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**FACULTY OF BUSINESS MANAGEMENT, ECONOMICS AND SCIENCE**

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**CREDIT RISK MANAGEMENT STRATEGIES AND LOAN  
DELINQUENCIES IN HIGHLY INNOVATIVE (DIGITAL) BANKS: THE  
CASE OF STEWARD BANK**

**BY**

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## **DEDICATION**

I would like to thank my mother Evelyn Myambo for her love.

## **ACKNOWLEDGEMENTS**

I am particularly grateful to the assistance given by Dr Kaseke whose patience and guidance was largely instrumental in the success of this dissertation. I would like to thank Steward bank and the staff that graciously participated.

Finally, I wish to thank my best friend Dadirai for her support and encouragement throughout my study.

## ABSTRACT

The main objective of the research study was to analyze the effectiveness of credit risk management strategies and loan delinquencies in highly innovative and digitized banks. The research used Steward bank as a case study. This main objective was augmented by secondary research objectives which were; to establish the forms of innovative credit risk management strategies used by Steward Bank in mitigating loan delinquencies, to determine the effectiveness of Steward Bank's innovative credit risk management strategies in mitigating loan delinquencies, to find out challenges affecting Steward Bank in implementing its innovative credit risk management strategies that it uses in mitigating loan delinquencies and to determine ways that Steward Bank can use to address challenges affecting it in implementing its innovative credit risk management strategies in mitigating loan delinquencies. The study was guided by the Liquidity Theory of Credit, the Portfolio theory and the Credit Risk Theory. Quantitative research method was adopted in this study. The research was based on the positivist philosophy that is quantitative based. The research design was explanatory in nature and it adopted a deductive research approach. The population was made up of 36 employees in the Credit and Risk department, Asset and Liability Management Committee as well as the Credit Risk Management Committee of Steward Bank. A sample size of 33 was adopted using simple random sampling technique. A structured research questionnaire (in Google Forms format) was used to collect primary data for this study. A structured research questionnaire (in Google Forms format) was used to collect primary data for this study. SPSS Version 23.0 and Micro soft Excel 2013 were used for statistical data analysis. Regression and Pearson's Correlation Results were also used to show the direction and strengths or significance of the relationship between credit risk management strategies and loan delinquencies in highly innovative and digitized banks. The study found out that Steward bank has digitized loan management systems that assist credit or loan officers to determine the capacity of prospective borrowers to repay the loan, systems that are able to supervise and monitor borrower's actions as well as digitized loan management systems that facilitate repayment of loans and collection of amounts due from clients. From the Regression and Correlational results, the study found out that statistically there is a strong positive relationship between innovative credit risk management systems and loan delinquencies that is the digitized loan management systems are very effective in mitigating and reducing the level of NPLs. The study also found out that information asymmetry, the turbulent and changing business environment affects the ability of Steward bank to determine weights and criteria for judging creditworthiness of borrowers. The major conclusion was that digitized loan management systems are effective in assessing prospective borrowers using the 5Cs hence are very effective in mitigating and reducing the level of delinquent loans. The major recommendation of this research was that the bank should devise online dashboards that are capable of effectively supervise and monitor the borrower's actions and financial statements movement after issuance. The study also recommended that the relevant regulatory authorities should consider setting up institutional and regulatory frameworks to enable the use of credit derivatives and structured products to leverage credit losses by banks because they ensure liquidity and the trading of credit risk in a secondary market. Future researches on similar topics were recommended to focus on other banks as case studies and adopt either purely qualitative or a mixed.

**Key words/phrases:** Credit risk, innovative credit risk management, delinquent loans, NPLs

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## **LIST OF ABBREVIATIONS/ACRONYMS**

BIS	Bank for International Settlements
CRB	Credit Reference Bureau
CEBS	Committee of European Banking Supervisors
CDS	Credit Default Swap
EAD	Exposure at Default
ECL	Expected Credit Loss
KYC	Know Your Customer
LGD	Loss Given Default
MoF	Ministry of Finance
NPLs	Non Performing Loans
OTC	Over the Counter
OECD	Organization for Economic Cooperation and Development
PD	Probability of Default
RBZ	Reserve Bank of Zimbabwe
ROA	Return on Assets
TRS	Total Return Swap
ZAMCO	Zimbabwe Asset Management Corporation

## **CHAPTER ONE**

### **INTRODUCTION AND BACKGROUND**

#### **1.0 Introduction**

In banks, the ability to effectively manage risk is an important task for successful banks. The world over, granting of loans which is the core business (source of revenue) of commercial banks is also the major source of risk (credit risk). It is therefore realized that, competent and prudent risk management practices in credit and lending processes are critical to the overall financial health and soundness of most banking institutions (Kutsienyo, 2011). Banks are therefore investing much in digitizing credit risk management strategies to cut on credit risk and loan delinquencies. This study sought to analyze the effectiveness of credit risk management strategies and loan delinquencies in highly innovative and digitized banks using Steward bank as a case study. This chapter gives the background to the study, the statement of the problem, the research objectives and the research questions, significance of this research to various stakeholders of the project work, the delimitations, assumptions, structure of the dissertation before a chapter summary is given.

#### **1.1 Background of the Study**

The Central Bank of Barbados (2014) noted that commercial banks raise more of their revenues through interest income, which income is the interest paid by the borrowers of the various loans that the banks offer to their customers. Mashakada (2016) also noted that whenever a bank offers a loan to a borrower, there is a risk that the bank will not be able to recover some part or the whole of either the principal and/or the interest charged. This is referred to as counterparty risk or default risk (Mabasa, 2017). In spite of this risk to which banks are exposed, banks continue to offer loans because they get the bulk of their revenues through loans (Nhavira, Mudzonga and Mugocho, 2014), but put measures to reduce the default risk, which is the essence of loan delinquency management.

In order to minimize the default risk which causes non-performing loans, the bank undertake credit analysis before and after a loan is given to the borrower (Nhavira, Mudzonga and Mugocho, 2014).



Credit analysis involves analyzing the borrower for credit worthiness (before the loan is offered) and sometimes monitoring the investments to which the borrower puts the money borrowed (Nguyen, 2016). The concept of credit risk management became widely appreciated by Commercial Banks in the late 90s, but again this did not stop loan defaults to this date (Modurch, 2017).

Financial technology and digitization are taking the leading role which is very critical in lending decisions by commercial banks. In the United States, online lenders now account for about 8–12% of new mortgage loan originations, with Quicken Loans being recognized as the country's largest mortgage lender in terms of flow at the end of 2017 (Buchak *et al.*, 2017; Fuster *et al.*, 2018). China is a country where new FinTech credit is relatively well developed, representing around 3% of total outstanding credit to the non-bank sector at the end of 2017 (BIS, 2019). FinTech credit platforms use alternative data sources, including insights gained from social media activity (Jagtiani and Lemieux, 2018) and users' digital footprints (Berg *et al.*, 2018). In the case of large technology companies with existing platforms, data collection extends to orders, transactions and customer reviews (Frost *et al.*, 2019).

Secondly, traditional linear scoring models like the logit model, unlike machine learning in big data analytics can mine the non-linear information from variables. For example, Khandani *et al.*, (2010) construct a non-linear, non-parametric forecasting model for consumer credit that is based on machine learning techniques and find that this new model can outperform other models in a range from 6% to 25% of total losses. In Zimbabwe the concept of financial lending is a recent (less than two decades) practice in the local banking industry because financial loans were mostly issued directly by international banks before the year 2000 (Chagwiza, 2014). It began to show face in early 2000s but started to grow exponentially in late 2000 with the advent of factors that led to the rapid formalization of Zimbabwean economy (World Bank Report, 2013).

Commercial banks in Zimbabwe are mainly in the business of safekeeping and or safeguarding the monies and other customer valuables (safe custody role). Since 2000s the number of commercial banks offering loans was high but the number started to decline as we were progressing from 2003 until 2008 in Zimbabwe due to the economic status which was unfavorable leaving other

commercial banks bankrupt. According to Bank Report (2014) it is essential to note that with effect from 30 August 2013, The Financial Act number 3 of 2013 was gazetted, finishing a long period where Financial Sector was administered by a large group of a few bits of enactment including, the Money Lending and Rates of Interest Act Chapter 14:14; the prescribed rates of Interest Act and Statutory Instrument number 126 of 2003.

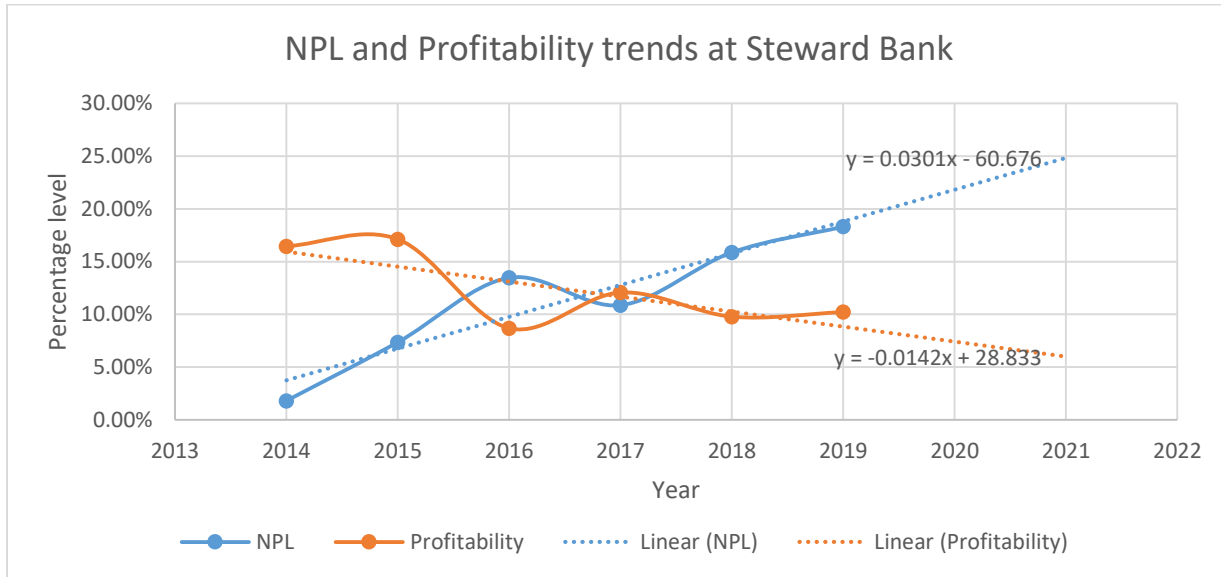
These statutes have not been revoked and keep on being pertinent close by the demonstration. The new demonstration perceives two essential sorts of monetary organizations, the Deposit Taking and the Non-Deposit Taking financial institutions (Munyanyi, 2018). Deposit Taking institutions accept deposits from the public, all banks and some microfinance institutions. Non-deposit taking financial institutions do not accept deposits from the public, especially the majority of the microfinance institutions. All the two types of financial institutions are involved in lending activities. With the introduction of dollarization policy, the environment encouraged investments and borrowing rate which is a key driver for commercial banks in the sector although the main issue is now centered on loan performance which has left other commercial banks bankrupt again (Chagwiza, 2014).

Credit creation is regarded as the main income generating activity for commercial banks (Basel, 2017). But for the past few decades this activity has shown huge risks to both the lender and the borrower with negative effects on loan performance as an investment portfolio (Basel, 2017). The risks arise as trading partners fail to meet their obligations as per contract on due date jeopardizing the smooth functioning of Commercial Banks' return on investment. The very nature of the Commercial Banks business is proving to be sensitive because more than 85% of their liability was deposits from depositors (Saunders, 2005). Business Banks utilized these stores to create credit for their borrowers, which actually was an income producing action for most Commercial Banks. This credit creation procedure is uncovering the Commercial Banks to high default hazard (Andersen, 2014). Among the danger that faces Commercial Banks, credit danger is one of extraordinary worry to most commercial banks powers and commercial banks controllers (Mpofu and Marwei, 2015).

Steward Bank is one of the licensed, regulated and highly innovative banking institution in Zimbabwe. It was incorporated in 2013 and it is headquartered at 7 Livingstone Avenue Harare, with 9 branches countrywide. The bank was established in 2013, as a commercial bank. Prior to that, the company had existed as a Finance House since 1999 (Mpofu and Marwei, 2015). In July 2012 Econet Wireless, the largest mobile telephone provider in Zimbabwe, acquired 45% shareholding in the bank (Munyanyi, 2018). In February 2013, the mobile network operator Econet Wireless then acquired the remaining 55% shareholding in TN Bank, thereby turning it into a 100% owned subsidiary of the mobile network operator. Following the divesture from TN Bank, TN Holdings Limited rebranded to Lifestyle Holdings Limited (Mabasa, 2017). In July 2013, TN Bank rebranded to Steward Bank and began a series of reforms to separate itself from its former owners, including setting up a new Board of Directors, creating a new corporate logo, launching a new website and relocating its branches away from Lifestyle Holdings locations (Munyanyi, 2018).

