Cash Centre layout

Unlike branches, cash centre operations are outsourced by FNB competitor banks to curtail cost of funds and cash operation costs as well as to limit risks associated with bulk cash handling such as secure buildings, designed to house big machinery and space to manoeuvre and store bulk cash (notes and coins), security and building maintenance. Cash centres are sophisticated by design to cater for reception chutes, trolleys, teller counting tables, conveyor belts, shelves, server rooms, offices and vaults to enable proper cash management and to promote easy and safe cash recycling demands while avoiding industry penalties. In most cases, cash centres are situated in industrial areas as opposed to branches, the main reason for this paradigm is that most Cash in Transit companies prefer areas that are not populated (Giesecke & Devriet, 2019).

Figure 11: Overview of the bulk counting area in a Cash Centre (Cain & Hauque, 2008)

Figure 11 illustrates a cash centre counting house, an environment with no clients as opposed to a branch setting (Smith, 2011). According to Hraze (2013), branch banking is also moving away from contact banking in favour of electronic banking.

Celliers (2018) suggests that digital baking brought about better branch banking experience which in turn led to the relocation and migration of bulk cash clients to cash centres. On the other hand, segments such as cash centres can expand by gaining needed cash volumes (McKane, 2018).

2.3.8 Types of deposits

Cash centres handle deposits from Small and Medium Micro Enterprises to Corporate clients and Cash and Carry wholesalers. Deposits are received in different forms, shapes and sizes in terms of the sophistication in packaging from clients that utilize manual banking consumables such as stop-loss tamper evident bags that are supplied by Cash in Transit (CIT) companies.

Some clients make use of non-sophisticated cash devices such as drop-safes and electronic cash devices commissioned by vendors such as Cash Connect and Deposita bag and Cameo cannisters (Phillips, 2016). Cash devices are more expensive as some of them enable clients to receive value on pick-up and value on drop; depending on the sales and insurance structure that is chosen by the vendor or the bank in case of agreed end-to-end solutions.

Figure 12: Cash floor design and equipment (Cain & Hauque, 2008).

Due to the nature and size of deposits as illustrated in figure 12 above, it is imperative for the cash centre floor to follow a specific design that will prevent confusion and ensure seamless workflow. Suitable equipment and tools are required to maximise the centre's impact in accordance with set performance management indicators (Cain & Hauque, 2008).

2.3.9 Small drop safe deposits

Small vendors and fuel filling stations make use of a till system introduced and managed by Cash in Transit companies also known as a 'Depository safe' banking (Chaumont Menendez *et al*., 2015). This system is aimed at controlling the till balances and to mitigate risks, but the model is for Cash Centres as it requires time consuming manual interventions.

2.3.10 Bulk neat deposits

Corporate clients bank single and multi- drop deposits that are packaged in tamper evident bags accompanied by a paper envelope that contains the supporting documents that require only prepping and matching (Cabello, 2013).

2.3.11 Device deposits

High end clients make use of cash devices fitted with note validators capable of transmit transaction information to the vendor during the pick-up stage. These

devices are offered by Cash Connect, Deposita from Group Four Securicor (G4S) and Coin Cameos that is offered by Protea Coin and Fidelity Security (de Swardt, 2015).

2.3.12 Quality at source

Due to the stringent service level agreements, cash centres favour well packaged deposits and sorted cash to avoid variances, missing documentation and disorganized consignments have a negative impact on the operation in terms of overtime, processing costs, balancing and cash holdings (Ortiz, 2009).

2.3.13 Counting process

According to Anon (2017), time and process-flow are a major issue in the day to day running of an operation like a Cash Centre. The counting process depends on input quality of deposits. Customer deposits are first prepared for counting, it is at this stage that most of the time is wasted as the tellers first need to separate or put together and bundle the notes and simultaneously remove staples, paperclips and elastics that might hold back or jam the note counting machines (Anon, 2017).

2.4 FNB bulk cash banking

First National Bank is the only bank that kept bulk cash centres, unlike other competing banks that outsourced to various corporates such as Fidelity Group, SBV, G4S and other smaller counting houses to avoid operating costs. First National Bank decided to keep the cash component as an endeavour to take advantage of learning opportunities, to increase market share to retain customers (Kendrick, 2009).

2.4.1 FNB Cash Strategy

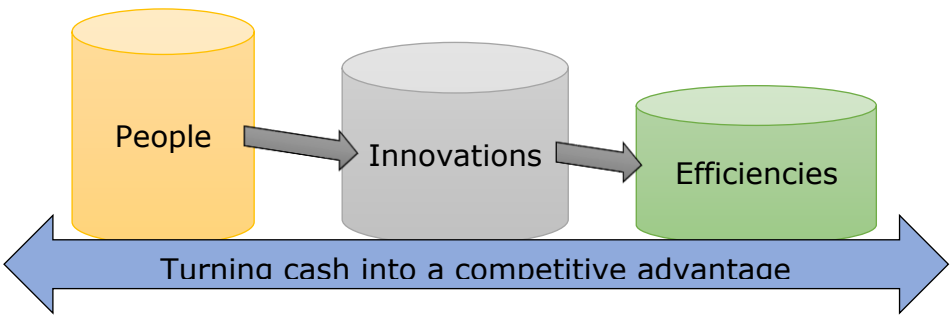

Figure 13: FNB Cash Strategy

First National Bank Cash focuses on growing the cash component by facilitating cash management solutions. People implement innovations that maximise efficiencies. FNB Cash centres control cash logistics within the First Rand Group and processes bulk cash deposits and electronic cash device deposits. FNB cash centres are classified as cost centres; they merely provide support to other segments such as branches and recycle cash- are hinged on managing process flow through design, technology and innovations (Matongela, 2013).

2.5 The evolution of technology in banking

According to Werner (2014), the banking sector is experiencing significant changes with new technologies that are disrupting and challenging the traditional banking models. Klobler (2016), states that digitalization is the leading trend in transforming banking towards competitiveness with automated processes serving as a springboard for banking solutions that may affect bulk cash systems and the development of smarter processes and adaptive equipment.

Figure 14. below depicts emerging technologies and models in response to customer needs. While customers demand tailored service, banks are challenged to implement digital solutions, supply-chain integration, cost effective operational models and safe transacting platforms that will enhance data analytics capabilities.

Figure 14: Business of banking models and disruptions

Source: The Deloitte banking business publication (2020)

2.5.1 Automation and Process design

According to Botes (2021), automation alters many domains of the economy including everyday life. Technological advancements in writing, printing, driving, manufacturing and communication has seen change over the last decades (Leung, Paolacci & Puntoni, 2018).

According to Colom (2019), banks are benefiting from automation in changing the industry. The first Automatic Teller Machine (ATM) was introduced in 1969, since then; the banking industry introduced several ways and techniques to improve customer service and other banking requirements. The ATM shown in figure 15, is an electronic devise that paved the way for many innovations in the banking industry. The ATM enables bank clients to make cash withdrawals and other financial transactions. The banking industry introduced ATM into the banking system's infrastructure improved convenience and the availability of cash to the public, computerization of offices that reduced of paperwork, banking applications that enabled customers better insight and control of their finances, chatbot systems that automatically respond to sophisticated and numerous requests and enable banks to let their employees to spend more time on crucial tasks (Oluwatolani, Joshua & Philip, 2011).

Automation has had a major impact on productivity and economic activities in general. Industry 4.0 such as robotic process automation (RPA) compel financial institutions to automate products and services. RPA helps organisations to save time and eliminate errors whilst improving customer interaction and improving efficiency (Ribeiro, *et al.*, 2020).

The use of digital services has become a growing trend in organizations due to an abundance of technology and the evolution of information systems. The financial sector and banks are evolving due to competition from FinTech companies that exert pressure at time where banks are rassling skills shortages, improved processes and a need to escalate efficiencies which necessitate the implementation of PRA towards virtual interventions and artificial intelligence (Ariwala, 2022).

Figure 15: The first cash dispensing Automated Teller Machine (ATM) (Colom, 2019)

Whist automation is regarded as one of the most important advances in the manufacturing process; Mishev (2006), implies that automation is associated with high productivity and competitiveness. Thus, making an explicit connection between outer demands in a form of changes that border the process, along with internal factors consisting of the organizational structure and human resources.

Remes *et al*., (2018) point out that a positive correlation between the productivity growth of an organization and its level of digitization. Technology and digitisation have led to new ways of process through which people interact in general and professionally, the design and construction of buildings, operations and other activities such as the knowledge creation and research.

2.5.2 Technology and digitisation in cash operations

With the rise of financial technology companies, the banking industry is facing challenges to boost productivity and to manage costs in order to maintain positions and to remain at the top. Due to technology and digitisation, banks are competing with fintech companies, which are vying for personal finance management, lending, payments technology and cryptocurrencies (Stani, 2019).

Technological evolution in the banking space brought a stimulus in the market that encourage changes on traditional institutions to embrace digitization and emergent technologies that can enhance business processes (Liang *et al.*, 2008).

Several researchers have dwelt on the implementation of digitisation and mobile technology (Kennan *et al*., 2002). The majority of these authors focused on the exploration of technology using short massages for marketing purposes. It was Tarasewich *et al.,* (2002) who delved on to the creation of value into products and services derived from the exploitation of technology and digitisation. The primary goal for any organisation should be to yield from technological advancements that translates into a movement towards growth and profitability.

Technology creates many possibilities and opportunities for cash centres to access data, communicate and work from different locations and to create advanced analytics and models for daily operations (Beukes, 2018).

2.5.3 Digitisation in the banking sector

According to Giri & Paria (2018), digitisation is not an option for banks but a necessity. Western countries and Asian countries such as India and Singapore are currently grappling with the possible emergence of a cashless economy. The banking industry understands the value of digitisation which in the banking setup is about turning data to a form of digital arrangement and embracing technological changes.

Digital banking may incorporate the adoption of emerging technologies that enhance banking with payment platforms such as debit cards and instant payment services where people send and accept wallet payments without going into much trouble. In other instances, people make payments using quick response (QR) codes that are scanned to vendors instead of using credit cards and cheques (Shettar, 2019).

Mohana (2018), states that the world has entered a modern banking culture through advancements and modern-day improvements in the way people and organizations transact. Technology and the internet paved a way for a digital revolution in banking, where banks strive to provide high quality banking applications. A holistic approach is where digital banking becomes fully integrated resulting in contactless banking, shorter queues and less time spent in branches (Shettar, 2019).

Figure 16 below illustrates old bank printing machines and a back-office area that housed cumbersome machines that look burdensome, but these machines fitted the times in which they operated. The banking industry invested a lot of money in new technologies over the past decades and as a result, information and communication technologies led to new product and service offerings in this sector. As a result of simplification and convenience, the banking sector adopted strategies that countenance infrastructural improvement and digitization (Shu & Strassmann, 2005).

Figure 16: Bank printing machines (Bradley, 1968)

According to Gillies (1994), Information Technology was governed by a specific model which was dictated by two components: hardware and software. The third and silent sphere dealt with the joining and implementation (Miller, 2017). Banks still run mainframes but there has been a shift recently from this approach with the movement to the cloud computing. According to Cecchetti (2002), digital revolution is changing the entire financial services environment, the financial sector is somehow puzzled by digitisation although improvements brought about by technology simplified things operationally and from the strategic point of view.

Li (2017), suggests that digitisation creates an accumulation of extra capital in a way that it offers an opportunity for the financial industry to accumulate extra productive capital. Phillipson (2017), advances the idea that improved services are resultant from digital innovation. In this regard clients benefit from easy access to financial services, convenience, privacy and safety.

Figure 17 below shows a speed point card machine as well as portable electronic devices that clients used to connect to banking applications and to transact

remotely instead of visiting branches. Cormert *et al.,* (2016), attributes structural changes in technology to the financial sector's evolution towards competitiveness.