Steward Bank in Zimbabwe is one of the commercial banks that have had a generally decreasing profitability over the period from 2014 up to 2019, with highly fluctuating annual profitability values despite its investment in financial technology that sought to reverse loan delinquencies (Makacha, 2020). However, the level of the bank's non-performing loans has been on a rise (Steward Bank financial reports, 2015-2019; Makacha, 2020). Figure 1.1 below shows the general trends of Steward Bank's profitability (Return on Assets - ROA) and that of Non-Performing Loans (NPL).

**Figure 1.1: The trends in Non-Performing Loans and Profitability (ROA) at Steward Bank**



**Source: Steward Bank Reports (2015-2019); Makacha (2020)**

Figure 1.1 shows that the level of non-performing loans at Steward Bank was generally on the increase from 2014 up to 2019, as shown by a trend line with a positive gradient of 0.0301. The percentages are the fractions of the total value of non-performing loans to the total value of all the loans made. Figure 1.1 also shows that the level of profitability (ROA) has been on a decrease over the period from 2014, as shown by a negative gradient of -0.0142. The major problem at Steward Bank is the rising loan defaults as shown in Figure 1.1. However, the decrease in profit levels may not be partly or wholly attributed to credit risk management. The purpose of this research is to determine the contribution that the current credit risk management practices at Steward Bank have on the current profitability levels at the bank and proffer strategies to loan delinquencies at the bank. In order to address the rising loan defaults, Steward Bank and the regulatory body, the Reserve Bank of Zimbabwe (RBZ – which is the Central Bank) have taken some of the following measures.

In a bid to reduce the Non-Performing Loans, Steward Bank like other banking institutions in Zimbabwe sell some of their NPLs to the Zimbabwe Asset Management Corporation (ZAMCO) (Ndlovu, 2016). These NPLs are sold at a discount to the asset management company (Ndlovu,

2016). According to the 2016 Reserve Bank Monetary Policy Statement, in 2016, the Zimbabwe Asset Management Corporation (ZAMCO) had made serious strides towards cleansing banks' bad loan books through acquisition and restructuring of delinquent loans. By around 31 December 2015, ZAMCO (the Special Purpose Vehicle) had acquired and restructured delinquent loans from various commercial banks totaling approximately \$357 million (RBZ, 2016). These companies are in critical sectors of the economy such as mining, agro-processing and manufacturing (*ibid*, 2016). However, despite these efforts, non-performing loans have generally been on a rise.

Also, the Reserve Bank of Zimbabwe had no credit bureau until 2016 (Mabasa, 2017). The Central Bank then introduced the credit bureau in 2016. Credit bureau is a central system where all debtors of the banks (and sometimes other lending institutions) are registered. This is necessary to help the lending institutions to assess the borrower in terms of the borrower's history especially with other lending institutions, whether they have been paying their debts (on time) or they were not. According to the Central Bank of Barbados (2014), a credit bureau helps banking institutions to assess their borrowers well in terms of their behaviour when they get the loans, because of the moral hazard risk after a loan is extended. The central bank of Zimbabwe had its credit bureau in 2016 (Mabasa, 2017), but however, non-performing loans for all banks (as per the Central bank's reports), have generally increased from 2016 despite the effort by the central bank to have a credit bureau. This therefore makes it imperative to assess the credit analysis systems used by banks in their bid to reduce loan delinquencies.

On its ongoing revamp of operations, Steward bank is investing in digitized and innovative credit risk management solutions to improve on its credit risk management. However, with the uniqueness of the credit risk management model in Zimbabwe, despite of the continued increase in non-performing loans at the bank has inspired this research. It is against a background of increasing loan defaults at Steward Bank, reduced profitability levels, innovative and digitized credit analysis efforts, selling of NPLs to ZAMCO and introduction of credit bureau by the Central bank that this study sought to evaluate the impact of innovative and digitized credit risk management strategies at Steward Bank on the mitigation of loan delinquencies and proffer strategies to reducing high loan defaults.

## 1.2 Statement of the Problem

Steward bank is one of the innovative and digitized banks in Zimbabwe. Innovative banks have innovative products which expose them to risk, but also they have innovative tools to manage the risk. It is therefore the intention of this research to find out the effectiveness of the adopted innovative tools at Steward Bank on credit risk management and loan delinquencies. The level of loan defaults (non-performing loans) at Steward Bank has been high and is on the rise (Steward Bank financial reports, 2015-2019; Makacha, 2020). This is despite the efforts by the bank to digitize and implementing innovative credit risk management strategies credit analysis, despite the bank's efforts to sell some of its non-performing loans to ZAMCO and despite the effort by the Central Bank of Zimbabwe to introduce a credit reference bureau (CRB) system.

Various studies have been conducted in developing and developed countries on different credit risk management strategies by banks and their effectiveness in mitigating and reducing the level of delinquent loans within the financial sector. There were mixed results regarding the different strategies and their effectiveness in mitigating delinquent loans. Chagwiza (2014); Chidoko *et al.*, (2016) and Munoru (2018) and analyzed the effectiveness of complex credit risk management strategies like total return swaps and credit default swap and found out that the effectiveness of these credit management tools does not only depend on how innovative or effective the bank is but also other factors like the breadth and depth of the financial system. Gremi (2018) reveals that the availability of the secondary market to trade the instruments, financial sector regulation, government policies and other factors also play a role in the effectiveness of the bank's credit risk management strategies.

Compliance by the financial sector in uploading credit reference information on the Credit Reference Bureau was also cited by Mabasa (2017); Mishkin and Eakins (2018) as another factor that aids the effectiveness of banks' credit risk management strategies in mitigating and reducing the level of Non-Performing Loans. Moti, Masinde, Mugenda, and Sindani (2015) noted that the bank's lending policy; the assessment metrics and the competence of the Credit Risk Committee are the key principles in managing credit risk within banks. In light of the above mixed results coupled by the rise in the level of delinquent loans at Steward Bank which is viewed as a highly

innovative digital bank in Zimbabwe, the researcher was motivated to conduct a study which sought to analyze the different forms of credit risk management strategies and their effectiveness in mitigating and reducing delinquent loans at the bank.

### **1.3 Research Objectives**

#### **1.3.1 Main objective**

The main objective of the research was to determine the extent to which innovative digital banks such as at Steward Bank are effective in mitigating loan delinquencies in their credit risk management strategies.

#### **1.3.2 Secondary Objectives**

1. To establish forms of innovative credit risk management strategies used by Steward Bank in mitigating loan delinquencies.
2. To determine the effectiveness of Steward Bank's innovative credit risk management strategies in mitigating loan delinquencies.
3. To find out challenges affecting Steward Bank in implementing its innovative credit risk management strategies that it uses in mitigating loan delinquencies?
4. To determine ways that Steward Bank can use to address challenges affecting it in implementing its innovative credit risk management strategies in mitigating loan delinquencies.

### **1.4 Research Questions**

#### **1.4.1 Main Question**

To what extent are innovative digital banks such as Steward Bank effective in mitigating loan delinquencies in their credit risk management strategies?

### **1.4.2 Secondary Research Questions**

1. What are the innovative credit risk management strategies used by Steward Bank in mitigating loan delinquencies?
2. How effective are Steward Bank's innovative credit risk management strategies in mitigating loan delinquencies?
3. Are there any challenges affecting Steward Bank in implementing its innovative credit risk management strategies in mitigating loan delinquencies?
4. How can Steward Bank address challenges affecting the implementing of its innovative credit risk management strategies in mitigating loan delinquencies?

### **1.5 Research Significance**

This research is considered important to the following stakeholders.

#### ***Theoretical significance***

The research benefits theoretical development and modifications. Theories on credit management for banks such as the Liquidity Theory of Credit (Emery, 1984) and Portfolio Theory (Markowitz, 1952) were developed long ago before the advancement of technology and digitization. These theories are now outdated to explain loan management and credit risks of banks today. Technology for example has reduced risk associated with lending to a risky borrower relative to traditional models of conventional periods. It is therefore important that researches of today can help to modify these theories to fit the business world today.

#### ***The researcher***

This project qualifies the researcher for the award of a degree with the University since it is a requirement for the award of the degree. The researcher gained serious insights regarding how commercial banks can protect and safeguard themselves from delinquent and high-risk loans. Further, during the research, the author could practice and improve his research skills in different areas such as communication, data analysis as well as decision making, which are important for future endeavours.



***Primary stakeholders*** (Steward Bank, other commercial banks and other lending institutions)

The research is awakening all the bank executives and staff members in the corporate banking department, credit department and advances section operating at branch level, the need to create a distinctive competence in Commercial Bank facility advancement. This is expected to result in the reduction of the level of bank failure, through loan quality improvement. By dissecting the present innovative and digitized credit examination techniques, models and loaning approaches utilized by Steward Bank, the undertaking distinguishes the conceivable vital changes that the bank can make. The project also shall assist the credit control staff members, in coming up with the best practices to be implemented by commercial banks. This helps them in their credit monitoring process and periodic review of the borrowers' repayment capabilities.

***Secondary stakeholders*** (such as government agencies and Reserve Bank of Zimbabwe-RBZ)

These stakeholders benefit from the project to improve loan performance since loan quality deterioration and the level of bank failure have been continuously increasing in the Zimbabwean financial sector. The Reserve Bank of Zimbabwe (RBZ) highlighted in its First Quarter Monetary Policy Statement that there is a great need for strategic policy formulation and implementation in the lending business. However, this project outlined some strategic policies that can be formulated by the Central Bank to act as guidelines to all commercial banks in the lending business. This is because the project laid out a variety of factors that Commercial Banks should consider to reduce adverse selection of loan applicants, which in turn reduces the level of non-performing loans. Management of credit risk and delinquency in the financial sector is important as it is a pillar for financial soundness and depth.

***Tertiary stakeholders*** (such as Government Ministries)

These significantly benefit from the project since the project builds on the principles of bank lending and credit analysis, and acknowledges the importance of innovative and digitized Loan Management, which Ministry of Finance may have to consider. More so, it can be an eye-opener to all financial stakeholders in the lending business.

## **1.6 Delimitations of the Study**

The study looked at the effectiveness of digitized and innovative credit risk controls in Commercial Banks in Zimbabwe, focusing only on Steward Bank, forming the representative sample. In order to estimate population parameters, the sample was drawn from Harare where the head office of Steward Bank is located. Within the Steward Bank commercial bank, a sample was drawn from the Credit and Risk departments, which the researcher believes are the most relevant departments to provide more relevant information necessary for answering the research questions. The study used both primary and secondary data, whereby secondary data from 2015 to 2019 was collected for analysis.

## **1.7 Limitations of the study**

The researcher encountered some constraints during the process of conducting this study but nonetheless managed to sail through up to the completion of the project. The researcher faced the following limitations: The outbreak of a pandemic corona virus disease 2019 (Covid-19) rendered impossible physical meeting with the supervisor for guidance and supervision. The researcher utilised online means to get in touch with the supervisor and cut on physical visits to uphold social distance. There was also a time limitation due to the short academic semester and to minimize the effects of time constraints, the researcher had to work on weekends and overnight.

## **1.8 Assumptions**

The researcher assumed that the responses from questionnaires and interviews were accurate. The selected bank (Steward) fairly represented the banking of financial service industry. The respondents have an understanding of the research subject. Information provided by respondents would be treated with utmost confidentiality. The Covid-19 pandemic lock down and other restrictive measures would not render data collection impossible.

## **1.9 Structure of the dissertation**

The study comprises five chapters as outlined below.

**Chapter 1:** This first chapter presented the introduction and background of this study as well as the objectives and questions that the research sought to answer. The chapter also looked at the scope and relevance of the study.

**Chapter 2:** Chapter 2 reviews the related literature pertaining to the effectiveness of credit risk management strategies and loan delinquencies in highly innovative and digitized banks using Steward bank as a case study.

**Chapter 3:** The third chapter (Chapter 3) elaborates on the research methodology that was adopted in this study.

**Chapter 4:** The fourth chapter concentrates on data presentation, analysis and discussion of findings. In this chapter, the research study compares the similar and different findings with those of other scholars reviewed in Chapter 2 so as to determine concurrences or conflicts of findings.

**Chapter 5:** The fifth chapter summarizes the whole project work and gives conclusions to the research objectives and questions and those conclusions are the basis for the recommendations that the researcher gave to various stakeholders.

### **1.10 Chapter summary**

The chapter focused on the general introduction and background of the research, together with the problem statement and the objectives of the study. The significance of the study was discussed as well. The chapter gave the limitations of the study and the delimitation of this research. Other important introductory aspects such as assumptions and definition of terms were presented, inter, alia. The following chapter focused on literature on innovative credit risk management and their effect on loan delinquencies.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

The chapter reviews and analyzes the views of different authors concerning Credit Risk Management Strategies and loan delinquencies or loan repayment performance in highly innovative (digital) banks. It highlights the importance of concept of innovative credit risk management strategies in digitized commercial bank within the financial sector. It also enunciates the role of innovative credit risk management strategies in ensuring good and sound bank performance. Risks associated with commercial bank lending are also highlighted. Forms of literature used include journals, textbooks, and published research work.

#### **2.1 Definition of Terms**

##### **2.1.1 Credit risk**

According to Hull (2016) credit risk is the risk that counterparties in loan transactions and derivatives transactions will default or fail to honour their obligation usually for a period of 90 days. This has traditionally been the greatest risk that lending institutions face and is usually the one for which the most regulatory capital is required (Hull, 2016).

##### **2.1.2 A non-performing loan (NPL)**

A non-performing loan refers to a loan or credit on which the interest payments by the debtor or client are overdue usually for 90 consecutive days (Online financial dictionary, 2019). According to Glogowski (2008), a non-performing loan (NPL) refers to a loan in which the borrower is in default due to the fact that they have not made the scheduled payments for a specified period and many loans become non-performing after being in default for 90 days, although this can depend on the contract terms.

### **2.1.3 Provision**

It is an amount that is set aside out of profits in the accounts of an organization for a known liability (even though the specific amount might not be known or being a certain percentage) or for the diminution in value of an asset (Merton, 2019).

### **2.1.4 Asset Management Company**

Is a public, private, or joint entity that manages non-performing assets removed from the financial system with the goal of maximizing the recovery value of these assets (Cerruti and Neyens, 2016) for instance the Zimbabwe Asset Management Company (ZAMCO).

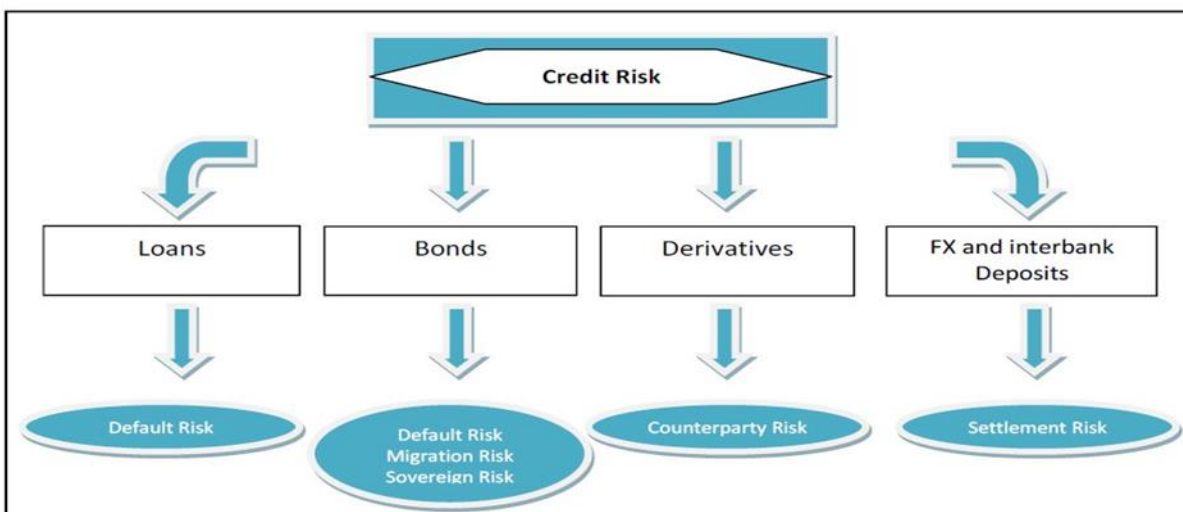
## **2.2 Credit risk**

Kutsienyo (2011) defined credit risk as the likelihood of an economic loss to the commercial bank or financial institution arising from the failure or inability of the counterparty to fulfill or honour its contractual obligations. It is also the risk to earnings or capital of an obligor's failure to meet the terms of any contract with the bank or otherwise to perform as agreed (Merton, 1974 cited in Maphosa, 2020). Koch (2016) also said that whenever a bank acquires an earning asset, it assumes the risk that the borrower will default, that is, not repay the principal and interests on a timely basis. Credit risk is not limited only in loan products but it also exists in other credit products, for instance, letter of credit and guarantees – a contract in which a bank agrees to act on behalf of a client if that client fails to execute what he committed in business contracts, investment services or asset finance- the bank lend out real assets like land, properties, and equipment (Murphy, 2008).

Credit risk is inherent in commercial bank activity according to Ross (2008). Ross (2008) noted that in terms of financial asset monetary loans the most affected by credit risk taken after by bonds however in a littler degree. Be that as it may, different items, for example, Over the Counter (OTC) subsidiaries, Asset Backed Securities and Structures bonds, between Commercial Banks exchanges, duties and insurances are likewise more influenced by credit hazard. The distribution of credit risk in banks is seen as a compound process that is mainly driven by the following key variables; Default risk (Probability of Default) (abbreviated PD), Credit exposure commonly

known as exposure at default (abbreviated EAD) and the Loss given default (abbreviated LGD). Thus losses due to defaults of the obligor before the time can be represented as follows:

$$\text{Default Loss} = \text{Default Arrival} \times \text{EAD} \times \text{LGD}$$



**Figure 2.1: Credit risk Categorization**

**Source:** Ross (2008)

Amid the previous 10 years, most methodologies in credit hazard demonstrating include the estimation of three parameters: the likelihood of default (PD) on individual advances, the appraisal of the misfortune or loss given default (LGD) and the connection crosswise over defaults and misfortunes (Crouhy, 2015). The initial two are recognized as two key danger parameters of the interior rating based (IRB) approach, which is fundamental to Basel II. The IRB approach permits banks to process the capital charges for every presentation from their own particular assessment of the PD and LGD. Despite the fact that default and misfortune are generally recognized as basic terms of credit danger displaying, there are no standard definitions for them.

Credit danger is the risk of misfortune because of the likelihood an obligor (obtain, counterparty) cannot or unwilling to pay its credit. Credit hazard makes up around 50-60% of the aggregate danger in an extensive bank (Kuritzkes *et al.*, 2013). Contrasting and the circumstance that main

part of scholarly research concentrates on business sector hazard, credit hazard has gotten less consideration in the writing, as of not long ago.

### **2.3 The Concept of Credit Risk Management by Commercial Banks**

The term management according to Kotler (2017) can be defined as the act of planning, directing, controlling, monitoring and testing for desired results to be obtained or it is simply the act, manner, or practice of managing; handling, supervision, or control (answers.com, 2010). In addition, risk on the other hand can be defined as the possibility that something unpleasant or dangerous might happen (Stern and Feldman, 2016). Credit risk management therefore refers to the process of identifying the source of credit risk, measurement, assessment, control and monitoring the likelihood of making losses from the failure by a counterparty/obligor in honouring his obligations. Credit risk is the most important of all bank risks because it comes about as a result of failure of the borrowers to pay their debts or delayance to meet up with their obligations in time (Rajan, Seru, and Vig, 2015).

Although the effects of all risks types can cause negative consequences to the bank, credit risk has been identified as the key risk associated with negative consequences in terms of its influences on bank performance (Sinkey, 1992 cited in Rajan *et al.*, 2015). This means if credit risk is not well managed, it can lead to bank failure, hence, for any bank to succeed, its credit risk management must be handled with a lot of seriousness and in a holistically approach. This is because should a loss occur, the bank will have to stretch out and extend its hands to get funds from other means to meet up or cover the losses (Di Maggio and Yao, 2018). Given that traditional credit risk management strategies have failed to effectively mitigate loan delinquencies; it is envisaged that banks should develop innovative strategies to cater for complex financial transitions that may pose high loan default by clients. The idea of credit administration turned out to be generally valued by Commercial Banks, however again this did not stop advance defaults to this date (Modurch, 2017). Credit intensifies the more an economy formalizes (Kithinji, 2016).

## **2.4 Theoretical literature review**

This section reviews literature on conventional credit risk management theories that are available. The researcher reviewed theories that underlie credit risk management strategies in commercial banks as well as the empirical review which formed the basis for the construction of the conceptual framework.

### **2.4.1 Liquidity Theory of Credit**

This theory, first suggested by Emery (1984), proposes that credit rationed firms use more trade credit than those with normal access to financial institutions. This view supports the idea that those businesses or companies presenting good liquidity or financial position or better access to capital markets are able to finance those businesses that are credit rationed. For example, Nielsen (2015), using small firms as a proxy for credit rationed firms, finds that when there is a monetary contraction, small firms react by increasing the amount of trade credit accepted. Petersen and Rajan (1997) obtained evidence supporting this negative relation.

### **2.4.2 Portfolio Theory**

Further, this theory of investment by companies and businesses tries to maximize the portfolio's expected return (return that investor expect to get after investing their funds) for a given amount and size of portfolio risk. Alternatively, the theory stresses that companies or investors tries to minimize risk they face for a given level of expected return by carefully choosing the combination of various classes of securities or assets. Although portfolio theory is widely used in practice in the finance industry and several of its creators won a Nobel prize for the theory, in recent years the basic portfolio theory has been widely challenged by fields such as behavioral economics (Markowitz, 1952). This include the fact that financial returns do not follow a Gaussian distribution or indeed any symmetric distribution, and those correlations between asset classes (Micheal and Sproul, 1998).



### **2.4.3 Credit Risk Theory**

The Credit Risk Theory propounds that there are three quantitative approaches of analyzing credit risk: structural approach, reduced form appraisal and incomplete information approach (Crosbie *et al.*, 2003). Melton (1974) introduced the credit risk theory otherwise called the structural theory which is said the default event derives from a firm's asset evolution modeled by a diffusion process with constant parameters. In these models, the default can happen throughout all the life of a corporate bond and not only in maturity (Longstaff and Schwartz, 1995).

### **2.5 Innovative credit risk management strategies used by digitized commercial banks in mitigating loan delinquencies**

Berg, Burg, Gombovic and Puri (2019) reveal that any person or company facing business is never far away from the serious disruptions and the financial sector is one undergoing rapid upheavals due to digitization. The ways and processes with which financial institutions particularly commercial banks and MFIs are lending money or finance to their clients is now much driven and anchored by the digital systems and various loan management systems or softwares (Berg *et al.*, 2019). The usual conventional loan application assessment, disbursement and the subsequent management of the entire credit system are nowadays being done through the use of digital systems and softwares so as to mitigate loan delinquencies in commercial banks (Berg *et al.*, 2019).

Most commercial banks are now using credit-scoring models such as the multivariate models. These models or systems adopts the main economic and financial indicators of a business or company as inputs, then they assign a corresponding weight to each of them, which will then reflect the relative importance in forecasting the probability of customer defaulting ((Berg *et al.*, 2019). The result from such models is an index representing the creditworthiness which is expressed as a numerical value and indirectly measures the prospective borrower's probability of default. Categories of credit-scoring models include the Linear Discriminate analysis, the Regression models (linear, logit and probit), and Inductive models like neural networks and genetic algorithms. This section looks at some of the forms of innovative credit risk management strategies that are being used by highly innovative and digitized commercial banks in and outside Zimbabwe.

In most cases, every commercial bank has its own lending policy, which determines the bank's vision and strategies linked to its credit activities. For a commercial bank, this policy acts as a guideline for employees and credit analysts in their daily jobs by setting a common mind-set, a common goal among workers whenever they make decisions, handle transactions, negotiate and interact with customers (Di Maggio and Yao, 2018). Though the components of a lending policy may vary from bank to bank, a lending policy needs to contain at least five elements which include introduction, objectives, strategies, credit standards, lending authorities and approvals (Hempel and Simonson, 1999 cited in Di Maggio and Yao, 2018).

In another study which was done with the aim to define the basic components of a lending policy, Buzzell and Spasovski (2014) point out that a lending policy should cover the following sessions like lending organization, lending objectives, standards and criteria for loan, credit risk rating, loan authority and lending procedures. A good lending policy is a strong tool to manage credit risk because it forms a system to evaluate and analyze credit profiles of new and existing borrowers (Buzzell and Spasovski, 2014). As loan officers are affected by the lending policy and or processes in granting or refusing prospective borrower's loan applications, the board of directors and the Credit Management Committee (Asset and Liability Management Committee) should seriously consider developing, institutionalizing and or reviewing the policies at least on an annual basis and make adjustments where necessary. With the trend of innovation and digitization of banks' credit risk management strategies, the lending policy of a bank should be developed and reviewed in line with the banks' envisaged innovative strategies.

### **2.5.1 Innovative credit risk management strategies pre-loan issuance**

Buchak, Matvos, Piskorski and Seru (2018) noted that digitized banks should establish innovative credit risk management procedures to control their credit operations as it is the most critical risk activity which have the greatest influence on loan delinquencies and if carried out properly it reduces the level of NPLs in banks (Negera, 2016). According to Saba *et al.* (2016) the success of issuing out loans rely on the lending policy and the techniques used to assess and to grant the credit hence the credit decision should be based on a cautious evaluation of the customer. Vukovic and

Damazet (2013) explained that banks need to carry out proper credit risk procedure because if not carried properly it causes the rapid spread of Non-performing Loans (NPLs).