Figure 17: Modern banking devices (Shetty, 2017)

Banks are benefiting from digital technology and innovation resulting into financial stability and profitability. It is however interesting to note that in other instances such as the introduction of innovations during the 1960s, such changes led to an opposite outcome and financial immobility. A secondary result was incoherence and institutional weakness (Carbó-valverde, 2017).

According to Massey (2015), innovation and new technologies have influenced and transformed the world of work and individual's lives. People refer to new terminology such as the new economy and the technological revolution as an expression on how things have changed. The impact on digitisation has come with high speed, with potential to transform the financial sector and its competitiveness. Such changes imply the revolution of banking and bank delivery channels. The growth of FinTech companies amplifies productivity and competitiveness.

2.5.4 Delivering Superior customer service through technology

The world is in the middle of the Fourth Industrial Revolution (4IR) that combines Artificial Intelligence (AI), robotics, 3D printing, the Internet of things, quantum computing and generic engineering coupled with other innovations that make life simpler and contribute to the speed of doing things as well as the enhancements in efficiencies and productivity. Significantly, banks have spent considerable time implementing new strategies to prosper in a precipitously digitized and data driven market to improve customer experience.

Retail banks in South Africa rely on technology to enhance operations, and the biggest highlight will be the implementation of systems and processes that enable banks to provide banking solutions. According to Musara & Fatoki (2010), technological innovations have a direct impact on cost reduction, profitability and service delivery.

Jayamaha (2008) posits that customer service in banking is enhanced by speed and accuracy in processing deposits and withdrawals as well as the transmission of information and the marketing of various banking products. It is also important to note that the introduction of technological and innovative devices boosts staff and customer awareness in relation to products and benefits. Porte & Hazelhurts (2003), attribute the considerable amount of success to technological innovations such as the internet banking that revolutionised banking by reducing costs associated with access, time and the overall convenience.

The internet brought about better telecommunications networks with on-line transactions. On the other hand, heavy reliance on new technology can bring outcomes for both the clients and banks if such technologies fail. Austin (2007) warns that a single case of shutdown or a breakdown of an Automated Teller Machine may attract huge costs or at worst reputational risks.

2.5.5 Enterprise content management and inventory supply accounting

The use of software and data management in a cash centre eliminates manual processes in cash counting, verification, track and trace as well as balancing (Gascoigne, 2019). Enterprise Content Management (ECM) and Inventory Supply Accounting (ISA), provides cash centres access and track and trace capabilities in real time. In this regard data is not lost but it is recoverably stored, controlled and recorded (Khan, Faisal & Abdullah, 2018).

Supervisors and managers can view and interrogate operational data and historic reports. Automated systems such as ISA enhance customer service by taking care of internal and external customer queries with the integration of cloud-based solutions for convenience, safety and cost reduction on Vault Management Systems (VMS).

2.5.6 Automated Commercial Deposit Processing (ACDP)

Walsh (1998) asserts that automated systems have been developed and utilised with success both in the banking and retail sector. These systems improve the handling of transaction data for financial instruments. Cash Centres employ high speed deposit processing that eliminates waste resulting from manual cash handling. The ACDP processing cuts repetitive stages in cash processing and saves time as the cash is processed in a streamlined process. According to Hashemi-Petroodi *et al.* (2020) with the ACDP process, the cash centre could process high volumes and mixed deposits in the same pass and reconcile continuously improving machine uptime, associated costs.

2.5.7 Quick Delivery Program (QDP)

By using advanced machines that can process cash on the quick delivery program module can enable cash centres to save time and resources. QDP enhances processing automation by removing dividing header and trailer cards and unifies the process. To secure the process and guarantee dependability, several advanced algorithms that are underpinned by contextual familiarity are in place to improve recognition (Malali, 2020).

The closed loop strategy is used as a processing tool to check for consistency. Deposit data is protected by the system and can be traced back to the preparation stage by highlighting the user seal number that acts as a deposit identity (Bunke, Impedovo & Wang, 1997). Cash handling and the bank's drive toward merging and maximising efficiencies could not be possible with primitive methods that involved manual cash counting and outdated machines that did not have any capability of reading and sorting. The manual process of counting meant that people had to rely on their own skills and concentration, this therefore meant that banks paid more overtime, and the processes were not error free (Hashemi-Petroodi *et al.,* 2020).

Figure 18: Primitive manual counting methods and an old note counters (Bradley, 1968)

Earlier bank note counters depicted on figure 18 were primarily designed to escalate speed and accuracy in accurately counting the quantity of banknotes. These machines could not detect defects and had no sorting and batching capabilities. Without the sensor technology, the note counters had no reading and detecting aptitude. In most cases, the next generation of note counters continued that trajectory and were flawed in terms of design as they had only one output pocket and were limited to counting one hundred notes at a time (Malali, 2020).

Figure 19: Note counting machines (Hyundai, 2017)

Improvement in technology, complexity, economic variables such as growth in population, demand and supply had a positive impact in the growth and intensification of cash volumes, therefore manual and entry level machines were no longer suitable for bulk banking and the cash industry (Gopalakrishnan, 2020). The South African reserve bank approved machines equipped with note sensors and multiple pockets as well as a capability to integrate multiple applications and processes such as Inventory Systems and Accounting (ISA) and Automated Commercial Deposit Processing and Quick Delivery Program (QDP) (Enemuor, 2012).

Schmidt & Nakajima (2013) argue that cash centres must drive resource efficiency by checking the product's functional benefits, usefulness and durability. This can be done by evaluating attributors to potential losses by pointing out economic

benefits that are derived from resource efficiency. In addition Baily *et al.*, (1995) aver that; the nature of competition facing companies, has a strong influence on efficiencies and production processes. This concept typifies the fact that business units such as cash centres need the best technologies to achieve output per hour that is higher competitors and a micro-oriented framework that incorporates accounting techniques that highlight the propensity to achieve labour productivity.

2.6 Cash handling and counting equipment

According to Mityas (2018), machines are changing business operations. Gone are the days of complete dependency on intuition, as a substitute; data-driven solutions take centre stage. Technology is fast replacing repetitive tasks that were previously done by human beings. In general, the operations floor is implementing technology hurriedly; with tech that brings harmony between strategy, high-tech speed and efficiency. De Jong & von Hippel (2009) support the view that firms often innovate to resolve inhouse problems, before market needs. But as soon as the implemented methods become viable; the market reacts to these products and other producers and competitors learn and adopt items, machinery and systems from lead users (Malander, 2017).

Empirical evidence from Dutch small and medium-sized enterprises (SMEs) conducted during the year 2009 found that more than fifty four percent of high-tech enterprises survived by developing new and modifying existing process equipment to enhance efficiencies. Through radical innovation which is dependent on collaboration with other role players such as suppliers, competitors and customers towards cocreating products and services; resources are blended to co create and outline an innovation ecosystem (Planko, 2018).

In this context, cash centres also rely heavily on high-tech equipment and technology to meet market needs and to fulfil strategy requirements. It becomes a matter of survival whether the cash centre as a business unit can be successful in a rapidly changing market space. In this regard, the decision to go with a particular tool is mainly informed by strategy requirements (Shiby, 2021).

Cash Centres rely on high-tech machinery with flexible capabilities such as open architecture and strong infrastructure for counting and note sorting. These translate in cash processing solutions which can be tailored for exact needs at a

given time. In this framework, there is a heavy reliance on machines with multiple pockets that can be configured to cater for several needs.

Figure 20 below illustrates comprehensive modules that enable full integration, former limiters such as data solutions are essential for record keeping and machine data. Since cash centres count different deposits from different customers, it then becomes a necessity for note counters to run different modules and capable of counting cash received in any condition. It is therefore crucial for note counting and sorting machines to offer a variety of functionalities for banknote processing that conforms to diversity and individual needs of the operator. Cash centres and commercial banks require counting machines that can operate with utmost reliability, security and efficiency in line with the set industry standard (Coco and Viegi, 2019).

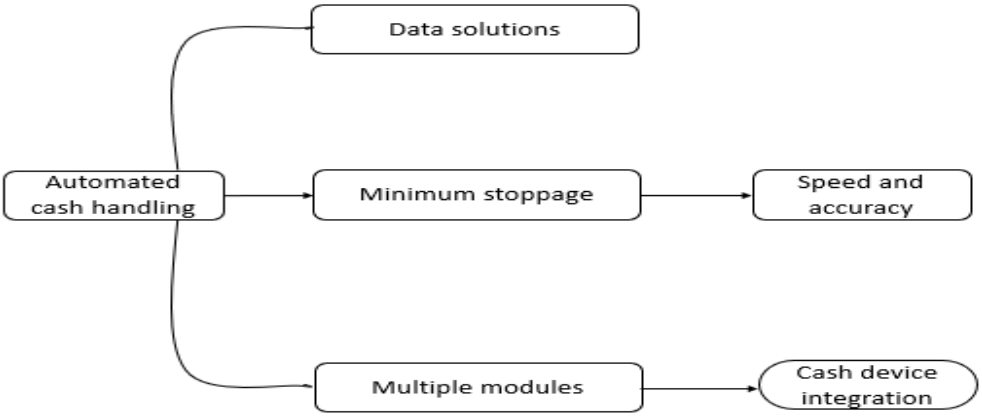

Figure 20: Modules of a high-tech counting machine for cash centres

According to Hosny (2019), cash counting machines are one of the most beneficial products that cash centres rely on, just as most businesses need an up-to-date cash machine that can get the job done swiftly and efficiently. Modern cash counting machines have sophisticated software that enable optimised processes to run seamlessly for track and trance and trouble-free end of day balancing. It is essential for bulk cash counting that the machines are fully automated.

Figure 21 depicts the G+D's BPS-M7, a modular high-speed banknote processing machine that is specially designed for cash centres and the central banks. This machine is boasts intelligent automated systems that cater for highspeed processing. The M7 can reach up to one hundred and twenty thousand (120,000) notes per hour by balancing speed and accuracy for deposit verification, sorting

results for fitness and authenticity. In this respect, digitization has become a reality with machinery that boast thickness sensors that can be set for global banknote counting, processing and serial number reading.

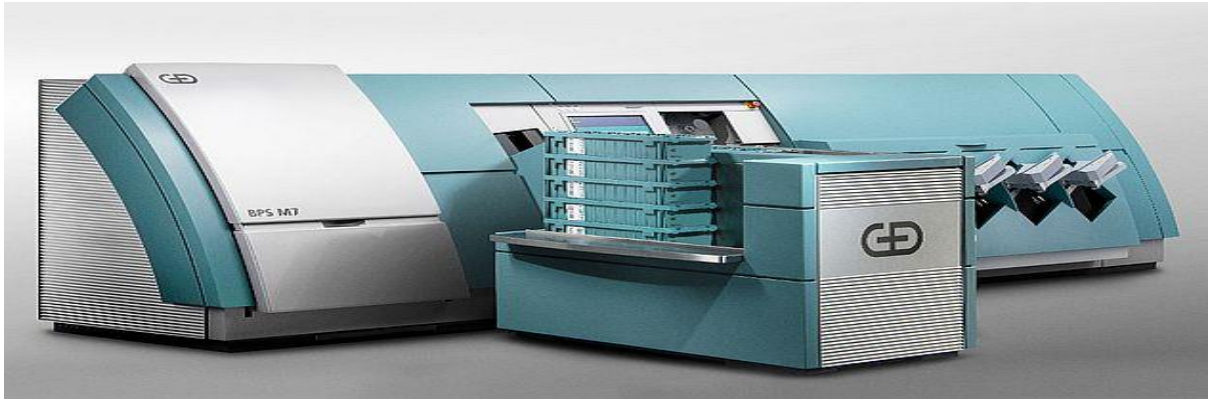

Figure 21: BPS M7 from G+D (G+D Group, 2018)

Machines such as the BPS-M7 are well placed for cash centre management as they incorporate vault management systems (VMS) software that has straightforward deposit verification and cash safes management. Different modules are used for balancing deposits and for reconciling trailer and header-card processes. According to Nardo *et al.*, (2021), these machines require maximum care, technical support, maintenance and system updates. The upside is that companies like G+D offer tailor made operator training and consultation for cash centres in an endeavour to ensure that the cash centres reap the maximum benefit from the units.