The credit risk management procedure runs from client appraisal, credit terms, credit risk control, collection policy and economic cycles. Most commercial banks are using online or digital lending platforms, lending softwares, digital software lending solutions, loan management systems as well as digital document management softwares all designed from artificial and business intelligence for peer to peer lending, speeding up the process of loan processing, underwriting proposals, managing loans and client documents, repayment schedule, monitoring and administration as well as client experience and subsequent loan restructuring. These softwares and all other innovative credit risk management strategies are aimed at managing delinquent loans within commercial banks.

#### **2.5.1.1 Prospective Borrower or client Appraisal**

According to Abedi (2016) banks evaluate their clients to see if they can be potential borrowers using a model known as the 5Cs (character, capital, capacity, collateral and conditions) model of credit. Moti *et al.* (2016) asserts that the 5Cs model helps banks to increase loan performance and mitigate loan delinquencies as they get to know their customers better. In addition to the 5Cs, nowadays banks also use an alternative called the CAMPARI (character, ability, means, purpose, amount, repayment and insurance) model (FSB, 2019). Some banks before issuing a loan, the loans officers do an evaluation for the borrowers known as know your customer (KYC) where they will be assessing the ability of the borrower to repay (Abedi, 2016).

Client appraisal is an instrument that allows for weighing of ethics for different characteristics of a borrower and scores obtained by the client are used to estimate credit worthiness (Kolapo *et al.*, 2016). Hou *et al.* (2016) as supported by Murumba (2018) and Negera (2016) assert that proper client appraisal has a positive effect on reducing NPLs or loan delinquencies. Jackson (2015) carried a research in Kenya and found that client appraisal has strong impact on NPLs. In a speech at the Centre for Financial Study, Tommaso (2017), a member of Executive Board of the European Central Bank, shared his thought that the banking industry has become significantly more competitive than in the past, and competition is likely to increase further. On the contrary, it is not

always a good thing for banks, according to Chorafas (1999), competition can affect strategies for loans and force banks to lend credit to low creditworthy customers more than they used to.

However, in order to survive in today's tough competition, credit institutions might have to accept a decline in the number of AAA or AA rated customers (Kargi, 2015). The upsurge in financial technology and digitization has led to the development of online lending softwares by commercial banks like Euro banks and other digitized banks in developed countries. These digitized systems and or platforms have in-built consumer centric approaches where consumers can register their details on the system interface and start applying for loans and the comfort of their homes. In addition, the process of prospective customer verification, assigning of weights, eligibility documentation as well as other processes are done with openness. The same business intelligence was applied by Steward bank where a customer can register on mobile banking and start applying for loans (Kashagi). The online lending system will assess the customer's transaction history and calculate the customer's eligible balance before disbursing.

For subjective evaluation, banks can utilize **5Cs** of good credit, described by Apostolik, Donohue and Went (2017), which represent more or less the tenets of a CAMPARI model as key features when assessing borrowers:

- **Character** indicates the debtor's willingness to repay, the reputation of the debtor in his industry and in relationships with other lending institutions (Apostolik, Donohue and Went, 2017). For example, if a firm has always repaid its interests on time in the past, it is more likely that, for a new loan, the firm will continue to retain its reputation and full fill its loan's obligations (Otasevic, 2013). Thus in assessing the character of an existing client, the software will automatically trace the repayment history of the client and generate reports which credit analyst will use to approve or reject the application. If the client has a bad history in repayment, then the digital software solution will indicate red flags and tell the officer to reject which will help the bank mitigate against a potential default by the client.

- **Capital** refers to the capital structure of the borrower (Apostolik, Donohue and Went, 2017). Credit analysts study the level of leverage of the target firm by evaluating the weight of debt and equity that are used as sources of finance (Beck *et al.*, 2015). Debt ratio indicates the degree of

risk due to claims attached on the borrowers' assets (Muponda, 2016). The higher the debt ratio, the riskier the borrower is, as the borrower has so many obligations, and in case of liquidation, the borrower's assets are shared amongst so many creditors, increasing the chance of the bank not to fully recover the money lent (Nhavira, Mudzonga and Mugocha, 2014).

- **Conditions** refer to external factors that might affect the borrower's financial situation and his ability to repay (Winiski, 2016). These external factors to the customer are generated from the economic and technological environment in which the business operate under and are industry-related. For example, tobacco, cocoa, cotton and tomato businesses react strongly to changes in demand, the market as well as weather conditions. When the economy grows, people have more income and demand for tobacco, however, in hard time when people needs to save their money, the demand for this product can be very low (Fredrick, 2016). When dealing with individual clients, conditions may also mean life styles of clients like age of the borrower, extended families, spending habits and family background.

- **Capacity**: When analyzing this, banks focus on cash flow reports of customers (Musyoki and Kabuko, 2015). Commercial banks usually want to give out or lend money to companies of businesses that have predictable, firm or stable cash flows as well as alternative sources of revenue which can enable them to pay back the loans (Musyoki and Kabuko, 2015). Individual customers' capacity emanates from sources of income and its stability in relation to its expenses.

- **Collateral** refers to assets of the borrower which are used to securitize loans (Apostolik, Donohue and Went, 2017). In case the client failed to make payment, the lending bank can sell these assets to compensate for part or all of the loss (Fredrick, 2016).

So, with digitized banks, they are using business intelligence software solutions in lending like the lending management system where prospective borrowers or clients can submit their application documents more easily and conveniently, be able to check their own credit scores as generated by the models as well as being able to track the status of loan processing or during the loan life cycle (Pierri and Timmer, 2020). The digital lending platform tracks and prompts borrowers to submit required documents and fast tracks the loan processing times (Pierri and Timmer, 2020).

In addition, the digital lending means enables managing various loans and documents for they can be quite cumbersome. With an online lending platform, the financial institution can specify the required mandatory documents and necessary fields for loans (Pierri and Timmer, 2020). This enables that no human interference can be done to manipulate the documents of customers in favour of certain clients who sometimes might not be qualifying for the loan (Pierri and Timmer, 2020). In effect, the automated processes will ensure that the right deserving customers are given the loans which will limit the potential for non-performing loans.

Bartlett, Morse, Stanton and Wallace (2018) stipulated that the digital lending platform can have multiple lenders, borrowers and loan criterion. This means that when a prospective borrower's loan application documents are submitted, the systems or digitized models then matches the client to the best fitting lender in the market. This is most applicable and is used by Euro banks when advancing syndicated loans or lines of credit. Bartlett *et al.* (2018) noted that when the borrower's application is processed, all the required documents and collaterals for loan disbursement are also digitized. The system automatically generates an underwriting report for the lender's assessment of the risk, insurance value, capacity, capital, loan particulars and all the necessary information that will aid credit officer to make an assessment (Benmelech and Frydman, 2015). This will therefore limit the potential of high loan delinquencies.

Advanced credit-scoring models like the Linear Discriminate Model relies much on the identification and measurement of the financial and economic variables which make it very possible to "discriminate" better between sound and healthy businesses or companies and "abnormal" ones. Under the regression model (the Linear Probabilistic Model), the variables that will be used to calculate and ascertain the probability of default of a business or company as well as their weights are identified and picked by a simple linear regression. These models are used to determine the capacity of a company and in mitigating the potential for delinquent loans. The models also give a summary which help credit officers and the committee to assess whether to grant or not and the norm is that the bank should grant credit if the expected profit from doing so is greater than the profit from refusing (Di Maggio and Yao, 2018).

### **2.5.1.2 Credit Terms and conditions**

Once the assessment of the client is done, the bank clearly lays out the credit terms and conditions to successful borrowers. This alludes to the conditions under which a business bank propels credit to its clients (McGregor, 2015). The credit conditions will determine the loan time and loan costs in terms of the interest payments. Credit time alludes to the timeframe in which the credit is conceded. The length of the credit is impacted by Collateral worth, loan hazard, the extent of the record and advertises rivalry (Jordan, 2018). Obligation in a specific class will have its own particular loan fee as per the hypothesis of term structure (Westerfield, 2018). The financing costs charged is an expense on obtained supports and might influence the credit execution (Ross, 2018).

Credit terms refer to the terms and conditions applied by a bank when issuing loans to its clients (Mancka, 2016). The borrower is expected to sign as a way of agreeing to the terms and conditions. This is done to reduce the level of NPLs as the borrowers will be bound with this agreement and failure to repay will result in legal actions being taken against the borrower. Murumba (2013) argues that the adverse effects of NPLs can be minimized if proper credit terms and conditions are put in place. Some scholars have also found that proper credit terms reduce NPLs and among them are Stern and Feldman (2016), Kithinji (2016), and Kargi (2015).

Nowadays, highly innovative and digitised banks are now using sophisticated business or lending solutions to calculate interest payments which are amortized not only by the conventional excel spreadsheets. Digitized banks like Steward are using Finacle and Flexicube to automatically calculate loan installments based on the information provided like principal amount, interest rate, and duration of the loan and times of payment per year (Fuster, Plosser, Schnabl and Vickery, 2019). The system will make sure that the loan installment is deducted on the specified date set in the system so as to maximize the loan performance.

Debts are classified into different categories and each debt category has its own rate of interest. The rate of interest charged is the cost of a loan and the loan performance depends on its rate of interest (Abedi *et al.*, 2016). However, Bellas *et al.* (2013) as supported by Guy (2015) have contrasting views and they argued that even if proper credit terms are set the effect on the reduction of NPLs will be very insignificant to a bank. Bofondi and Ropele (2015) go on to say that there is

no significant relationship between credit terms and NPLs. Otasevic (2013), Beck *et al.* (2015) and Winiski (2016) concluded that they found empirical evidence that credit terms have no significant effect on the reduction of NPLs for banks.

### **2.5.1.3 Credit Risk Control**

Fredrick (2016) demonstrated that credit risk control is a risk procedure that has strong impact on reducing the level of loan delinquencies in banks. Poudel (2016) goes on to say that credit risk control is a crucial procedure in reducing the risk of banks making losses arising from clients who fail to meet the agreements of their loan contracts such an event is called a default. Their view is in line with the findings of Tracey (2015) as supported by Bindra (2016) who outlined that banks usually lose both the principal and interest payment which will result in high loan delinquencies and they suggested that proper credit risk control procedure reduces the level of NPLs in banks. These loan losses may result in reduced working capital for banks. Default risk can be mitigated by carrying the credit risk control procedure properly (Unaefe and Orgboi, 2013) as supported by Musyoki and Kabuko (2015).

With digitisation and innovative credit risk control metrics, banks are able to create robot or dashboards which indicate the level and the probability of client defaulting. This means that the system will monitor the performance of a customer over the loan period and in case the customer's deposits into the account starts to diminish, the dashboard will change colour from say green (less likely to default) to say amber (moving towards defaulting) or to red (highly likely to default). These metrics will serve as innovative tools of credit risk control because in the event the customer loan dashboard changes, the bank will promptly takes an action to mitigate against the likelihood of a client defaulting his loan installments (Pierri and Timmer, 2020).

### **2.5.1.4 Innovative Collection Policy**

According to Asari *et al.* (2015) banks should devise strategies which aim at reducing loan delinquency through proper innovative credit risk management strategies. One of the major strategies is an effective collection policy which is required to ensure that all borrowers pay their loans in time. Warue (2016) asserts that some borrowers delay to pay their loans whilst some of



them do not pay at all and become bad debts. Kariuku (2016) asserts that the collection policy is a strategy aimed at speeding up payments from those who delay and reducing credit losses from the non-payers. With digitization of lending and collection or recovery policies, banks can automatically deduct loan repayment installments on an agreed fixed date from the customer's account towards offsetting the loan balance. In addition, the bank or credit department will set the minimum balance that the customer can maintain in his or her account which equals or is above the monthly repayment amount so that they will be able to recover the loan (Raghavendra and Simha, 2010). This will limit on the probability of clients failing to pay or delaying the payments which can lead to loan delinquencies.

Kargi (2015) goes on to say that some borrowers fail to pay their loans in time therefore banks should create effective collection procedures and follow them properly so as to reduce the level of non-performing loans. The system can also generate automatic messages reminding the customer that the repayment amount is now due or overdue. This will force the client to take action in case they forget. Darsh and Karba as supported by Azeem and Amara (2014) postulated that banks should effectively carry the collection policy procedure so as to reduce the high rates of NPLs. Gremi (2016) concluded that if collection policy procedure is carried out properly it will have a positive effect on the reduction of NPLs for banks. The loan management software used by highly innovative banks also tracks the status of client repayments. It can be weekly, biweekly, monthly or quarterly as per the specified agreement terms (Kariuku, 2016).

## **2.6 Digitized Credit risk management strategies during the loan's life cycle**

Once the loan is disbursed to the client or the corporate, the bank does not sit and relax waiting for the payments to be done but however, implements innovative strategies aimed at ensuring that the client will not default. Client reassessment is also done, constantly monitoring cash flows, potential for capacity impairment as well as change in character of the client. This section reviews literature on strategies of monitoring credit after loans have been issued already.

### **2.6.1 Supervising and monitoring customers**

Credit risk management does not stop after the preliminary of credit analysis when borrowers apply for new loans but it happens along the life of loans (Poudel, 2016). Alawiye-Adams (2008) explains three major activities in credit supervision of a client. The first activities is of performing the re-analysis of the customer's credit profile and evaluate the customer's ability to repay and detect changes in credit quality from time to time. For example, doubtful loans need re-assessing more regularly than standard loans. Secondly, the banks should examine and establish the purpose and use of the loan by a customer in accordance with the loan agreement and loan covenants enshrined in the contract.

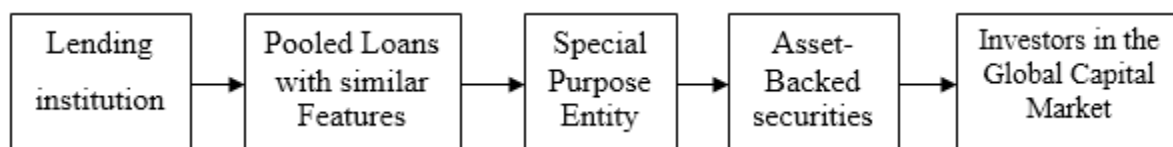
This is because borrower can use or spend the entire loan amount for wrong purposes or other reasons not stated in the application forms which might then impair the ability to repay the loan. This corresponds to the purpose on the CAMPARI model. Gambling with loan amount should be avoided as stipulated by most terms and agreements set forth by most commercial banks. Lastly, the bank should supervise the operations of the debtor's business to project future cash flow. A loan agreement indicates that the borrower of the loan must present reports of any changes in the value of his collateral quarterly (Fredrick, 2016). However, for larger banks which operate internationally and have many transaction centers, this process could be decentralized to branches or regions (Apostolik *et al.*, 2017).

One of the main parts in credit monitoring and supervising activities is loan review process (Gup, 2015). According to Hempel and Simonson (1999), the five factors that make a good loan review namely; fundamental financial statement analysis of the debtor and the ability to repay, the thoroughness of documentation, the performance of the borrower's business in compliance with the written loan policy and regulation, the status and value of collaterals and the level of profitability of the loan. In addition, Hempel and Simonson (1999) suggest that banks have developed models that separate loan review officers from loan employees because one should not monitor and supervise his own work. Therefore, highly innovative banks across most countries have advanced softwares used to supervise, monitor and administer clients.

## 2.6.2 Securitizing loans

Brigo, Morini and Pallavicini (2013) find that under the time value of money theory, the value of collateral can change dramatically during the loan period, so it is not always easy to evaluate the fair value of the asset. In Figure 2.2, Rose and Hudgins (2016) describe the securitization process starts when a lending organization chooses a group of assets that are hard to convert to cash and have similar features, such as a group of loans, mortgages, receivables.

**Figure 2.2: Securitization Process**



**Source:** Rose and Hudgins, (2016)

In addition, ABSs free bank's capital and allow the bank to issue more loans or invest in other business and lastly ABSs are a faster way to transfer illiquid assets to cash (Economy Watch, 2016). Other post-approval credit risk management strategies include netting arrangements, setting position limits on the exposure to a counterparty in a portfolio context, analysis of management accounts, disbursing of funds in tranches, paying directly to suppliers (when the purpose of the loan is to pay creditors or suppliers) as well as regular client visits (Rose and Hudgins, 2016).

## 2.6.3 Credit Default and Total Return Swap (Credit Derivatives)

Apart from that, nowadays highly innovative and digitized banks adopt and make use of complex financial tools to mitigate loan delinquencies and among others include Credit Default Swaps and Total Return Swaps. These tools are mainly used when the financial institution realizes that the customer is almost in default or has defaulted already. These credit derivatives as tools for managing credit risk are contracts that are capable of passing the credit risk from one party to the contract to another. They will also allow credit risk to be stripped off from bad loans and bonds and placed in a different market where they can be immunized and limit the credit exposure.

Highly innovative and digital commercial banks in well developed countries like the China Merchants Bank and other Asian banks with a sound secondary market used innovative credit risk management strategies like credit default swaps (CDS) (Berg *et al.*, 2019). A Credit Default Swap (CDS) was defined by Berg *et al.* (2019) as a financial contract that provides insurance (insulation) against the probability of default by a certain customer or company. This company is regarded as the reference entity whilst the default event by the client or company is known as a credit event.

The whole idea of this advanced credit risk management strategy (credit default swap) is that the buyer of the insurance obtains the right to sell a particular credit or bond that is issued by the company at its par value when a credit event materializes. The bond in this case is known as the reference obligation and the total par value of the credit or bond that can be sold is called the swap's notional principal (Berg *et al.*, 2019). In addition, the buyer of the CDS makes periodic payments (or lump sum) to the seller (the commercial bank in this case) until the end of the life of the CDS.

Conversely, a Total Return Swap (TRS) is defined as an agreement entered into by parties to exchange the total return on a credit or bond or other reference asset for a London Interbank Offered Rate (LIBOR) plus a spread (Berg *et al.*, 2019). This means that the total return of the bond (reference bond) includes the coupon payments, interest rate, and the gain or loss on the asset over the life of the swap. If there is a default on the loan or bond, the swap thus terminated and the receiver makes a final payment equal to the excess of par value of the bond or principal amount of the loan over the market value of the bond or loan. If the payer owns the credit, loan or bond, the TRS allows the payer allows to pass the credit risk on the bond to the receiver. If it does not own the bond, the TRS allows it to take a short position in the bond.

## **2.7 Effectiveness of digitized credit risk management strategies in mitigating loan delinquencies by commercial banks**

The Organization for Economic Cooperation and Development (OECD) (2020) researcher about the effectiveness of digitized credit risk management strategies in a paper titled "Digital Disruption in Banking and its Impact on Competition". The paper reveals that the use of new technology, innovation and the digitization of banks have important implications for the welfare of market

participants. The implication was that it may lead to lower financial intermediation costs in lending, payment systems, financial advising, and insurance, better products for consumers as well as mitigating the level of loan delinquencies (OECD, 2020). Although, Philippon (2018) emphasized that the unit cost of financial intermediation has not gone down until relatively recently despite technological progress, however, through online origination technology, highly innovative and digitized banks offer more convenience to their borrowers and drives efficiency in several ways.

The use of advanced credit scoring models like CAMPARI, 5Cs and Neural Networks can more effectively screen candidate borrowers via statistical models based on big data, thereby overcoming the information asymmetries that are at the root of the banking business (FSB, 2019). Furthermore, to predict consumer default, easily accessible variables from the digital footprint (such as accessing a website) are as good as or better than the information content of credit bureau scores (Berg *et al.*, 2018). This will enhance sound decision making with regards to whether to disburse a loan to a certain customer or not hence very effective in mitigating against the level of non-performing loans.

Apart from that, the use of innovative credit risk management strategies reduces the need for personnel (such as loan officers) and for an extended branch network (since customers use their mobile phones for banking). Human interference with loan application and disbursement through paperwork resulted in most cases undeserving customers getting loans which may result in high loan delinquencies. Therefore, the system can eliminate the risk of information editing and altering in favour of certain clients (Berg *et al.*, 2018). Advanced innovative models that are used to calculate interest payments allow much more targeted interest rate discrimination. For example, innovative and digitized lenders employ interest rate–setting models for mortgages with superior performance compared with those used by non-digitized institutions, since more of the variation in prepayment outcomes across borrowers can be attributed to interest rates in the case of FinTech loans (Buchak *et al.*, 2018). These models also assist in restructuring loans so as to reduce the burden of client and in effect limiting the potential for loan delinquencies.

In addition, a study by Mburu and Muathe (2020) which sought to determine how credit management practices affect loan performance and also a study by Otieno and Nyagol (2016) which investigated on credit risk management strategies and loan performance of Commercial banks in Kenya and Nigeria respectively. The authors found out the importance of managing credit risks on loan performance which ultimately reduces the level of non-performing loans. Apart from that, Ahmed and Malik (2015) examined on loan performance and credit risk management strategies taking empirical evidence from Pakistan commercial banks. The study found that client appraisal and credit terms had a significant positive influence on the loan performance whereas collection policy and credit risks had a positive but insignificant influence on how the loans performed (Kairaria, 2017). These results have shown that innovative credit risk management strategies are very effective in mitigating loan delinquencies in commercial banks. However, Kairaria (2017) noted that the models should be applied and used by highly skilled personnel who will be able to interpret the results and summaries of such models.

More so, complex credit-scoring models like the linear discriminate and neural networks provide effective solutions in reducing the probability of disbursing loans to undeserving customers which may lead to high default rates. These innovative models were believed to be fast and effective in providing early default warning signs and correctly forecasting and predicting the likelihood of the client to default (Mburu and Muathe, 2020). The authors further stated that these highly sophisticated models also take into consideration other factors which a human being cannot be able to factor in. Thus their application in today's businesses enhances the effectiveness of banks in managing and mitigating the level of loan delinquencies.

Furthermore, Ofonyelu and Alimi (2013) studied how the bank's risk on borrowers affected NPLs in Kenya and South Africa. Their study found that loan delinquencies could be reduced through credit analysis which involves analytical manipulation using artificial intelligence business solutions. Although, their study confirmed the importance of credit risk management in managing loans, the study did not document the specific components affecting how loans performed which is crucial in assessing the effect of loan performance. Moreover, Gakure *et al.*, (2012) examined on credit risk management techniques and banks performance of unsecured loans and he found out that credit management techniques had a positive effect on the bank's performance as measured

by the low levels of non-performing loans. All these findings point to the fact that innovative credit risk management strategies by highly innovative and digitized commercial banks are very effective in mitigating loan delinquencies. This is through offering a faster way of analyzing or rating the credit worthiness of borrowers, fast in processing and recovering loans, easy with which a bank can monitor and administer a client as well as providing effective credit-rating scores.

## **2.8 Challenges affecting commercial banks in implementing digitized credit risk management strategies in mitigating loan delinquencies**

Despite the benefits or the effectiveness of different innovative credit risk management strategies in mitigating loan delinquencies by commercial banks, banks are faced with challenges in implementing these strategies. Among the chief challenges is the issue of asymmetric information. Shibata and Tian (2010) noted that although it is known that the bank has to have information about the borrower before taking its credit granting decisions, there is no guarantee that the borrower will give all the information about itself. This type of information which is known only to the borrower and hidden from the bank about a customer it has already financed is called asymmetric information (Shibata & Tian, 2010). Given that business intelligence softwares perform as per their programmed and the amount of information fed into their systems, they can produce reports which support the granting of credit to a certain customer when in fact that customer does not deserve the loan. This can increase the chances of such clients defaulting which are beyond the systems' or human capacity due to lack of sufficient information.

In addition, there are also limitations associated with Credit Scoring Models like Neural Networks, Linear Discriminate Models and Regression analysis for instance the definition of an abnormal or insolvent company as different “degrees of insolvency” exist (Beaudry, Doms and Lewis, 2010). A model can define an insolvent company differently according to the information provided and this can have potential implications on credit rating. Rejecting a solvent company is better than accepting an insolvent company as a result of computational bias, hence this can pose the risk of loan delinquencies to the bank. In addition, credit scoring models suffer the limitation of different variables. Meaningfulness of the independent variables used by the scoring model may vary over time, thus their weights should change as well (Beaudry *et al.*, 2010).

Again, the cost of procuring advanced credit rating systems and other Business Intelligence Softwares by commercial banks is another factor that conform lending institutions. These most advanced credit management strategies requires heavy budget to install, train credit officers who will be using such models as well as hiring IT specialists like programmers and data miners (Benmelech and Frydman, 2015). Cloud computing is one of the latest development in the field of IT and this requires people who were trained to do so. Thus the cost of implementing the whole system is so high to the extent that most commercial banks have just procured but never used them. They have to rely on excel spreadsheets which are easy to use (Pierrri and Timmer, 2020).

Poor infrastructure development in most developing countries like poor networks and information communication technology limits most commercial banks in fully implementing innovative credit risk management strategies. Most banks have relied on traditional credit risk management strategies due to lack of proper infrastructure to support the models. According to the Innovation Diffusion Theory, technology and innovation is transmitted from one institution to another as a result of their interconnectedness in a financial system. Thus the incentive by commercial banks to innovate comes as a result of competition from other financial institution and the infrastructure that supports the development.

## **2.9 The Basel Committee Credit Risk Management Framework**

Scricciu (2015) postulated that as volatility or risk has become the dominant economic environment in which most commercial banks and microfinance institutions operate, they were put in a difficult position to meet and surpass the new challenges and to face greater and complex risks. This has created the need for the supervisory institutions including central banks to develop complex and serious models and or techniques for credit risk management. Alternatively, the financial crises especially the Global Financial Crisis of 2007 to 2009 has shown that Basel II has several shortcomings when it comes to credit risk management and must be upgraded (Scricciu, 2015). In response to that, the Basel Committee on Banking Supervision (BCBS) proposed Basel III at the end of 2009 which is a comprehensive strategy for regulation, supervision and risk management of internationally-active commercial banks and other financial institutions (Scricciu, 2015).