G+D's rival, Cash Management Solutions also offers high-tech cash counting and sorting equipment that is backed up by cash centre consultancy, software and data solutions. CPS's solutions comprise of integrated solutions that enable cash centres to have full access of bank note data as well as machinery that binds and shreds soiled notes. Organizations that produce note sorting machinery are fully aware of the need to cater for lasting partnerships with central banks and cash centres to conform to set standards and to understand various business unit's strategic needs.

Figure 22 below shows a CPS i7000 sorting machine with intuitive, intelligent and innovative settings. This device is marketed as an industry leader in note counting with high-resolution camera systems and banders within pockets. The modular configuration allows for several options that enable configurations that are congruent with processing needs. The i7000 conforms to sorting standards set by the South African Reserve Bank.

Figure 22: A CPS i7000 counting and sorting machine (Vignes, 2017)

Note sorters have sophisticated software to interface with in house processes for seamless integration with networks with ISA software and the Automated Commercial Deposit Processing that optimises efficiency and productivity (Nöth, 2002). It is important to point out that no matter how complex the machine, the biggest problem with cash centre efficiency is the quality of through put that is determined by the deposit make-up.

According to Tiwari *et al.* (2021), manual interventions such as the preparation process is done by hand; manual banking slows down and reduce the cash centre performance and work flow as most of the time and resources get wasted during the prepping process where a bank teller would normally prepare a deposit for counting. This process alone accounts for a third of the entire process from reception, counting and cash recycling as well as the dispatch stage which is the final stage of the entire process. Wajcman (2006) states that there is a power relations frame which necessitates for new connections to be formed and for a better design to emerge where machines and humans interact well to form technological advancements that will settle and reconcile human action and technology performance.

2.7 The impact of cash devices on processing efficiencies

According to Bohen *et al.* (2011), cash devices are used by other cash handling entities besides commercial bank branches. Retail stores that consist of a multiplicity of point-of-sale devices such as cash tills that are located throughout the store rely on electronic devices for safety, accuracy and reconciliations. In some cases, retailers use manual techniques to retrieve sale data from each point-of-sale location. In this instance the retailor or the supervisor verifies the physical cash for cash-ups and banking pick-ups.

In contrast to manual cash management, cash devices enable users to monitor and detect cash discrepancies that could occur between physical cash and cash-up balances (Ndengwa, 2019). Furthermore and depending on the device, shift managers are able to get line of sight into expected deposits in regards to business performance during the month and during peak periods. Us & Robert (2002), suggest that cash devices can be used in bank vaults to verify notes and or coin. In the South African context, cash devices with additional security features are used as an instrument to prevent robberies and inhouse theft.

According to Ewa Abbas (2017), cash devices play a pivotal role in saving time and money, simplify financial reconciliations and provide cash management security that interfaces with bank systems for seamless matching and reconciliations. Figure 23 illustrates main selling points for cash devices in South Africa. Navon (1996), states that cash flow is an important component of cash management which forms the core of business sustainability often requires smart and efficient instruments that will safeguard businesses.

At most, cash devices offer end-to-end solutions that facilitate the storage of cash on site before pick-ups by cash in transit companies. These devices facilitate the safety of monies that are dropped at the sales point, affording store managers and business owners the privilege to remotely monitor the performance of their operation and fast-track credits through value-on-drop or value-on-pick-up options.

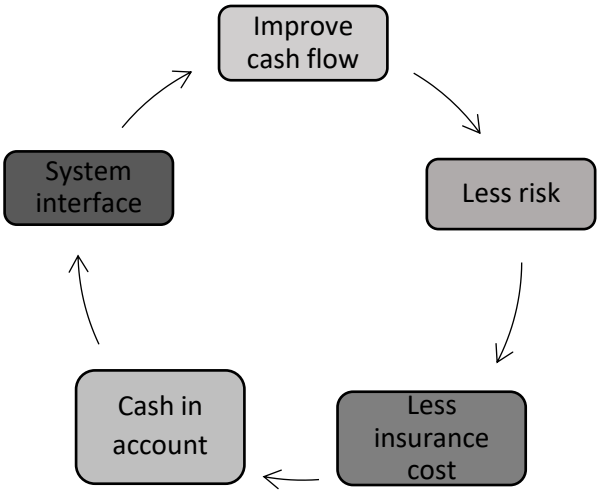

Figure 23: Cash device selling points

Narendiran, Rabara & Rajendran (2008), emphasise that clients benefit from credit interest that is earned in instances where the contract permits credit on removal or credit on banking by means of end-to-end banking solutions. In this instance, cash device clients benefit from receiving value on drop and receiving value on pick-up. Clients who opt from this device option are exempt from risk exposure as cash handling is outsourced as soon as the canisters or bag is removed. It is important to note that with cash devices, onsite risk is reduced when cash is deposited into a device as cash is stored within a secure device that doubles as a mini vault that serves as a deterrent to robbers and other risk exposure such as shrinkage.

Figure 24 shows a vault-based cash device with a canister, in some cases canisters are not favoured by cash-in-transit companies due to additional administration and logistical issues such as space and docking control requirements. But these canisters may improve efficiency and reduce costs by transferring the risk to the bank using the online portal for cash transfers.

Cash devices guarantee streamlined cash handling solutions, with automated cash management solutions that ensure a safe retail environment. Wholesale and retail stores can choose from a range of devices with a maximum capacity of ten thousand notes per bag. The automated counting function of the computerised machine reduces human error and saves time. Tally slips are used for record keeping, retrievable data can later be used for reconciliation with bank

statements. Business owners acquire full access to an online platform, that enables the tracking of every deposit that is made into the device.

Figure 24: A depiction of a cash device and a cassette cannister (FNB Smart Box, 2015)

While automated cash handling systems and devices are attractive to big and small businesses, there are drawbacks associated with these systems. Most cash devices take a limited number of notes. Cash devices offered in the South African market are only capable of validating the authenticity of the notes and not the quality of notes that are accepted by the validators (Szczepanik & Jóźwiak, 2018). Cash centres spend the bulk of the time preparing and packing notes for counting. This aspect alone is an immense drawback on the operation that could force the business to revert to manual banking.

It is also important to note that cash devices come at a hefty price with additional maintenance costs for support technicians who ensure that the machines operate as expected and that the users are using additional tools such as preparation trays and handle the machines correctly.

The rise of artificial intelligence, mass-production and the prerequisite to be competitive is driving a new wave of trends in innovation. Cash centres rely on good financials, processing efficiency, innovation and agility to survive (Rao, 2019).

According to McAfee & Brydnjofsson (2017), current technological changes compel organizations to reconsider the balance between human minds and machines, platforms, products and the core which customer perceptions and decisions. Through innovation, people can contribute to data that forms part of the global accumulated knowledge.

2.8 Customer processes and cost

Narendiran, Rabara & Rajendran (2008), state that in the face of technological advancements, there are service influencers and perception shifters in regard to cash processing and digital payment methods. According to Mpogole *et al.*, (2016), global trends show that non-cash transactions are on the increase with almost 320 billion digital payments made by the end of year 2012. With global interconnectedness across the globe, emerging markets are showing an increase in this mode of transacting. Mobile money services that are boosted by mobile telephony are adding to several banking facilities. Kameswaran & Muralidhar (2019), in contrast express that in developing economies such as South Africa and India; millions of consumers counting the middle class, the poor and those buying from informal traders trust cash transactions. Kameswaran and Muralidhar's research implies that over sixty-three million people with visual impairments as well as people with disabilities who battle with social and economic participation solely rely on cash transactions. Besides attitudinal barriers and a lack of inclusive financial infrastructure, in South Africa, there are some industries such as scrap metal recyclers and waste recyclers who prefer to use cash only.

The existence and relevance of cash in the economy make a good case for the existence of cash centres. While cash centres are regarded as cost centres, there are certain strategic requirements that push for efficiencies in these business units such as balanced score cards and financial dashboards. According to Muela *et al*., (2017), cash is still the leading method for making payments globally; with over 46% of transactions in the United State and 82% in the European Union. Cash transactions are less significant in value terms. A related literature on the role of cash in compensation concludes that cash wages are more attractive and motivating in retaining employees (Ouimet & Simintzi, 2017).

In line with figure 25 below, cash is recognised as a suitable and simple instrument for making direct payments. Vulnerable groups such as the working poor, social grant recipients and the visually impaired groups trust and rely on cash payments. While electronic and card payments can speed up the payment processes and bridge the distance between the payer and the recipient; card and electronic payments present a different set of challenges in relation to security and potential fraud (Jones, 2015).

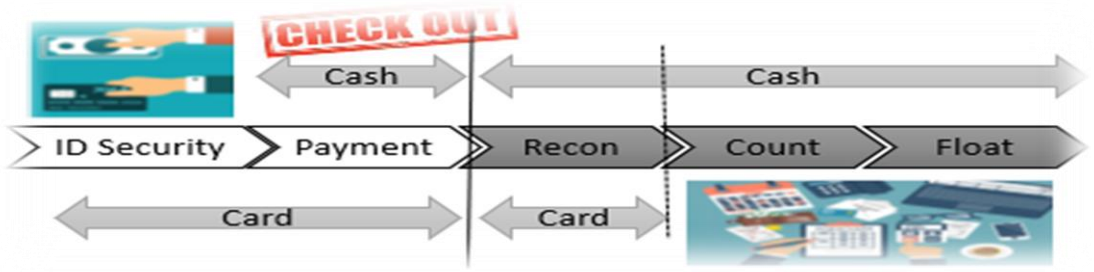

Figure 25: Cash efficiency model (Zille, 2020)

The cost of payments can be a complex exercise with variable results, on the contrary; cash remains a yardstick against which the adeptness of other instruments is measured. Montgomery (2016) posits that cash is the most efficient payment instrument for low-value transactions which form the bulk of informal retail transactions, while electronic payments are predominantly associated with transactions conducted in affluent sectors of the economy. The cost of electronic payments is mostly associated with the electronic infrastructure, conversely cash-related costs are based on processing models, the cost of transportation, holding costs and unit rates (Obuya, 2022).

2.9 Cash centre sustainability

The sustainability of cash centres is determined by the cost of processing cash which forms part of the strategic management and performance that serves as a barometer for business functions and subsequent peripheral sequels (Niţă & Ştefea, 2014). The employment of scorecards forms a pathway for key elements of the business approach and tactics that form incessant improvement and desired results in cash centres.

Kaplan & Norton (1992), point out that financial measurement systems should be tied to operational enhancement in areas such as cycle time and defect rates; they argue that taking care of the latter will predictably impact on the former. Kaplan *et al.,* (2003), support the view that measurements drive performance and that companies which are able to maintain a competitive advantage are the ones that are able to turn the business strategy into a corporate challenge. Hegazy & Hegazy (2020) argue that there should be a balance between financial and no-financial indicators on performance measures that lead to a competitive advantage. This argument is supported by Albright *et al.,* (2015).

2.10 Cash centre production measurement instruments

For cash centres to be sustainable, cash centre operations managers pay close attention to the set strategy and ensure that team and all role players are intimately involved with the strategy. For Neilson & Martin (2016), strategy means continuous planning, supervision, analysing and assessing organizational imperatives towards achieving set goals. Wooldridge & Floyd (2020), observed that a brilliant strategy can lead to competitiveness when implementation is comprehensively fulfilled.

Figure 26 illustrates strategic operational performance management channels that operations managers use as a measurement for strategic alignment. Each facet is as important as the next; financial performance measures the financial health of the business unit by measuring financial results of each cash centre in respect of financial expectations and current performance. The data derived from financial results is used as a scale to measure up against other cash centres in aggregation.

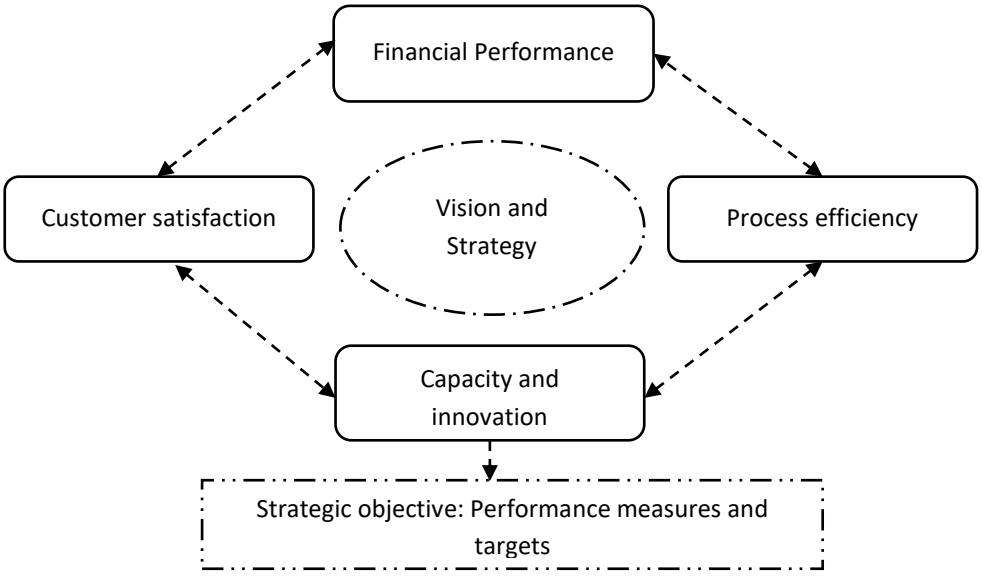

Figure 26: Strategic operational performance management channels (Duncan and Elliot, 2002)

According to Duncan & Elliot (2002), the profitability of a financial institution is attributable to service and quality in an automated banking context. Wiele *et al.,* (2002), share the same opinion in connecting performance improvement with service and quality as predictors of business performance in the context of automated banking. Ward (2015), argues that financial performance serves as the primary indicator on the prosperity of businesses, while financial analysis renders

the strength and weaknesses of a business unit. Current performance can thus, be compared to historical and expected performance, in doing so; managers find reason to take appropriate action and decisions.

A unit rate is the most important cost measure for cash centres, every resource that touches money is measured against the unit rate. A lower unit rate justifies the survival of the business unit. If a cash centre counts ten times more with less resources, then it is deemed to be profitable. The same applies to equipment that is operated; the better the equipment the more efficient the centre becomes (Roh, 2019).

Every resource influences the unit rate, depending on the structure and the strategy, in cases where a cash centre uses modern equipment but has poor planning and processes: this could have an adverse impact on the performance of the cash centre. It is essential for the cash centre to have proper systems, equipment, workflow, processes flow, planning and to run on a lean operation to improve and maintain good results.

Table 1 shows an example of cash centre volumes as a measure to indicate contribution to bottom-line improvement in a cash centre. Volumes are spread across three months as well as a unit costs per deposit source to indicate viability: ATM deposits, branch deposits, foreign exchange, retail (normal) deposits, and smart box (cash device) deposits. The unit rate is calculated as follows:

Total volume/ R1 000 000.00/ cost

Volumes are the bulk of deposits; a million rand is a benchmark and cost could be any resource used to count a hundred rand; from human resources to equipment. The industry benchmark is 15c per R100, however some cash centres go as high as 21c per R100. Therefore, operational management impacts revenue, process efficiency and proper management of inventories affects the primary strategy which encompasses all functions within the broad scope (Shark, 2017).

Volumes	Transaction category	202006	202007	202008
Volumes	ATM	R 9 474 431 190.00	R 10 459 092 550.00	R 11 340 229 230.00
	Branch	R 4 851 759 109.00	R 6 046 399 480.00	R 7 070 260 312.00
	Forex	R 137 009 370.00	R 82 716 070.00	R 1 215 000.00
	Retail	R 27 819 395 178.00	R 2 986 423 875.00	R 3 538 314 982.00
	Smart box	R 2 289 668 151.00	R 5 379.00	R 6 711.00
Unit cost per	ATM	0.1893	0.1215	0.1312
	Branch	0.1417	0.1098	0.1141
	Forex	0.2195	0.1277	0.1376
	Retail	0.4356	0.4071	0.4731
	Smart box	0.157	0.1293	0.1364

Table 1: Cash centre volumes and cost pivot (FNB Cash, 2020)

2.11 Customer service measures for success

Customer management and satisfaction indexes are applied by cash centres to certify that the strategy and the operation is aligned to client needs and expectations. Hegazy & Hegazy (2020) call this "a management approach that integrates the organization's operational objectives with exceptional performance measures grounded in monitoring planned success and a symbol for future performance". Technological advancements that came at unprecedented speeds, heightened dynamic proficiencies of organizations, advance digital technologies are the key diver of innovation. As strategies call for dexterity and pliability toward the environment, ever changing customer needs and expectations generate a new focus towards good quality, speed of delivery and convenience (Lee & Lee, 2020).

Banks differentiate themselves from competitors through customer service by means of customer satisfaction indexes that measure customer experience. Mehtap & Katircioglu (2005), maintain that service and quality perceptions are sacrosanct in forming a basis for testing the depth of relativity between service quality, word of mouth and overall satisfaction. Reeves & Bednar (1994), define quality as: worth, suitability, surpassing customer expectations and competitiveness. Peeler (1996), supplements the notion that the quality of banking products and services has become an indispensable component in the banking sector and proclaims that good customer service begins with a good attitude, computed intentions as well as service policies that speak to every aspect of customer experience.

The information era and the internet present unique opportunities for financial institutions and customers. The transacting space has been transformed by the readily accessible information which brought about the transformation in the management of relationships between banks and clients. The abundance of digital banking is continuously improving operational efficiency, resulting in convenience for customers. Businesses are constantly challenged by constant improvements in the environment to be dynamic. Customers are no longer loyal to brands but rely on complex banking solutions that address customer needs and cater for customer circumstances.

2.12 Conclusion

The literature review gave an integrative review into organisational management research by presenting an overview of cash management systems and their effect on customer service. Preceding and relevant literature was expended in an endeavour to plot and assess relevant examination subjects to stimulate the aim of the study and give good reason for justifying the research questions.

Chapter 3

Research methodology

3.1 Introduction

This chapter describes the research design and method used in the exploration of the cash management from individuals within the organisation. The philosophical position defines the ontological issues that affect what exists to analyse and understand events in the organization. The research process is outlined by presenting reasons for using the qualitative method as defined through the research onion in figure 27, depicting the research philosophy, approach to theory development, methodological choice, strategy, data collection and data analysis (Saunders *et al.,* 2019).

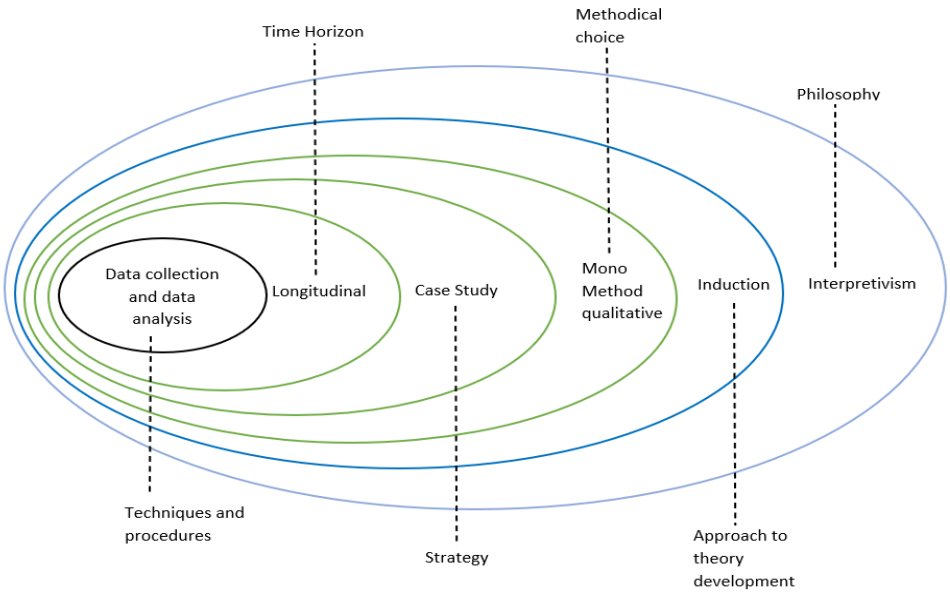

Figure 27: Research onion (Saunders *et al*., 2019)

3.2 Philosophical position

The study focuses on meaning expressed through words to provide accurate findings and therefore, adopted an interpretivist approach in appreciation of dissimilarities between people. The researcher chose a naturalistic approach in collecting data by making use of interviews to extract meaning, but the researcher fused cross-cultures in the sample size in an endeavour to achieve depth and richer understanding. An inductive approach provided a concentrated and holistic description of data to provide an understanding of real-life situations, the

paradigmatic framework assisted the researcher to understand the nature of the phenomenon.

Phenomenology informed the theoretical viewpoint which the researcher viewed individual experiences gained through direct contact with the phenomena as a means of gaining exposure and finding meaning. Interpretivism motivated the researcher to gain better understanding of the phenomenon from a subjective point which is dependent on the views of the participants (Ponelis, 2015).

3.3 Approach to theory development

The intention of the study was to gain an in-depth understanding of a complex issue which is the integration of management systems, and in this case; the study was explorative in nature. An inductive approach was adopted to enable the researchers to carefully examine the data within a specific setting by means of in-depth interviews with a limited number of participants (Zainal, 2007).

3.4 Qualitative Research Methodology

According to Jansen & Warren (2020), qualitative, quantitative and mixed methods refer to how the researcher chooses to design the study. While quantitative research focuses on measuring and examining numerical data on confirmatory objectives, a qualitative analysis is exploratory in nature and brings together peoples understanding and perceptions. The mixed method integrates both qualitative and quantitative methodologies. The qualitative data was crucial in explaining complexities to create a better understanding of dynamics using patterns to develop a theory. The qualitative approach was appropriate for this study based on the research questions which explored and described the cash management and set no limit to flexibility by allowing the researcher to adapt to the responses of the participants. According to Alase (2017), the qualitative research approach allows and inculcates an added advantage to the exploratory and incisive competence that are essential to explore the research.

This study does not repudiate the work done by previous researchers, but it adds layers of knowledge by investigating additional facets on the effectiveness, efficiencies and the sustainability of cash management business units.

3.5 Justification for using qualitative research

According to Alase (2017), qualitative research is orientated on the systemic gathering and interpretation of textual information and data generated from discussions, observation or documentation. Through interviews, data was extracted from purposefully selected individuals with the objective of making a conceptual generalisation that relates to natural settings. In this regard clarity of the research questions that is in line with aims and objectives of the study is crucial towards the assessment of results (Draper, 2004).

Qualitative research is appropriate for this research project as the intention of this study is to get authentic views from role players through exploratory methods to dig deeper for new concepts, theories and products (Tiley, 2017).

3.6 Target Population

Mensah (2018) defines a target population as a subset of individuals considered based on their qualification for data analysis and represent the entire population in respect of the depth of knowledge they possess. All participants were adults above age of eighteen years with more than ten years of experience in the cash centre environment. Porzsolt *et al*., (2019), state that target population defines the scope and trait for qualification from the total population which in this case is the entire workforce within FNB cash centres.

3.7 Sampling strategies and techniques used in this study

The purpose for sampling is to select suitable candidates from the population to concentrate on a population that will yield tangible results. In this study eleven participants considered to possess the required information, understanding and experience in cash management were requested to participate in the study. According to Marshall (1996), it is rarely practical in any research to ethically and efficiently study the whole population in a research project. The researcher used non-probability purposive and judgmental sampling techniques in identifying individuals who could respond best to the research questions. Judgement (purposeful) sampling was applied in the research by selecting the most beneficial sample to assist in answering the research question.