Bank for International Settlements (BIS) (2020) reveals that the volatile macroeconomic conditions or environment, the subdued economic activity that were witnessed at the last quarter of the financial year 2008, currency devaluation as well as liquidity problems in international developed and developing markets, marked the slowdown or recession of the growth rate of non-government loans and credit. As a result, the dynamics of bank assets decreased rapidly in 2009 compared to the previous year. The implementation of Basel II from 1 January 2008 required the acquisition and adaptation of reporting forms developed by the Committee of European Banking Supervisors (CEBS) and ensures the comparability of financial information reported to the supervisory authorities of the European Union (BIS, 2020). The Global Financial Crisis of 2008/2009 has shown that Basel II has several shortcomings such as the average level of capital required by the new discipline was inappropriate and this was one of the reasons for the collapse of several banks (Ernst and Young, 2016).

In addition, under Basel II, credit risk assessment was delegated to non-bank institutions such as rating agencies, which could lead to potential conflicts of interest and that the key hypothesis that internal models to measure risk exposures are above proved to be wrong (Ernst and Young, 2016). In light of the above shortcomings of the Basel II, the Committee on Banking Supervision Basel (BCSB) has proposed the crafting of a comprehensive strategy that was aimed at addressing the fundamental and technical weaknesses that were revealed by the global financial crisis on regulation of financial market, the supervision and risk management of commercial bank assets across the world. The BIS (2020) indicated that the major thrust of this proposed comprehensive strategy was to strengthen and enhance the risk adjusted capital reserves. In addition, the strategy was aimed at promoting stronger risk management and sound corporate governance practices so as to limit credit concentrations of risk in banks.

Therefore, the Basel III which was signed by the Committee of Banking Supervision compelled all commercial banks to triple by 2015, all the capital reserves of high quality, up to a 7% capital adequacy ratio (BIS, 2020). Thus, banking authorities and major global central banks decided to increase the capital base rate ranking first (core Tier 1) to 4.5% from 2%. However, the total rate was established at Tier 1, 6%, compared with 4% today. Banks will need to build a new type of reserve, the preservation of capital, of 2.5%, along with Tier1 rates, consisting of common equity

and if the banks will be reported as having excessive credit conditions that will create a counter-book, of 0 - 2.5% (BIS, 2020; Deloitte, 2020). These capital reserves help banks to play its role of shock absorbing and limiting credit risks.

The European Banking Authority (EBA) supported the final Basel III framework for credit risk. Overall, the improvements in the risk sensitivity of the S-standardized Approach (SA) make it a reliable alternative to the Internal Ratings Based (IRB) approach (Ernst and Young, 2016). At the same time, the reduction in modeling choices introduced in the IRB approach is consistent with the shortcomings experienced during the financial crisis, when the credibility of internal models was challenged. The EBA believes that these measures, together with the bottom-up repair, will help to ensure sufficiently comparable and risk-sensitive models. The European Banking Authority has found that, the Basel III credit risk framework is suitable for implementation in the EU, especially as many of the changes in the framework take into consideration several existing EU practices, such as the lower risk weights (RWs) applicable to corporate small and medium-sized enterprises (SMEs), or the loan-splitting approach in the case of residential mortgages (Ernst and Young, 2016).

In addition, around February 2015, the Basel Committee on Banking Supervision promulgated a Consultative Document that clearly outlined the banking supervisory expectations pertaining to the sound credit risk management practices which were associated with implementing and applying an expected credit loss (ECL) framework within financial institutions. The expected credit loss largely maintained the Basel Committee's previous sound principles on effective credit risk management, assessment and valuation of various loans that were issued in the year 2006. However, the new principles were revised to reflect the move from an incurred loss by banks to an ECL accounting model. Thus the Basel Committee Credit Risk Management Framework (Basel III) outlined the principles for assessing banks' management of credit risk and these include establishing an appropriate credit risk environment principle, operating under a sound credit granting process principle, maintaining an appropriate credit administration, measurement and monitoring process, ensuring adequate controls over credit risk as well as the role of supervisors (central banks and other financial institutions regulators) (BIS, 2020).

Amongst these principles' tenets include that the senior management should have responsibility for implementing the credit risk strategy approved by the board of directors and for developing policies and procedures for identifying, measuring, monitoring and controlling credit risk as well as that banks should identify and manage credit risk inherent in all products and activities (Ernst and Young, 2016). In addition, banks must operate within sound, well-defined credit-granting criteria, establishing an overall credit limits at the level of individual borrowers and counterparties, and groups of connected counterparties that aggregate in a comparable and meaningful manner different types of exposures, both in the banking and trading book and on and off the balance sheet (Ernst and Young, 2016).

The Bank for International Settlements noted that although the board of directors and senior management bear the ultimate responsibility for an effective system of credit risk management, supervisors should, as part of their ongoing supervisory activities, assess the system in place at individual banks to identify, measure, monitor and control credit risk (BIS, 2020). Supervisors should conduct an independent evaluation of a bank's strategies, policies, procedures and practices related to the granting of credit and the ongoing management of the portfolio (Ernst and Young, 2016). This should include an assessment of any measurement tools (such as internal risk ratings and credit risk models) used by the bank (BIS, 2020).

## **2.10 The Reserve Bank of Zimbabwe (RBZ) Credit Risk Management Framework**

Following the Basel II, the Reserve Bank of Zimbabwe (RBZ) in its Bank Licensing, Supervision and Surveillance Guideline document of 2010, it stated that a commercial bank of MFI should adopt and implement a holistic approach to evaluating and assessing its credit risk and ensure that the available credit risk management strategies are integral component of an integrated approach to the management of all financial risks. This means that every bank should have comprehensive credit risk management systems appropriate to its type, scope, sophistication and scale of operations with international and highly digitized banks assumed to have a rigorous credit risk assessment and management (RBZ, 2010). These systems should enable commercial banks and MFIs to identify, assess, measure, quantify, monitor and control credit risk whilst ensuring that adequate capital resources (buffer) are available to cover risk tolerance. Thus, according to the

Reserve Bank of Zimbabwe, effective credit risk management by financial institutions is a critical part of a comprehensive approach to risk management that is anchored by effective board and senior management oversight, well-defined internal policies and procedures, strong management information systems and adequate and appropriate internal control systems to mention a few.

The board of directors should be ultimately responsible for providing overall strategic direction to the bank through approving and reviewing the credit risk strategy and credit risk policies (RBZ, 2010 cited in Mugodo, 2012). It should encompass the need to maintain sound credit quality, profits and business growth and allow for economic cycles and their effects on the credit portfolio during different stages of an economic cycle (RBZ, 2016). Apart from that, the financial results of the institution should periodically be reviewed to determine if changes need to be made to the credit risk strategy hence, senior management should be fully capable of managing the credit activities conducted by the bank and that such activities are done within the risk strategy, policies and procedures approved by the board (RBZ, 2020).

In terms of the risk management structure, the central bank clearly stated that commercial banks or MFIs should adopt and implement a risk management structure that commensurate with the actual size and nature of its banking activities. The organizational structure should facilitate effective management oversight and execution of credit risk management and control processes, senior management committee should be formed to establish and oversee the credit risk management framework (RBZ, 2010). This committee should comprise senior management from the business line and control functions (RBZ, 2010 cited in Mugodo, 2012).

Senior management should set out operational processes and procedures to implement the credit policies (RBZ, 2010). The processes should include credit limits, credit products and its mitigation and provisioning policy. The regulator also postulated that banks should conduct back and stress testing of its credit portfolio. This involves identification of possible events or future changes that could have a negative impact on the institution's credit portfolio and the bank's ability to withstand the changes (RBZ, 2019). Following the amendment of Basel II and the subsequent introduction of Basel III, the Reserve Bank of Zimbabwe has advocated the use of the risk based regulatory of

financial institutions. Minimum Capital Requirements have also been reviewed upwards to cater for probable losses as part of credit risk management framework.

Recently, the Reserve Bank of Zimbabwe has instructed banks to submit monthly credit reports as it prioritizes the identification of risk concentrations in the face of the impact of Covid-19 pandemic. In his monetary policy statement of late 2020, central bank governor John Mangudya said the identification of risk concentrations from an overall portfolio perspective was paramount during this pandemic. In particular, he said reviewing sectorial concentrations of loans was critical given that the pandemic has affected various sectors differently. Against this background, it means that with effect from 30 September 2020, banking institutions are required to submit monthly credit reports on the status of each of their top twenty loans or exposure and a clear strategy for action where there is deterioration in quality of the concerned loan (RBZ Monetary Policy, 2020).

Mangudya went on to say banking institutions were also required to submit to the central bank (RBZ) an updated effective cyber risk management policies and procedure by 30 October 2020, which takes into consideration the COVID-19 experiences up-to-date. This follows the face that COVID-19 pandemic and its subsequent regulatory measures have made a compelling case for banks to embrace digital banking. Mangudya (2021) further indicated that the accelerated financial technology (FinTech) and digitization by most commercial banking institutions at the back of COVID-19 and the working from home arrangements have expanded the attack surface of banks' information technology networks. Cyber and anti-fraud controls are critical for banking institutions during and post COVID-19 and that banking institutions should review the adequacy of their ICT systems (Mangudya, 2021).

## **2.11 Empirical Review**

Previous studies also show a close relationship between non-performing loans ratio and credit risk management. For example, Brewer and Jackson (2006) involve non-performing loans to total assets ratio (NPLR) as an indication of efficient management of credit risk. In addition, Tafri *et al.* (2017) examine the relationship between credit risk and profitability of the conventional and Islamic banks in Malaysia between the periods from 1996 to 2005 and found a significant

relationship among them. The researchers used proportion of allowance for the loan loss to total assets (Tafri *et al.*, 2017) which has a close relationship with NPLR to represent the credit risk. And in the beginning of Tafri *et al.* (2017) research, they emphasize that profitability as an ultimate test for the effectiveness of risk management.

In a comprehensive study that was conducted by Altman (2015) named as “Managing Credit Risk: A Challenge for the New Millennium”. The scholars pointed out those further refinements in banks’ credit-scoring models were required. In addition, it was recommended that there should be establishment of serious databases on customer defaults, recoveries made by banks and credit migrations where appropriate. Credit risk mitigation and control model and techniques like credit securitizations, credit derivatives as well as credit insurance and structured products were to be developed.

In the study done by Richard and Chijoriga (2014) from UDSM and Hakan and Bohman (2014) from School of Business Sweden on Credit risk management system of commercial bank in Tanzania, the paper was developed to present a conceptual model for understanding credit risk management system of commercial banks in an economy with less developed financial sector. The scholars found out that the major parts of Credit Risk Management approaches in emerging and developing countries are slightly different from those of the developed and third world countries like Russia, China, United States of America to cite a few. The environment in which banks operate under differs and this is a determinant for effective and sound Credit Risk Management Practices.

Recently a study by Hacıhasanoglu and Ozdemir (2017) in Turkey on “Credit Risk Market and the Recent Loan Profile in the Turkish Banking Sector” was conducted. The study sought to fill in the gap that was left out in terms of the impact of Credit derivatives on the level of delinquent loans or the quality of the loan book of most commercial banks. The findings of the study by Hacıhasanoglu and Ozdemir (2017) indicates that a well-functioning and supported credit derivatives market provide the basis for diversified and developed financial system to support a fruitful recovery in Turkish economy. Further, in the study done by Jorion (2017) of USA on “Risk management Lessons from the Credit Crisis” it was established that the perfect carrying out of risk management does not assure you that the huge losses will not occur. It emerged that the probability

of commercial banks incurring losses always exists despite that all the precautionary and preventative measures are taken.

### **2.11.1 Empirical Review on the failure to comply with the Basel Committee and the RBZ Credit Risk Management Framework**

From the review of the RBZ Credit Risk Management Framework and the ongoing review with regards to changes in the Basel, there has been a failure to comply with some of these guidelines by commercial banks and the regulator. The banking sector in Zimbabwe is still struggling to comply with the Basel II requirements hence lagging behind the requirements of Basel III. The Reserve Bank of Zimbabwe's Monetary Policy of February 2019 reveals that the entire banking sector has generally remained resolute and stable as exhibited by the adequate capitalization (risk adjusted) as well as the improved earnings power during the financial year ended 31 December 2018. However, the asset quality of these commercial banks has deteriorated as shown by the increase in the average delinquent loans to total loans ratio during the same period under review.

RBZ (2019) also postulated that the entire banking sector (financial sector) has remained adequately capitalized (risk adjusted) with average tier 1 and capital adequacy ratios of approximately 23.84% and 30.27%, respectively. Further, the banking sector's aggregate core capital has increased by 15.32%, from \$1.37 billion as at 31 December 2017 to \$1.58 billion as at 31 December 2018, mainly as a result of organic capital growth (RBZ, 2019). This shows compliance on the part of Basel II but falling short of the requirements of Basel III which encompasses more risk than before. Mangudya (2019) noted that the challenging macroeconomic environment underscores the need for banking institutions to implement capital preservation strategies.

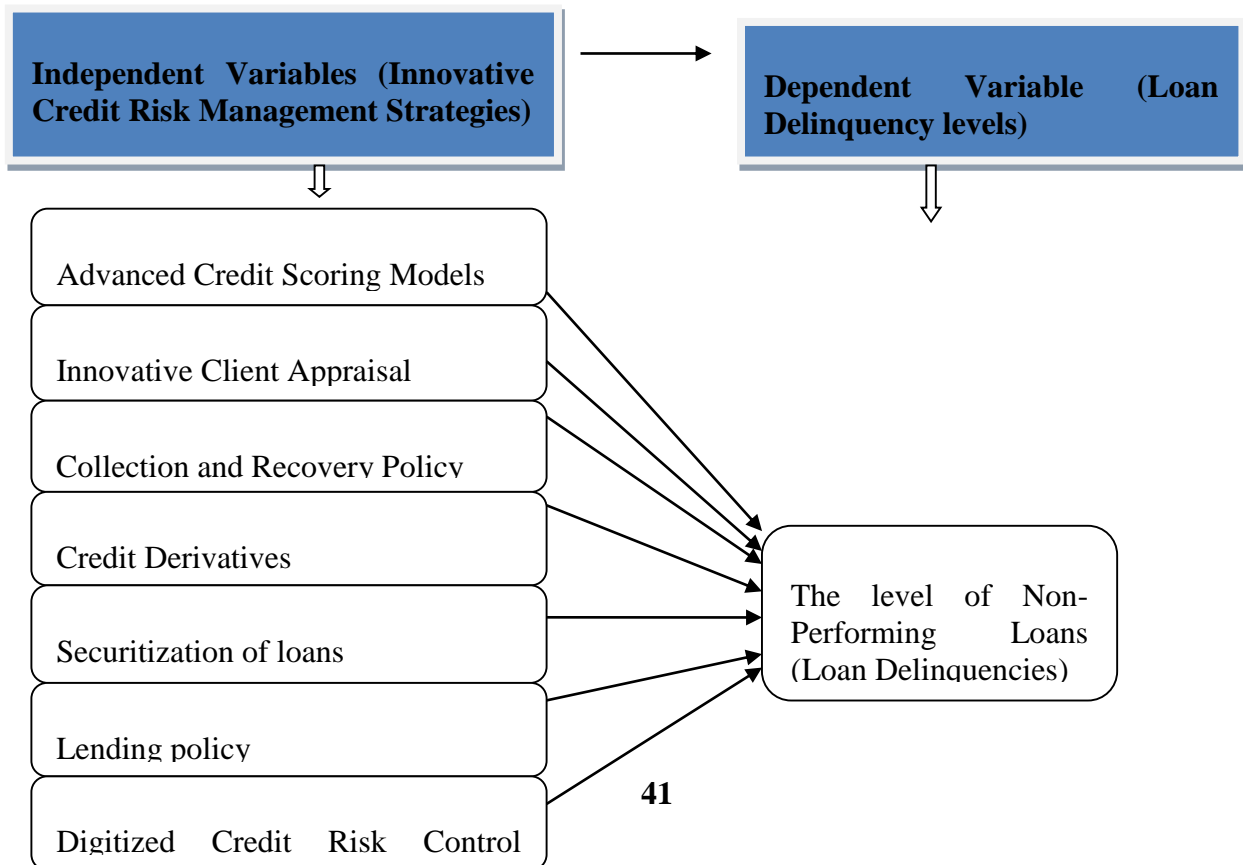
In addition, the failure by the Zimbabwean banks to comply with the Basel and the RBZ Credit Risk Management principles also lie in the political interference where the government sometimes direct banks to lend to a certain sector like Agriculture and mining for instance without following due processes enshrined in the frameworks. In addition, weak regulatory practices by the regulator and regulatory arbitrage by banks also cause some banks to be less compliant in terms of following the sound principles of effective credit risk management. As alluded to earlier on, harsh and

volatile macroeconomic environment in Zimbabwe mars the concerted efforts by banks and the regulator to effectively comply with the framework.

Apart from that, BIS (2020) noted that the Basel III is yet to be fully adopted by the European banks and other international and highly digitized banks. This shows that there are still gaps with respect to compliance with the frameworks worldwide. The use of the standardized approach and the internal ratings approach to complex financial instruments require heavy investment in information systems hence the cost is yet to be footed by banks and supervisors hence limiting compliance levels (BIS, 2020).

### 1.12 Conceptual Framework

According to Miles and Huberman (1994), a conceptual framework is defined to mean a visual or written product that explains either graphically or in narrative form, the main things to be studied, the key factors, concepts or variables and the presumed relationships among them. Put differently, a conceptual framework shows the way ideas are organized to achieve a research purpose. The following is a diagrammatical illustration of a proposed conceptual framework for this study.





## **Figure 2.1 Conceptual Framework**

**Source:** Author (2021)

As shown by Figure 2.1, independent variables for the study are the lending policy, innovative client appraisal, the use of credit derivatives, securitization of loans, collection and recovery policy and innovative credit risk policy. The collection and recovery policy is conceptualized by guarantor payments on borrowers' default, the collection enforcements, continuous monitoring and control of loans. Client appraisal is conceptualized by use of the funds, collateral characteristics, credit score, assessed character of the borrower and ability to pay the debt (5Cs). Lending policy is conceptualized to consist of credit limits, credit terms and documentation. Credit derivatives involves credit default and total return swaps whilst advanced credit scoring models involves metrics like regression, linear discriminate model and neural networks.

These metrics will be measured by their ability to correctly appraise and assign a correct credit score to the borrower based on the information provided. In addition, securitization of loans will be measured by the value of NPLs mortgaged and or sold to ZAMCO against the total NPLs outstanding. Digitized Credit Risk Control Metrics are measured by the effectiveness of the methods to determine, assess, measure and predict the probability of loans turning to be non-performing ones hence early warning signs. Thus overall, the independent variables are measured by their effectiveness in client appraisal, assigning credit scores, monitoring as well as in mitigating and controlling loan delinquencies. The dependent variable for the study is the level of loan delinquency (non-performing loans) by innovative commercial banks that is measured by the amount of NPLs to total loans.

### **2.13 Identified research gap**

Various studies have been conducted in developing and developed countries on different credit risk management strategies by banks and their effectiveness in mitigating and reducing the level of delinquent loans within the financial sector. There were mixed results regarding the different strategies and their effectiveness in mitigating delinquent loans. Chagwiza (2014); Chidoko *et al.* (2016) and Munoru (2018) and analyzed the effectiveness of complex credit derivatives like total

return and credit default swap, the use of advanced credit scoring models and found out that the effectiveness of these credit management tools does not only depend on how innovative or effective the bank is but also other factors like the breadth and depth of the financial system. Gremi (2018) reveals that the availability of the secondary market to trade the instruments, financial sector regulation, government policies and other factors also play a role in the effectiveness of the bank's credit risk management strategies.

Compliance by the financial sector in uploading credit reference information on the Credit Reference Bureau was also cited by Mabasa (2017); Mishkin and Eakins (2018) as another factor that aids the effectiveness of banks' credit risk management strategies in mitigating and reducing the level of Non-Performing Loans. Moti, Masinde, Mugenda, and Sindani (2015) noted that the bank's lending policy; the assessment metrics and the competence of the Credit Risk Committee are the key principles in managing credit risk within banks. From the empirical literature reviewed above, it has emerged clear that very few if not any researches have been carried out in Zimbabwe so far on the effectiveness of innovative credit risk management strategies in mitigating loan delinquencies in innovation driven commercial banks. Most of the studies have been carried out outside Zimbabwe, especially in first and second world countries. To the best of the knowledge of the researcher, the few that were carried out in Zimbabwe in relation to a similar topic were done long ago. Technology is inevitably ever-changing phenomenon and from the reviewed literature it emerged that internet or digital banking has serious implications on bank lending and its performance, hence a more recent research needs to be carried out filling the identified gap, thereby adding to the body of knowledge.

## **2.14 Chapter summary**

The chapter presented the available literature with regards to the innovative credit risk management strategies in mitigating loan delinquencies by highly innovative and digitized banks. In addition, the effectiveness of such innovative credit risk management strategies are reviewed as well as the challenges faced in implementing these strategies. Both theoretical and empirical literature was reviewed, which then pictured the research gap, which this research intended to fill.

The next chapter looked at the research methodology, stipulating how the researcher went about carrying out the research.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.0 Introduction**

This chapter presents a description of the methodology that was used in this study. The research sought to analyze the effectiveness of innovative credit risk management strategies and loan delinquencies in highly innovative and digitized banks using Steward bank as a case study. This chapter describes and explains how the researcher went about collecting and analyzing the data that would answer the research questions and fulfill the research objectives. Reasons on why the researcher chose those research methods were also clarified. Specifically, the chapter looked at the research philosophy, the research approach, the research design, the study population, the sampling methods used and the sample size taken, the data collection and research instruments used, the reliability and validity of data collected, the data analysis and presentation procedures and the ethical considerations observed in this study, before giving a summary of the chapter.

#### **3.1 Research Design**

Rajasekat, Philominathan and Chinathi (2013) reveal that research design refers to the overall approach to the whole research process that is from the theoretical underpinning up to the collection and analysis of the gathered data. The research design encompasses research philosophy, approach and strategy as explained by the research onion and these are in turn explained below. Several possible research designs exist including experimental, exploratory, explanatory, descriptive and mixed methods designs. Explanatory research design is more suitable when establishing cause and effects relationships between variables (Creswell, 2013). Bryan (2014) pointed out that descriptive research designs are more appropriate when the research is aimed at describing events or profiles of people and objects quantitatively or qualitatively, whilst mixed methods designs encompass more than one pure research designs. This study adopted an explanatory research design, whereby quantitative methods were used for data analysis, in order to clearly establish the relationship between the study variables and answer the research questions. Therefore, the researcher found mainly the explanatory research design as more suitable for this

research as it sought to analyze the effectiveness of innovative credit risk management strategies and loan delinquencies at Steward bank.

Saunders, Lewis and Thornhill (2012) define research philosophy as a set of assumptions that underpins a research strategy employed by the researcher. The main research philosophies are the positivism, interpretivism and pragmatism (Adams and Schvaneveldt, 2015). Kothari (2014) looks at positivism research philosophy as more appropriate when the research is quantitative, interpretivism philosophy as more appropriate for qualitative studies whereas the pragmatism philosophy as a mixture of positivism and interpretivism. This research adopted a positivism philosophy, with quantitative methods being used. The positivism philosophy was considered more appropriate because the main objective was to analyze the effectiveness of innovative credit risk management strategies and loan delinquencies in highly innovative and digitized banks in Zimbabwe; hence the researcher believed that quantitative methods could help to analyze the nexus between adopting innovative credit risk management strategies and the level of loan delinquencies of highly digitized banks like Steward bank.

The research approach is also a critical element of how a study is undertaken. According to Saunders *et al.* (2012), a research approach is the extent to which the researcher understands the theory at the start of their research. According to Bryan (2014) deductive approaches are more appropriate when doing quantitative researches and inductive approaches are more appropriate when carrying out qualitative approaches and abductive approaches are appropriate when both quantitative and qualitative methods are employed. In line with the research philosophy or paradigm employed, the researcher adopted a deductive research approach in order to employ regression and correlation analysis that would allow the effectiveness and the relationship between adopting innovative credit risk management strategies and the level of loan delinquencies of highly digitized banks to be established. Apart from the fact that deductive approach advocates for the creation of hypotheses and for its testing, it enabled a clear cut understanding of the causative relationships among the variables in the study. Also, according to Saunders *et al.* (2012) the deductive approach goes hand in hand with the positivist philosophy that was chosen for the study.

With regards to a research strategy, Hinkelmann and Witschel (2013) noted that research strategy is a procedure or combination of techniques that are used in data collection and analysis. Some of the research strategies identified by Saunders *et al.* (2012) include survey, case study, action research, grounded theory, ethnographic research and archival research. With respect to the research strategy, a case study of Steward bank was adopted for use in the study. This was done in order to concentrate time and resources on a smaller range of players in the banking sector in Zimbabwe, so as to improve representation of the results. In addition, a case study of Steward bank was used since it is one of the banks which are regarded as highly innovative and digitized. In terms of the clientele base, Steward bank closed the financial year 2020 with the largest number of clients whilst offering a wide range of credit or loans.

### 3.2 Target Population

Curran and Blackburn (2011) define population as the number of objects which a researcher is interested in when conducting a research project. Thus population is the aggregate number of items or elements in a research project. The study population for primary data comprised of the employees in the credit and risk management departments of Steward bank Headquarters in Harare. The target population also included members of the Asset and Liability Management Committee and the Credit Risk Management Committee of Steward bank. The population consists of 36 elements, broken down as shown in the following table.