3.8 Data collection

The researcher used semi-structured interviews with the eleven selected participants. The eleven participants were chosen with the aim of reaching a point of saturation. The researcher made it a point to get as much detail that would enrich the findings through elaborations.

Face-to-face semi-structured interviews were conducted with participants who serve at different levels at FNB cash management centres. The interviews were conducted in English, participants were informed about the study details and a pledge concerning ethical principles with specific focus on anonymity and confidentiality. The preparation of the interview gave the respondence an indication on what should be expected in the interview. According to Gill *et al.,* (2008), the preparation phase increases the prospect of openness to achieve scientific goals in a quest for truth and collaboration.

The interviews were conducted in private, in order to give the participants an opportunity to reflect and refer to the work area with ease in a relaxed environment that will result in a productive interview. The researcher was familiar with the interview schedule. Brinkmann & Kvale (2005) emphasise the importance of accurate preparation on the part of the interviewer, in this regard preparation should not fall short of practical and conceptual preparation. The interview schedule was first piloted to check whether there is clear and reasonable and tailored not to last more than forty minutes. According to Brinkmann (2014), proper planning for interviews guarantees success and favourable outcomes.

3.9 Pilot study

The pilot study was used to determine the usability and relevance of the research questions. Given that the actual sample for the study was eleven participants, ten percent (10%) of the sample was selected for the pilot study- resulting in two sample elements participating in a pilot study. The researcher used the pilot study to prepare for possible challenges, to gain an understanding of possible results, to test the effectiveness of the research instruments and to ascertain if the same results could be generated in similar conditions. According to Simkus (2022), a pilot study is used to aide researchers to add credibility and soundness of the study. Through the pilot study, the researcher became familiar with the

participants and found that it is possible to achieve the objective of the study by modifying some of the questions by amending the order of questions to provoke and produce rich datasets.

3.10 Data analysis

Soon after data was collected, the researcher commenced with data analysis. According to Yin (1994), early analysis of data is a key step in clarifying a case study and to connect data back to the research questions. All responses were recorded and transcribed by the researcher, from there; a data repository was created. Feedback was plotted on a sheet in a sequential manner for better organisation; then the data was coded using labels to unearth meaningful patterns and sorted using themes that emerged from text. Miles & Humberman (1994), suggest that coding enables researchers to link sections of the data to the research questions. The data was synthesised according to themes to formulate a general theory by means of triangulating findings for effective composition and sense making. Kiger & Varpio (2020), suggest that thematic analysis is a dominant and flexible techniques for analysing qualitative data. Dye (2019), stresses that thematic analysis is used to deduce meaning to reveal key insights and aids the researcher to understand experiences, thoughts and behaviours throughout the data set.

Data analysis is not merely reproducing statements from the responses but, analysing and evaluating if themes make sense, usable and addressing the research question. As soon as the researcher was satisfied beyond reasonable doubt, the next step was to interpret the themes with constant reference to literature review. The intention was to buttress the patterns in order to address the research questions in full.

3.11 Trustworthiness

According to Pilot & Beck (2014), trustworthiness signifies the reliability of methods utilised to strengthen the quality of the study. Korstjens & Moser (2018) state that trustworthiness concerns the trustworthiness of research findings based on a criterion by Lincoln & Guba (1985). The researcher conducted interviews and cross-referenced the data with the pilot study and all documents were locked in a safe to uphold research ethics.

3.11.1 Credibility

According to Stahl & King (2020), credibility tests the congruence of findings against reality. Marriam (2002), states that authenticity is very important in a qualitative study. The credibility of the study was augmented using carefully prepared and strategic questions that were carefully designed to probe for the truth and to avoid a situation where responses are turn out to be insincere. The researcher also checked for demeanour and motive by permitting each participant to give their own version, each account was cross examined to assess and separate fiction from facts. To ensure that facts are provided, the researcher avoided asking leading questions that would allow for bias.

3.11.2 Transferability

According to Baxter & Jack (2010), transferability provides evidence that the research findings could be applied in different settings and times. Korstjens (2018), transferability refers to the degree to which findings can be conveyed to other contexts. The researcher ensured that the research was applicable by detaining the context in which the research was conducted, a thorough description of the nature and background of participants was provided as well as the demographic and sample plan to bring out the of the descriptive data.

3.11.3 Dependability

Dependability is about consistency and reliability of findings and the opportunity to allow for documented procedures to be audited at a later stage (Polit *et al.,* 2006). The researcher ensured consistency of the data analysis process by keeping the audit trail; a set of notes, recordings and transcripts were reviewed for consistency and to enable transparency of the research course.

3.12 Ethical considerations

The researcher obtained informed consent from participants by ensuring that participants are informed about the research and that they knowingly give consent to participate. Issues of anonymity and confidentiality were extensively agreed upon and the participants were given surety that their dignity will be protected. In this regard, respondents were free to volunteer information and expertise

without withholding knowledge. Participants were not coerced or persuaded to take part in the study. The researcher did not attempt to gain trust or deceive individuals, but instead; participants gave informed and unambiguous consent agreeing to take part in the study (Heale & Twycross, 2015).

In order to ensure rigour, integrity and credibility of the research findings; adopted research methods relate specifically to outlined research questions. The appropriateness of the approach takes into consideration the integrity of the conclusion which addresses what is asked in the research questions and thus ensuring credibility of the research. Validity refers to integrity and the exactness in which the findings mirror the data. Reliability labels the consistency used in the logical events in establishing truth in a neutral manner that is also applicable (Heale & Twycross, 2015).

According to McNair (2015), confidentiality and risk of harm in research refers to benevolence and respect for persons. Confidentiality and anonymity of participants were respected to prevent risk of harm by measuring the risk to benefit as the study advanced. Overall integrity and transparency took centre stage, this in order to limit any probability of conflict of interest.

3.13 Conclusion

This chapter went into detail on how the research was conducted and presenting the adopted methodology which was an inductive case study used to select participants and conduct interviews, as well as the thematic data analysis. The data collected form participants brought to light the views and experiences of participants. In the next chapter the researcher will dive deeper and present findings from the research.

Chapter 4

Presentation and interpretation of research findings

4.1 Introduction

This chapter contains a descriptive analysis, presentation and interpretation of findings of the study. Findings are presented using quotes that are essential and most representative to the results in order to answer the research questions and to accomplish the research objective. A thematic data analysis of results from interviews incorporates a discussion of previous research findings from previous studies to enrich the scientific research and to check for correspondence and contradictions of key findings.

4.2 Demographic presentation of participants

Eleven participants were interviewed for the study, all are working adults above the age of 18, the youngest participant was 28 years old and the oldest was 53 years old. Seven of the participants were Africans, two were Coloureds and two were Whites. Out of the eleven participants four were males and seven were females. Three participants hold diploma qualifications, one had a post matric certificate, and seven had matric certificates. The working experience of the participants ranges from 10 to 25 years working in the banking sector. The most senior participant was in operations management and the and the junior participant was a query clerk within cash administration.

Figure 28 below is a representation of inclusion and diversity of participants to present data in a balanced manner and express the benefit of robustness in how people view and think about the world and varying approaches in solving problems. By featuring respondents of diverse age, gender, race, level of experience and educational background the researcher considered different perspectives and opinions. This is corroborated by Swartz et al., (2019), who attests that including diverse individuals with unique thoughts and experiences amplifies the breadth and depth of the study in reference to gaps and paradigms.

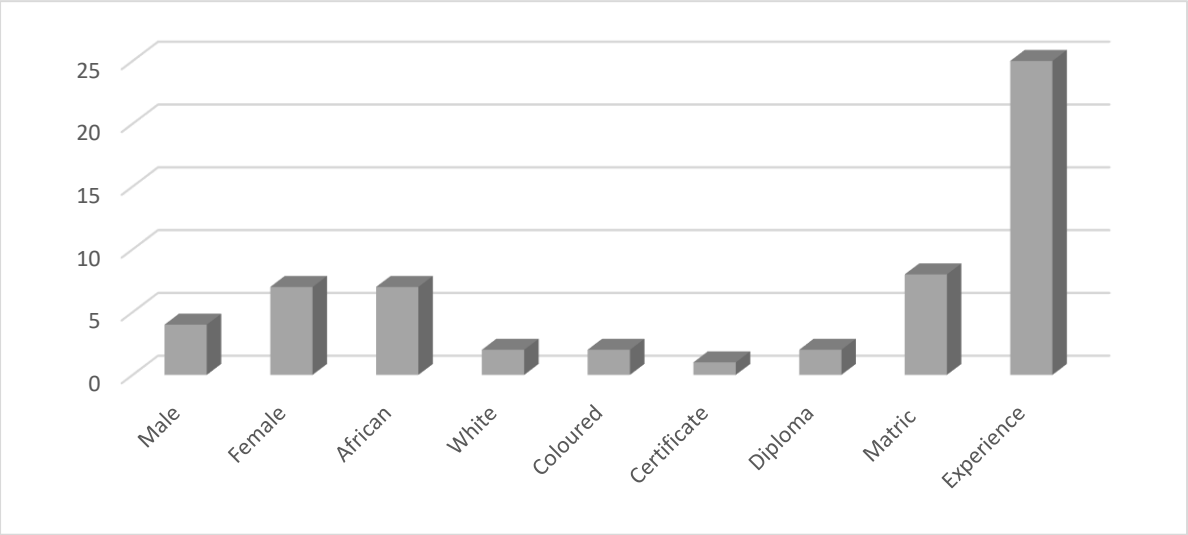

Figure 28: Cross pollination and diversity of participants

Table 2 below augments the illustration in Figure 29 above.

Participant ID (Gender)	Age Category and Race	Work Experience (Years)and qualification	Department (Position)	Employer (Current)
P-A:(M)	30-40yrs African	Above10 years Matric	Operations & Administration	FNB Cash- Perm
P-B: (F)	36-43yrs African	Above 12 years Matric	Operations	FNB Cash- Perm
P-C:(F)	25-38yrs African	Above 12 years Diploma	Operations	FNB Cash- Perm
P-D:(M)	40-53yrs White	Above 25 years Certificate	Operations & Administration	FNB Cash- Perm
P-E:(F)	35-46yrs African	Above 10 years Diploma	Operations	FNB Cash- Perm
P-F:(M)	28-36yrs African	Above 10 years Matric	Operations	FNB Cash- Perm
P-G:(M)	35-46yrs Coloured	Above 18 years Matric	Operations & Administration	FNB Cash- Perm
P- H:(F)	30-40yrs African	Above 10 years Certificate	Operations	FNB Cash- Perm
P- I:(F)	25-35yrs African	Above 10 years Diploma	Administration	FNB Cash- Perm
P- J:(F)	30-35yrs Coloured	Above 10 years Matric	Operations & Administration	FNB Cash- Perm
P- K:(F)	40-45yrs White	Above 20 years Matric	Administration	FNB Cash- Perm

Table 2: Presentation of demographics

4.3 Thematic data analysis

The objective of the study was to connect cash management systems that impact value through process and production agility and to examine and recommend cash processing solutions to improve cash operations and customer service. In exploring the research questions, nine primary themes emerged with sub-themes:

Question	Primary Theme	Sub-theme 1	Sub-theme2	Sub-theme3
1. What is your understanding of cash management?	Management of funds	Cash management risk	Cost management	Viability
2. What challenges are faced at cash management centers?	Manual interventions	CIT deliveries	Customer queries and disputes	
3. How can FNB cash centers optimize and adapt to future challenges?	Cash centre optimization	Process optimization	Production optimization	Machine downtime
4. What organizing systems are required to enable cash centres to meet strategic objectives?	Production planning	Staff motivation and execution	Compliance training	
5. How can cash processing centres reduce cash handling costs and achieve productivity goals?	Automation	Multiple interfaces	Increased control	
6. What policies, elements and activities constrain cash centre performance?	Manual prepping of deposits	Repetitive processes	Layout design and flow	
7. How can cash centres improve customer service within the "new normal" of intelligent systems?	End to end solutions	Cash devices	Quality and source	
8. How does your organization connect effective cash management systems?	Digital systems	Data management		
9. What recommendations can you suggest improving cash operations and customer service?	Strategy alignment	Meeting brand promise		

Table 3: Thematic data analysis

4.3.1 What is your understanding of cash management?

Primary Theme: Management of funds

Out of eleven participants, the consensus is that cash management involves the management of funds:

> *"In general context cash management speaks to management of funds, spending and usage. But in the cash centre context it speaks to managing physical cash, balancing the books and cash on hand" (Participant A)*

Nadiah (2016) states that it is through cash management that businesses strengthen finances by managing cash flow and balances to achieve business objectives. This is in support of Participant A's statement.

Most participants agree that cash is the main commodity in cash processing centres, therefore cash management practices are an essential tool in business management. Havika & Hari (2014), state that the business requires strictness in managing funds in order to maintain profitability.

Sub-theme 1: Cash management risk

Participants cited risk as a major factor within cash management in the cash centre context as cash centres must contend with risks associated with physical money flows, physical security risks and reconciliations challenges. Busaka (2013), asserts that risk is determined by internal controls that support the bank in protecting the cash centres from financial losses and reputational risks. Participant (E) and (C) highlighted security and potential losses as key risks which may affect cash centres:

> *"Working at a cash centre is risky, we worry about internal losses and what could happen during handovers at reception, the reception area is the riskiest area within a cash centre" (Participant C).*

> *"A lot of resources go into ensuring that the cash and the staff that handles cash are safe and secure during handling and processing of cash" (Participant E).*

Sub-theme 2: Cost management

It emerged from participants that cost management in cash centres is a strong imperative for sustainability and that a cash centre is not necessarily a profit centre but a cost centre with a positive expectation for growth which is dependent on cost reduction to improve performance and competitiveness. According to Pervan, Pervan & Ćurak (2019), unmanaged cost have a negative impact on business performance. Situm (2015), mentions liquidity and labour costs as main influencers of competitiveness and profitability. Similarly, participants identified salaries, overtime and maintenance as major cost drivers within the business unit that weigh down on financials.

Sub-theme 3: Viability

Participant (B) affirmed the significance of sustainability:

> *"Cash centres can only prevail by focusing on aspects that impact customer service in order to remain competitive".*

Dolly (2021) states that business viability depends on financial position and performance. It is in this regard that cash centres monitor to balance score cards as a measurement and monitoring tools for viability.

4.3.2 What challenges are faced at cash processing centres?

Primary Theme: Manual interventions

Five out of six participants pointed to manual processes and tasks as that are repetitive and slowing down production in cash centres. Participants stated the following:

> *"Manual counting has adverse impact on production". (Participant C)*

> *"Prepping of big bags takes a lot of time, it is a slow and repetitive task that I wish could be improved or changed completely". (Participant F)*

These assertions are consistent with the proclamation by Malak (2021), who found that the rise of automation in manufacturing is inevitable, and that automation could reduce high costs of production that is due to manual labour. Colom (2019), automation benefits highlighting process automation that cash processing centres can take advantage and implement predictable, fast and accurate processes.

Sub-theme 1: Cash in Transit deliveries

Participants alluded to challenges that result from late CIT deliveries and collections:

> *"We have no control over CITs, late deliveries normally result in processing backlog". (Participant: B)*

Participant (D) lamented CIT companies for a lack of a universal cash device by stating the following:

> *"There is no universal cash device and as a result we get numerous queries and complaints that emanate from CIT delays". (Participant: D)*

Shark (2017), proposed a service schedule analysis and analytical models to manage cash centre supply chain and the servicing of cash centres by external stakeholders such as CIT companies. The role of CIT companies is crucial to better cash centres management and resolving issues as their influence as a stakeholder is key to organizational operations. This therefore shows that participants understand the impact of stakeholder relations in organizational activity.

Sub-theme 2: Customer queries and disputes

Most queries in cash centres are about deposits that are not reflecting on time in chosen accounts, and change requisition that are either late, missing or packed in correctly.

> *" We are inundated with queries from clients, most queries are due to misalignment between customer expectations and what the cash centre can deliver". (Participant B)*
>
> *"When queries are not attended to on time, a simple query can turn into a complaint". (Participant C)*
>
> *"Service level agreements are sometimes not realistic; some clients cannot separate CIT responsibility and cash centre responsibility". (Participant K)*

According to Kock (2016), banks should implement systems to create and update queries based on profiles to track events on query criteria. According to Khoussainova *et al.,* (2009), the success of query management depends on modern database management that will enable query escalation, information storage and the sorting of data. The literature confirms that query management is an effective way of responding to clients and that query management should be system based in order to speed up the retrieval of data and manage data storage.

4.3.3 How can FNB cash centres optimise and adapt to future changes to improve operational performance, meet market demands and gain a competitive advantage?

Primary Theme: Cash centre optimisation

> *"Cash centres need constant innovation and improvement; the objectives must be clear across the industry. We need systems and machines that can handle volumes". (Participant A)*

> *"Better systems with the capability of closing deposits in one area will save processing time". (Participant C)*

> "*Cash centres can optimise through better technology and innovations that will eliminate manual work" (Participant H)*

> *"Production time is wasted during prepping, re-scanning of bags and re-counting". (Participant J)*

Participants are in harmony in stating the need for optimizing cash centre processes and that when it is correctly implemented, optimization can lead to greater efficiency and effectiveness of activities. This is in line with McAfee and Brydnjofsson (2017), who noted the impact of technological changes on human and machines, platforms, products and customer perceptions. Within cash processing, production optimization can lead to increased productivity and innovation could enhance inventory protocols and tactics used in processing and in cash sorting.

Sub-theme 1: Process optimisation

> "*Process optimization eliminates unnecessary steps and reduces the time and the margin of errors during counting and sorting". (Participant A).*

> *"At the note sorting area, we count and sort cash bundles but the aspect of elasticating notes and placing labels is slowing down note sorters, it would be great if another system of labelling could be implemented".*
> *(Participant E)*

> *"While dual control is a good control measure, we use bins and trolleys to move cash and the same trolleys and bins must be sealed and moved by two people". (Participant I)*

According to Immerman (2021), improving processes through real time data is advantageous in managing flow and production enhancement. Garcia (2021),

argues that process optimization is necessary in managing complex production plants that are pressurised to produce quick results.

Sub-theme 2: Production optimisation

> *"The rate of flow reception to note sorting serves as an indication on how fast we are able to complete distributed work in a day". Participant (B)*

> *"When work flows faster in the cash floor, the team can focus on service and quality. (Participant E)*

> *"Flow serves as an indication that clients will get their deposits faster and requisitions will be packed on time". (Participant G)*

Production optimization focuses on the entire system, and the rate of flow as well as the physical plan of a cash centre. Palaniappan (2016), stresses the significance of continuous flow as a unit of measure in production management.

Sub-theme 3: Machine downtime

> *"The machines that we are currently using are fairly old, their mechanism requires constant support and on on-site technicians for support". (Participant C)*

> *"Production could run smoothly with better sorting machines; the centre can save a lot of time and not struggle with overtime and fatigued machine runners". (Participant J)*

According to Palaniappan (2016), machine availability eliminates a prospect of production line stoppage, and suggests autonomous maintenance to avoid breakdown frequency. Ramlan *et al.*, (2015), argue that maximising equipment, autonomous maintenance and group activities as key activities in the management of operating equipment and machine uptime which measures the time planned for the machine during production against how much capacity and performance is contributed by a machine.

4.3.4 What organising systems are required to enable cash centres to meet strategic objectives?

Main Theme: Production planning

> *"Early scheduling and precise forecast demonstrate and present the status of the cash floor". (Participant A)*

> *"Proper planning is important in resource allocation, and team members are informed on which areas they are scheduled and at what time".*
> *(Participant G)*

Ramlan *et al.*, (2015), concur with participant (A) and (G) by stating that cash centres are affected by elevated dynamics such as demand for service and products as well as technology that enables processing centres to plan and cope with environmental demands. Moreover, planning depends on data to demonstrate capability by using administration to present the resource model. Guni (2019), states that planning is used to estimate demand and to determine production options.

Sub-theme 1: Staff motivation and execution

> *"A motivated workforce that works on a strict schedule of eight hours, that way we can improve efficiency and effectiveness in every role".*
> *(Participant J)*

Stewart (2002), notes that banks depend on real time execution to measure individual performance. Cash centres use performance data that is generated at the end of each day and subsequently totalled for quarterly during balance scorecards. The same data serves as motivation and presents a clear picture on the number or units produced by individuals. Panagiotakopoulos (2013), argues that execution is critical motivator in the workplace, and that teams tend to do better when results are favourable.

Sub-theme 2: Compliance Training

> *"Current processes are not easy to access and are seldom discussed". (Participant A)*

> *"Processes and procedures are at times only reiterated when we run into problems". (Participant K)*

Most participants recognise the value of training and adherence to process and procedures. Banking processes ensure that employees comprehend relevant functions within a business unit. Non-compliance may lead to losses and reputational damage. Process compliance is a key concern for the financial industry which has a high margin of risk. When employees don't comply with processes and procedures, security measures lose their usefulness (Puhakainen & Siponen, 2010). Jones (2016), states that compliance is essential to protect organizations and their employees. It is therefore important to note that compliance training empowers employees with knowledge on specific roles.

4.3.5 How can cash processing centres reduce handling costs and achieve productivity goals?

Main Theme: Automation

> *"We need to implement an electronic treasury book that and paperless entries for orders where dispatch entries can be consolidated". (Participant F)*

> *"Automation could significantly reduce production costs, FNB is innovating almost every aspect of banking and I feel that same can apply in cash centres. We have manual processes and actions that need to be computerized and automated" (Participant I)*

Cash centres struggle with vague operations and are bloated with staff members, leading to high staff turnover. A lack of visibility in the management of resources and outdated software increase labour costs, lead time and mistakes. Participants are unanimous in stating that cash centres should automate to improve operational performance.

Unlike branches, cash centres operations are similar to manufacturing factories with advances where humans have to compete with machines with the introduction of fast and intelligent systems such as robotics and artificial intelligence that work better than humans (Chui *et al.*, 2017). According to Leung, Paolacci & Puntoni (2018), automation makes it possible for work to be performed by systems, decreasing errors and yielding better results.

Sub-theme 1: Multiple interfaces

> *"Searching for video footage takes time, especially with the three- part counting process. One must search for three different areas, and it takes time". (Participant H)*

> *"It would be ideal if we could be able to access CIT systems to track bags, it is frustrating to have to call the CIT control for information and give feedback to clients". (Participant J)*

Van Looy (2021), suggests that competition management should motivate the human-machine interface that will result in productivity, efficiency and profitability. Cash centres are struggling with disconnected systems such as security systems, close-circuit television that monitors teller station and the movement of people and work, information technology systems, counting and sorting machine hardware supplied by different vendors.

Sub- theme 2: Increased control

> *"A monthly view of comparative dashboards will enable us to understand how we are performing in comparison to other centres". (Participant A)*

> *" Automated predictions for cash ordering and ATM dispatch management" Participant(C).*

Worrell *et al.*, (2011), found that process control is useful in predicting changes and that control gives organizations an advantage when using algorithms on impartial variables. Mills & Rosenfield (2016), make a case that cash centres need process control to guarantee safety and efficiency and that control should be a common tool in processing. According to participants, cash centres struggle to streamline the processing of deposits and to implement changes.

4.3.6 What policies, elements and activities constrain cash centre performance?

Main Theme: Manual Prepping of deposits

> *"Prepping contributes the most in labour cost, we have more preppers than machine runners". (Participant A)*

> *"It can take a good prepper up to two hours to prep one bag depending on the quality and state of the deposit, some cannisters are too heavy to lift up". (Participant D)*

According to Kenton (2020), labour intensive activities depend on people and physical effort which lead to increased costs and high levels of exhaustion on workers. Gomez, Riveros & Sachs (2021), maintain that there are financial institutions still face challenges that are associated with manual interventions which prevents them from reaching productivity gains. Conversely, the replacement of manual labour with machinery and digital analytics can yield substantial gains in production throughput, reduce cost and change skills requirements. Participants perceive prepping to be the most labour-intensive task in cash centres. Prepping takes a chunk of time to process one bag, this has been noted especially with big bags, branch re-banks and large mixed deposits that consist of notes and coins.

Sub-theme 1: Repetitive processes

> *"Manual control sheets required multiple checking and signatures, this meant that we spent more time repeating and double checking for accuracy and errors" (Participant D)*

> *"The ACDP process require us to repeat count, I wish we could count once to save time". (Participant F)*

According to Zeelie (2018), repetitive process dictates that production ingredients are moved in batches, and the product goes through changes and mixing in a production module and process routing. Blair (2020), stresses the importance of tracing and quality testing. Repetitive processes on the cash floor guarantee high

throughput and fast distribution. The ACDP process which is also known as the fast lane or three-part counting process was introduced as a solution for counting and sorting in one area. However, participants raised concerns with multiple stages of deposit handling, this assertion is in line with the literature.

Sub-theme 2: Layout design and flow

> *"Structure and flow are not well thought out at cash centre, teller cubicles are not connected to the conveyor belt and as a result we use trolleys". (Participant G)*

> *" The note sorting area is too small, we currently have three cobra machines in an enclosed area with limited space for movement during peak times such as month end" (Participant J).*

Lean management tools lead to rapid increase in production, cash floor layout contributes to resource allocation, utilisation and product quality (Worrell *et al.*, 2011). According to Warren (2019), proper layout reduces time wastage by improving combined process value streams from processing to delivery. The space allocated for deposit process and note sorting within a cash centre has an influence on flow. Most participants agree that cash floor design impacts on the time spent from reception, processing and dispatch of work.

4.3.7 How can cash centres improve customer service within the 'new normal' of intelligent systems?

Main Theme: End to end solutions

> *"We need to implement end-to-end solutions with track and trace capabilities that will take care of customer deposits from pick-up, processing until the end". (Participant A)*

According to Beck (2014), end-to-end solutions revolve around clients by quickening banking innovations and market related risks. Maggo (2017), found that the automated cash vaults with digital till integrations also known as smart retail cash management provide the best end-to-end solutions for retail and

wholesale clients in a risky environment such as South Africa. End-to-end solutions in the cash centre context are underpinned by one contract that covers cash while it is a store vault until it gets processed by the bank.

Guriev (2021), states that cash centre operations need an all-in-one industry specific product that will cover cash movement risks, processing, insurance and customer orientated. In this regard, technology-based cash devices are currently a tool that covers industry needs with reference to safety and workflow integration.

Customised and connected banking is a new trend in the cash processing space, component banking is earmarked to increase revenue by resolving client related issues that affect with customer service channels. Participants feel that customers demand purpose-built solutions that guarantee satisfaction by innovating the speed with which deposits get credited.

Sub-theme 1: Cash devices

> *"Most electronic cash deposits are found to balance upon verification, this limits the number of incidents and paperwork". (Participant B)*
> *"Cash device deposits are neat and easy to prep, especially the small bags it is only a few clients where we struggle with folded notes and corner folds". (Participant D)*
>
> *"It is only there and there where you find discrepancies, and most are occurring at client level". (Participant G)*

Gundaniya (2021), studied the impact of cash devices on cash centres and found that the processing of device banking is faster compared to manual deposits that were dropped in cash boxes accompanied by a deposit slip. The cash centre only scans the barcoded seal number and the deposit information is populated on the system. Mach (2022), stated that electronic cash tills are more secure and bank clients tend to save time as opposed to traditional methods. Clinton (2022), exclaimed that electronic cash devices increase security and flexibility with an added advantage of automated record keeping that supports both the bank and its clients with reconciliations.

Seven out of eleven participants agreed that cash devices could transform cash centres and that cash devices are the way of the future based on their experience with smart box deposits. Pretoria cash centre used to have a dedicated department that only prepped and counted smart box deposits.

Sub theme 2: Quality at source

> *"Customer focus, listening and responding to client needs could help us to better understand the market and to respond to competitors".*
> *(Participant A)*

> *"I believe that clients need to be introduce to our processes so that they also can know our strategy, that way they will bank accordingly". (Participant B)*

> *"Customers need training to improve, that way our throughput quality will increase". (Participant K)*

According to Brady & Cronin (2001), effective organizations depend on a client-oriented culture where business identifies with its customers by placing and emphasis on customer needs. Grieve (2020), states that good customer service generates loyalty. Hemmer (2021), maintains that product training should be aimed at both the service provider and clients, and that training should be a continuous process leading major growth and retention.

Based on the submissions by participants and the literature, cash centres are a client orientated business unit that strives to keep the needs of the client ahead. Eight out of eleven participants agreed that cash centres comprehend FNB cash is dependent on clients.

4.3.8 How does your organization connect effective cash management systems?

Main theme: Digital systems

"By implementing digital systems to manage throughput, routing and planning of daily work". (Participant A)

"Cash centres have no choice but to embrace digitization to simplify tasks and to respond operational challenges". (Participant F)

Valenti (2021) states that digitisation presents financial institutions a chance to take advantage of digital channels and capitalize on relationship management through mobile applications. According to Alderman (2021), banks should find a mix between digital banking and skills as digitization support cost reduction and customer loyalty. Medga (2020), found that digitization of has led to significant improvements in client experience in cash centres. Technology has led to increased cash visibility, fast data flows and quick process changes. Participants felt that the introduction of digital systems in cash centres as it is the case with branches will result in solution for several challenges faced by processing centres.

Sub theme 1: Data management

"By evaluating supply chain analysis to identify opportunities for improvement". (Participant D)

"Through data driven decision making that is based on tangible data and resource management". (Participant F)

Medga (2020), suggests that cash processing centres should enhance data analytics skills that will enable each business unit to respond to clients and report to segments. Lee (2018), warns of prospects of cyber-crime and suggested that banks should balance the implementation of digital technology with increased security to protect the business and clients. Participants felt that decision making should be based on results and supported by data to measure performance, demonstrating that these participants understand the role data management in a cash centre.

4.3.9 What recommendations can you suggest in improving cash operations and customer service?

Main theme: Strategy alignment

"The financial strategy must align with operational reality, processes and procedures must be reviewed on a continuous basis". (Participant B)

"Through matching digitization, meeting the brand promise and by finding new ways to attract new customers". (Participant H)

"By seeking new ways on how to maximise efficiencies and provide added value to customers". (Participant J)

Trevor & Varcoe (2016) state that strategic alignment should incorporate market strategy and the way in which business units organize themselves. Organizational goals should reflect the intention by stating what and how the business intends to achieve by stressing the choices leading to ideal products and services. Hertz (2018), warns that strategic alignment should be viewed as a process, in that way; partners will appreciate the shared commitment to achieve organizational goals. In response to this sub-question, participants felt that it is imperative for business units to be familiar with strategic objectives as detailed in the literature.

Sub-theme 1: Meeting the brand promise

"Relationship management is important in building close relations and nurtures deep trust between the bank and its customers". (Participant E)

"A customer will always remember good service; we want our clients to trust that we can deliver on our promises". (Participant H)

Broadbent & Weill (2013), found that financial institutions are comparatively mature in developing strategy and formulating brand promises that are client focus. FNB's brand promise is evolves around service and solutions which an objective that is linked to coordination between the bank and its customers. Thean (2020), maintains that a brand promise is more than a marketing line, and if followed upon; the brand promise could help organizations to attract and retain profitable clients. Participants expressed that creating trust encourages customers to buy products, and that trust is central to customer retention. Their views are complemented by the literature.

4.5 Conclusion

Eleven participants with in-depth knowledge and experience in cash processing were interviewed for this study. There was a mixture of men and women of different race and age which conforms to the dictates of research as required in higher learning. In terms of thematic analysis, nine questions were posed to participants to respond. The questions were constructed in line with the literature and findings from the interviews are supported by the literature from previous studies to demonstrate alignment and reasons for corroboration and contradiction.

The findings reflected that cash centres can grow through innovation in line with the TIPS Managerial Framework by bringing new technology that will in turn motivate for better products and services throughout the market. Innovative ideas encourage the workforce through new paradigms that will result in high sales and profitability that is a major aspect in gaining a competitive advantage. Participants demonstrated that when people are aligned with the strategy, the organisation benefits form experiences and knowledge that is contributed by workers through their interest.

Based on the findings, technology and innovation emerged as the source of competitiveness that will transform both the people's ideas and the organisation to become solutions driven in probing problems and in meeting customer needs. When management pays attention to contributed ideas, ideas can be implemented with the support of an engaged managerial leadership team (Ahikari, 2011).

The next chapter presents a summary of findings, conclusions, recommendations, implications for future research, policy, practice, limitations and contributions of the study.

Chapter 5

Conclusions and Recommendations

5.1 Introduction

This chapter presents conclusions and an elaboration on the impact of findings of the study on the integration of cash management systems at First National Bank cash centres. The first section presents a summary of the empirical findings, followed by recommendations, return on investment, limitations and contributions of the study and final conclusion.

5.2 Summary of main findings

The contributions by the participants is supported by the general literature which demonstrates that the participants understand what cash management entails as well as how the integration of cash management systems impacts processing centres and benefits customer service. The findings for this study demonstrate that process and production agility can be realised through the integration of cash management systems that enhance cash operations and customer service.

5.2.1 Participants' understanding of technology and innovation

Innovation, technology advances simplified a number of processes by cutting the time it takes to realize business objectives, leading to high dependency and reliance on machinery and equipment (Coppersmith, 2019). Participants also outlined capabilities of technology in comparison to manual processes and ongoing transition; in this context the benefits of going paperless and the ability to electronically send, save and retrieve data (Torn, 2022).

5.2.2 Participants' understanding of strategy alignment

A lack of alignment between strategy formulators and workers who serve as strategy implementors and poor management of processes serve as key factors leading to insignificant industry performance concerning quality, cost and time (Koskela & Howell, 2002). The participants supplement that proper process design has a positive impact on efficiency and performance at cash centres

5.2.3 Participants' understanding of layout and flow

In cash centres layout consists of a particular formation that outlines work areas or clusters and boundaries. The introduction of high-speed teller balancing methodologies in cash centres forms part of the most prominent element that affects flow and efficiencies within the cash space. Wankhade & Shahare (2017), highlight the fact that the employment of improved methods, and optimised plant layout can enhance material flow. Participants note that the elimination repetitive work and obstructions and the use of cutting-edge machinery, improves flow and thus ensuring maximum throughput.

5.2.4 Participants' view of cash centre processes

Participants are of the view that cash centres handle an established product in the form of cash and that ease of processing requires the simplification of communication between different departments and optimizing the design. Process matters in cash centres, and full potential is reached when processes are clear and effective better than they should be. Deely (2019), affirms the importance of process adherence and process improvement.

5.2.5 Participants' views of risk management

Participants also raised the issue of compliance and risk management regarding workflow management. These form part of multi-faceted regulatory frameworks and banking compliance that aims to manage how people interpret and manage work in a regulatory reform. Processes also require automation as they form part of the process and compliance mix.

5.2.6 Participants' views on the impact of policy on cash centres

Participants note the stringent measures imposed on cash centres for compliance and the role of cash centres to ensure that there is sufficient currency in circulation and to ensure that money is available to the public via cash centres, branches and automated teller machines (Maredza, 2013).

5.2.7 Participants' view of customer service

Customer service at cash centres is founded on the brand promise which based on helping and the strategy of turning cash into a competitive advantage.

Respondents state that FNB cash centres can provide exceptional customer service for customers by means of a structured response to the needs of the market through stakeholder liaison, innovative cash devices and end-to end solutions.

5.3. Conclusions

Despite advances in with internet banking and other non-contact banking technologies, cash remains the most used method of payment in South Africa with customers that require cash to be accessible in various locations (Simutis, Dilijonas & Bastina, 2007). It is in this regard that financial institutions created cash networks that comprise of branches, cash centres and automated teller machines (ATMs).

Cash centres form a backbone in cash processing, distribution and recycling which is depended on manual interventions, however through automated optimisation, systems and technology; systems and machines reduce processing time and heavy lifting interventions towards better throughput and data sets that should be embraced by every role player within the cash ecosystem (Suneja, 2022). According to Phaneauf (2022), digitization is changing how banks do business on a daily basis through technology advancements that cash centres can apply to solidify cash management systems to remain competitive.

The integration of cash management systems is essential for understanding the significance of data management for faster gathering, storing and retrieving data that can be applied for better decisions where banks and cash in transit companies can enhance performance and improve operational efficiency (Kenton, 2021). According to Drury (2021), cash centres that utilise efficient machinery and understand machine performance stand a better chance to achieve optimal processing efficiency by measuring machine availability and yield and equipment effectiveness in processing large deposit volumes.

The implementation of end-to-end solutions counters manual counting and the time spent on sorting and balancing daily volumes (Struben, 2018). According to Suddaby (2021), integrating cash devices with cash centre systems could eliminate manual processing and the effort in recording and retrieving reports and data. Technology as advanced the optimisation of many processes that impact on

business decisions and the quality of service that is given to stakeholders and customers.

Molefe (2020) states that eliminating manual cash processing could lead to efficient services from collecting to delivering back to retailers through cash-in-transit companies. Cash efficiency could result in the adoption of other cash handing strategies that can mitigate the risk for retailers by opting to recycle cash instead of having change delivered by cash-in-transit companies.

According to Keim (2020), cash centres are tasked with providing cash to the entire structure and should make precise calculations to eliminate the shortage of banknotes and coins which can impact the economy and result in poor customer service. Zhen (2021) states that cash management consists of a whole set of organizational processes resulting in seamless automation of counting, processing, sorting and dispatching of cash as well as maintaining optimal cash balances towards improving customer experience and satisfaction.

5.4 Recommendations

Findings form this study suggest that banks must use technology and automation to improve processing efficiency in cash centres and to manage end to end processes toward a superior customer experience. Innovation and technology offer banks and customers endless possibilities by introducing speed, improvement, cost reduction and simplicity through technology and automation.

5.4.1 Handling of cash

Cash centre management needs to identify value adding activities in handling and cash management by differentiating between value-adding and waste. The identification of the desired product in line with the strategy. Through mapping of processes through a composition of stages to ensure efficient processing and service delivery. Emphasis should be made in measuring cycle time and throughput as performance measurement scales for activities and the planned daily tasks to enhance productivity. Crawford (2016), states that cash management is about maximizing customer value in less time while using less resources.

5.4.2 Improved internal processes

Cash centres need to disburse financial resources to automate processes that will enable compliance and other technologies that will curtail business risks that can lead to loss of market share and reputational risks as a result of inefficiencies. Cash centres need to find ways to counterbalance the cost of operations to avert liquidity and other forms of business risks, optimization and technology can lead to cost savings by cutting time and reducing bottlenecks. According to Brown (2022), productivity cash management depends on processes and workflow that cash centres must observe on each day. Furthermore, optimization enables cash centres to realise skills and knowledge towards better service delivery.

5.4.3 Adoption of a cashless banking environment

Some challenges in banking emerged during the Covid-19 pandemic, resulting in most consumers who depend on physical cash transactions feeling trapped and stuck (Henry, 2022). A suggestion is to examine the relevance of cash within the global village and how this will affect the existence and relevance of cash centres as well as investments that were made to improve cash processing facilities. The approach could be based on foreign exchange implications for travellers and tourists, digital banking headways that aim to eliminate the need for cash and moving towards a cashless society. Bresendale (2021), argues that though non-cash alternatives have not seen mass adoption in South Africa, embracing cashless interventions could result in cost-effective means of payment and result in convenience and savings for individuals and businesses. It is in this regard that there could be many opportunities for further studies in the cash space.

5.5 Recommendations for future studies

This study focused on one entity-FNB, thus, does not give a holistic view of how other South African commercial banks manage cash related issues. For future studies, a comparative study would suffice to help clients and society understand how and what challenges are confronted by other commercial banks. A holistic perspective of cash management would then help management devise appropriate strategies to improve their processes. Future studies could also be undertaken using a different research methodology where a large sample size would be selected, leading to rich data-sets. The current study used a small sample, thus, recorded as one of its limitations. Large samples would be generalisable with a high degree of reliability and validity of research findings.

5.6 Implications for practice

One of the recommendations was to have a cashless transaction environment. Given the high levels of the unbanked and illiteracy rate in the country, having a cashless environment may not be feasible in South Africa. A lot of unbanked and elderly clients still and are comfortable using traditional financial transactions-use of cash in their transactions. These clients keep most of their money in their homes and take full responsibility for its security. The implications for practice are that if the banking industry decides to do away with cash transactions, then, many people will be alienated and excluded from all forms of financial transactions. People would not be able to buy and sell goods especially those that are accustomed to cash transactions.

5.7 Return on investment

There were no financial inputs or support towards this study. Outcomes of this project are aimed at providing a systemic awareness on in regard to the integration of cash management systems and to enable ordinary workers to think in terms of managing business success. Findings and recommendations of this study are intended to transform cash management strategies that will enable First National Bank cash centres and socially responsible managerial leaders to dominate macro and micro sectors of the economy. At a personal level, the outcomes of this study would enable and benefit both the researcher and the First National Bank cash centre employee to view daily challenges as an opportunity to seek lasting solutions. At a professional level, the extensive work conducted during the interview is aimed at unlocking potential and to give a voice to knowledge workers in managing innovations.

The return on investment at enterprise and societal level is determined by the organization's ability to constantly innovate towards achieving strategic goals in the medium and long term through operational excellence that translates in a competitive advantage and the provision of a superior customer experience.

5.8 Limitations of the study

The major limitation of the study was that the research focused on First National Bank cash centres only, this aspect limited the study and precluded the researcher from understanding what is happening in other banks. Therefore, the findings

cannot be generalised against other banks in South Africa, if the study was conducted in other institution; the scope would have been broader this would result in rich findings. Another limitation is the methodological limitation which is characterised by methodology and approach with a larger sample size which could have yielded richer results. In this case only a qualitative study was conducted utilizing interviews as a research instrument, but if mixed approaches were chosen then the results could have been richer (Prince & Murnan, 2004).

5.9 Conclusion

This journey started with an idea to address cash management processes at First National Bank, this led to the development of a research proposal. This was followed by various chapters. In chapter one the researcher presented a funnel overview of the research problem by outlining what happens at different levels of the environment as far as cash management is concerned. The researcher gave a brief history of payment systems. The literature review followed in chapter two where the focus was to describe cash management and associated tools and techniques used by FNB cash centres.

The study followed an interpretivist philosophical position culminating in the adoption of a qualitative research methodology. Data was collected through the lens of face-to-face interviews. This allowed the researcher to analyse data using content analysis. In chapter four, research findings were presented as outlined in the research plan. The last chapter provided conclusions and recommendations. For future studies it was recommended that First National Bank management should consider better ways of cash handling to maximize customer value, improved internal processes that were underpinned by optimization, automation and technology as well as a vista on the adoption of cashless banking environment and how this will impact the survival and relevance of cash centres.

The research aim and objectives were achieved by carrying out a cogent research plan, collection of relevant date and ultimately processing data in line with research questions. The literature helped to refute and support participant's views. Overall, the research problem was successfully addressed, thus giving the researcher some relief. The research journey was tiring and challenging, however the amount of learning and development achieved throughout this process is infinite.

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Annexure A

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Ethical Declaration

I, the undersigned, hereby declare that the Masters Research of the student named below has received ethical clearance from The Da Vinci Institute Ethics Committee. The student and supervisor will be expected to continue to uphold the Da Vinci Institute's Research Ethics Policy as indicated during the application.

Proposed Title: The Integration of Cash Management Systems to improve customer service: "An FNB case study"

Student Name: Mabena Richard

Student Number: 8591

Supervisor: Dr Joel Chigada

Co-Supervisor: N/A

Period: Ethics approval is granted from 2022/10/21 to 2023/02/28

Chairperson: Research & Ethics Committee

Prof HB Klopper
Executive Dean: Research and Institutional Partnerships

THE INTEGRATION OF CASH MANAGEMENT SYSTEMS TO IMPROVE CUSTOMER SERVICE: AN FNB CASE STUDY

Annexure B

THE INTEGRATION OF CASH MANAGEMENT SYSTEMS TO IMPROVE CUSTOMER SERVICE: AN FNB CASE STUDY

Qualitative research instrument:

Interviews were used as a tool to collect data and analysed to the satisfaction of the subject that is being researched. The chosen research instrument has been validated to prove reliability in line the research questions. The aim of these interviews is to get responses to the research questions, aims and objectives without any bias in the collection of data based on the appositeness of the research instrument itself.

Semi-structured interviews were utilised as a tactic to lead with open-ended questions and to cater for follow up questions that will aide in drawing more information where necessary.

The research questions are formulated as an important measure and guide to narrow the research aims and objectives to the precise research (Johnson and Christensen, 2014). The following research questions were essential in guiding the research methodology and data collection choices (Doodly and Bailey 2016):

1. What is your understanding of cash management?
2. What challenges are faced at cash processing centres?
3. How can FNB cash centres optimise and adapt to future changes to improve operational performance, meet market demands and gain a competitive advantage?
4. What organising systems are required to enable cash centres to meet strategic objectives?
5. How can cash processing centres reduce handling costs and achieve productivity goals?
6. What policies, elements and activities constrain cash centre performance?
7. How can cash centres improve customer service within the 'new normal' of intelligent systems
8. How does your organization connect effective cash management systems?
9. What recommendations can you suggest in improving cash operations and customer service?

Annexure C

POINTS OF PRESENCE CASH

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The Regional Manager

06 August 2021

Dear Sir

Request for permission to conduct research FNB Cash Centre

The integration of cash management systems to improve customer service: an FNB case study.

This letter serves a request for permission to conduct a research study at First National Bank Cash Centres towards the fulfilment of a Master of Science degree. I Richard Mabena, am doing research under the supervision of Dr M. Sekgaphane towards a Master of Science at the Da Vinci Institute. The aim of the study is to create a robust and synchronized environment where people, processes and systems thrive in meeting strategic objectives of the organization.

I selected First National Bank to address my work-based challenge, the study will therefore address the impact of technological advancements as part of the future world of work. The benefits of the study are not limited to the gathering of industry information, creating a holistic view of the market, implementing solutions and cultivating critical thinking.

Due to the nature of the study, participants will be selected across departments in order to enrich the results and to extract as much information as possible. There are no risks associated with the study and participation is voluntary and information of participants will be kept confidential. There will be no reimbursement or any incentives for participation in the research. Feedback will be given to participants in writing.

Yours Sincerely

Richard Mabena

Operations Manager
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Annexure D

POINTS OF PRESENCE CASH

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10 August 2021

To whom it may concern

I hereby grant permission for Mr. Themba Richard Mabena to proceed with conducting research at Pretoria Cash Centre in line with the selected topic: The integration of cash management systems to improve customer service: an FNB case study.
The granted consent will cover all relevant field work and preferred methodologies that will contribute to the project. This is with reference to the letter dated 06 August 2021 regarding the approval for research.
Kind regards

Kulane Mavikane
Regional Manager Pretoria Cash
Points of Presence, Cash Delivery Channel