**Table 3.1: Research population**

<b>Department</b>	<b>Population size</b>
Credit department	16
Risk department	9
Asset and Liability Management Committee	6
Credit Risk Management Committee	5
<b>TOTAL</b>	<b>36</b>

**Source:** *Steward Bank HR Reports, 2021*

### **3.3 Sampling methods**

According to Bryman and Bell (2007) sampling is a process of segmenting a group of people from a mass population for the purpose of research investigations. Crawshaw and Chambers (2001) maintains that sampling methods can be probabilistic (where elements have equal chances of being selected) or non-probabilistic (where elements of the population have unequal chances of being selected into the sample). The study used probabilistic methods of sampling that are in line with Gujarati (2009) who stipulates that a quantitative research is suitably acquainted with probabilistic sampling methods.

#### **3.3.1 Simple random sampling**

Inside each department (credit and risk management) and committee, simple random sampling was used, using the hat system. Simple random sampling is defined by Kothari (2014) as a random selection of elements from the population haphazardly arranged. This was selected as it gave the respondents in each department or committee an equal chance of being selected into the sample, therefore reducing bias and sampling error. The researcher used this sampling technique because of its appropriateness in quantitative researches. According to Gujarati (2009), for quantitative researches, probability sampling techniques are appropriate. This eliminates bias as the population elements in each category would have equal chances of being chosen.

### **3.4 Sample size**

Glaser and Strauss (2015) define a sample as a part of the population drawn from the target population and studied, whose results are then generalized for the whole population. Hakim (2013) highlighted that sampling is necessary when the population is too large to be studied wholly and when time and resources are limited. However, whenever a sample is used, it results in sampling error. Mintzberg and Waters (2018) highlighted that in order to reduce the sampling error, adopting the formula by Krejcie and Morgan (1970) to arrive at the sample size can be valuable. This was done to improve representation. The sample size of 33 respondents is presented below.

**Table 3.2: Sample size**

<b>Department</b>	<b>Target Population size</b>	<b>Actual Sample size</b>
Credit department	16	15
Risk department	9	7
Asset and Liability Management Committee	6	6
Credit Risk Management Committee	5	5
<b>TOTAL</b>	<b>36</b>	<b>33</b>

**Source:** *Steward Bank HR Reports, 2021*

### **3.5 Data Sources**

There are two types of data sources which are secondary and primary sources. The researcher derived her data from both secondary and primary sources.

#### **3.5.1 Secondary Data**

Secondary data is data that is already in existence and has been collected by other people (Eden and Huxham, 2015). Such data can be analyzed to provide answers for the study in question. Secondary data helps the researcher gain an initial overview of the research problem (Eden and Huxham, 2015). Feinberg, Kinnear and Taylor (2012) stated that secondary data can be classified according to source from where it is derived and whether internal or external. Internal secondary data, also called in-house data, is secondary information gathered and acquired from within the organisation where the research is conducted. Data collected from outside sources is external secondary data (Feinberg, Kinnear and Taylor, 2012).

Bank publications, financial statements, CEO's keynote to shareholders, newspapers and the internet were sources of secondary data used in this study. Apart from that, secondary data was also gathered from other banks, the Reserve Bank of Zimbabwe (RBZ), the Zimbabwe Asset Management Corporation (ZAMCO) Pvt Limited and other financial sector bodies and the surveys that were conducted in the banking sector. Secondary data proved to be cheaper in accessing and less time consuming compared to primary data. Student research websites such as EBSCO host,



Google Scholar, Research Gate and JSTOR provided the bulk of literature including journals, electronic books and other publications.

### **3.5.2 Primary Data**

Primary data is defined as data collected by the researcher, to solve the current research problem (Cohen and Manion, 2015). Primary data collection was accomplished through giving out questionnaires to employees within the credit and risk management departments as well as members of the aforementioned two committees of Steward bank. Steward bank employees at the banks' head office and main branch (located at 79 Livingstone Avenue in Harare) were primary sources of data used in this study. Data collected was up to date and appropriate for the problem at hand.

### **3.6 Research instruments**

A research instrument is a tool that is used to collect data. According to Robson (2014) an instrument can either be structured or unstructured. There are various instruments to collect primary data, including experiments, observations, questionnaires and interviews (Kersley *et al.*, 2016). This research used research questionnaire for data collection. The research instrument is attached in the list of appendices put at the end of the research document as Appendix 1.

#### **3.6.1 Questionnaire**

Merriam (2012) describes a questionnaire as a research technique which is aimed at exposing a single phenomenon which may be very difficult to expose when using other research methods such as observation. A total of 33 questionnaires were designed where 21 of them were hand delivered to the respondents in a drop and pick manner whilst the remaining 12 were sent via online email addresses as some of the respondents were working from home due to Covid-19 induced lockdown. A structured research questionnaire was used to collect quantitative data. The instrument also used a Likert scale. The Likert scale, named after Rensis Likert (1932) is the most commonly used approach to scaling down responses in a survey (Merriam, 2012). The end-points of a Likert scale are typically “strongly disagree” and “strongly agree” (Robson, 2014).

The use of a Likert scale shortened the process for the respondents to answer such questions helping manage the collection of quantitative data. After dropping the questionnaires respondents were given five working days to complete the entire instrument and thereafter the researcher went to collect, checking the whole document to see if all the questions were answered before leaving the respondent. For those questions not answered or where clarity was needed, the researcher clarified to the respondent in layman's terms and then encouraged the researcher to fill in hence ensuring high response rate. For those sent on the email address, the researcher would make a follow up through sending a gentle reminder email.

Saunders *et al.* (2009) argue that questionnaires are an important research tool basically used for gathering quantitative data. Questionnaires are thus used in connection with survey research method where responses from the sample are inferred to the whole population-hence the choice of questionnaire in this research too. Moreover, the researcher chose to use a questionnaire in order to facilitate statistical analysis of the data collected. Use of questionnaires also allows objectivity compared to other methods such as interviews which may go astray especially if not well structured (Yin, 2018). The choice of the questionnaire also helped to ensure that all the sampled elements were subjected to exactly the same questions which helped improve credibility of the results obtained.

### **3.6.2 The Likert Scale**

The Likert scale is the mostly common used approach to scaling down responses in a survey (Johnston, 2009). It is named after its developer, Rensis Likert. The end-points of a Likert scale are typically "strongly disagree" and "strongly agree." The respondents are required to indicate their degree of agreement by having a comparison between any one of the five response categories which are agree, strongly agree, disagree, strongly disagree and undecided. The researcher used a scale from 1-5, with 1 representing strongly disagree, 2 representing disagree, 3 representing neutral, 4 representing agree and 5 representing strongly agree.

The Likert scale had several advantages which included the fact that it could be easily constructed and administered by the researcher and the respondents could understand and comprehend it easily.

The researchers were also given the opportunity to show the extent to which they view or feel about credit and risk control issues, unlike the dichotomous Yes or No questions.

### **3.7 Data Collection Procedures**

The researcher compiled a list of questions in line with the reviewed literature and came up with his own questionnaire. The researcher then collected a letter of permission or approval from the University of Zimbabwe Business School to gain audience at the bank's branches. The researcher sought permission to carry out the research from the management of Steward bank at Head Office using the letter issued by the University. In line with Covid-19 restrictions and for those who were working from home, the researcher requested for the employees or members' email addresses for him to send the research questionnaires online and uphold social distancing restrictions.

Each respondent was asked to complete the questionnaire, which on average would take 2 days depending on how busy one is. For those who were not able to complete the questionnaire in time, they were given a maximum of five working days to complete the questionnaires. The researcher considered five days as sufficient for the respondents to study and complete the questionnaire, at the same time reducing their chances of failing to return the questionnaires, common problem if a longer period was allowed for completion. The researcher also used follow up emails and phone calls to improve response rate. After collection, the researcher then checked for wholeness, consistency and reliability of data and proceeded to summarize, present and analyze data.

### **3.8 Validity of data**

In a bid to improve the validity of the research instruments, a pilot study was carried out before conducting the actual study, and a pilot study is also recommended by Sushanta (2014). Denscombe (2017) noted that data validity refers to the extent to which the results measure what they are supposed to measure. Gibb (2016) defines data validity as the degree to which a research instrument measures what it is purported to measure. In researches, validity is harder to assess but it is widely estimated by comparing the results to some criteria. In a bid to improve validity, the researcher carefully designed the questionnaire and pretested it for further refinement. The

researcher conducted a pilot study and refined the questionnaire. The validity of data was important in authenticating the research findings. After the pilot studies, the researcher observed that;

- ✓ Most respondents ignored open-ended questions. In order to deal with this problem, the researcher tried as much as possible, guided by literature reviewed, to exhaust the possibilities using closed ended questions.
- ✓ Some questions in the questionnaires seemed to be vague or ambiguous. The researcher then found ways to redraft and simplify them to remove ambiguity.
- ✓ Some questions required employees to speak for themselves and others (through use of pronouns like ‘We’). These questions were rephrased so that a respondent would speak for himself or herself, by using the pronoun ‘My’.

### **3.9 Reliability of data**

The researcher carried out a test-retest reliability assessment, whereby a respondent would be given a questionnaire to complete. After which the researcher used the responses to refine the questionnaire. The researchers gave back the refined questionnaire to the same respondent and determine if the responses given this time were consistent with the responses given the first time. This consistence was also tested using statistical package, SPSS version 23.0, by determining the Cronbach’s Alpha, which tests the internal consistency of the questionnaires basing on the responses given. This is a reliability coefficient which shows how items in a set are positively correlated (Johnston, 2009). It measures the inter-correlations among test items, with a measure of 1 being highest in terms of internal consistency and reliability and 0.5 to 0.9 being moderate to high and any value between the two is acceptable (Johnston, 2009).

### **3.10 Analysis of data**

The responses were coded using the Likert scale by assigning of Arabic numerals to the nominal, ordinal or interval data, for closed-ended questions in the questionnaires. The researcher then fed the codes into IBM’s SPSS version 23.0 Package. After feeding all the questionnaires the researcher used the available options on the SPSS package to analyze the fed data. Analysis was done in form of percentages, regression and correlational analysis.

### **3.11 Data presentation**

The researcher used the SPSS package to get summarised data, such as percentages and then the researcher could also use the same application package to present data in form of tables, figures, charts and graphs. However, the researcher felt that the package was not an expert in presenting data, but just in analyzing data. As a result, for data presentation, the researcher would import summaries of data from the SPSS package to Microsoft Office Excel application package version 2013 and would then use Excel to present data in form of tables, charts and figures. These graphs were then exported to Microsoft Office Word 2013 for presentation and interpretation. The process of importing from Excel to Word proved to be quite simple and convenient because the two applications communicate very well, therefore where editions were necessary, the process proved to be quite easy.

### **3.12 Ethical Considerations**

According to Tharenou, Donohue and Cooper (2013) ethics are the standards or the norms of behaviour that help to guide the researcher's moral choices concerning the behaviour and the relationships towards others. Saunders *et al.* (2009) reveals that ethics refers to "the appropriateness of one's behaviour in relation to the rights of those who become the subject of his/her work or are affected by it." The completion of this research study was made possible through careful adherence to ethical considerations. The researcher made sure that all necessary measures were put in place to ensure high ethical standards were adhered to during conducting the research. A clear explanation of the importance of the research to the respondents was done with the assurance to participants that the data would be professionally handled and kept anonymous. The researcher emphasized the need for voluntary participation in the study and that respondents should not feel obliged to disclose information they felt it private and confidential. This enhanced sincerity and helped to reduce skepticism.

In addition, Fisher (2010) emphasized the need to respect respondents' rights to privacy and confidentiality, and in line with this, the researcher in an effort to guarantee all participants, discretion and anonymity used a coding system to replace participants' names and any form of personal identification. Consistent and accurate referencing of ideas and work accessed from other

authors was done using the Harvard Referencing Style to ensure that there is integrity in the conduct of the research.

In a bid to gain consent from the participants, the researcher included an introductory letter on the questionnaire, aiming to elicit positive response and cooperation from the participants. The researcher also obtained a letter from the University of Zimbabwe Graduate School of Business department to use for gaining permission from Steward Bank Management to carry out the research. The respondents were not coerced to participate. The respondents were anonymous through the research process. Identification was not required from the questionnaire respondents; thus, confidentiality was assured with anonymity on questionnaires.

The study participants were accorded the right to withdraw from the research since they were not compelled to continue if they so wished to discontinue and this was made known to the participants during the data collection process. It was also revealed that the information was meant solely for academic purposes. The researcher also did not pay or bribe the respondents for participating in the research, but she just thanked them by word of mouth and replies on emails.

### **3.13 Chapter summary**

The chapter looked at the methodological steps that were adopted by the researcher in carrying out this study. These steps involves research philosophy, strategy, approach and research design, the target population and the actual sample size that was used, the sampling procedures adopted to come up with the sample size, the research instrument (questionnaire) used to collect data, validity, reliability as well as the presentation, analysis, discussion and ethical issues. The next chapter focused on the analysis, presentation and discussion of data.

## **CHAPTER FOUR**

### **DATA ANALYSIS, PRESENTATION AND DISCUSSION**

#### **4.0 Introduction**

In this chapter, the researcher presents the findings from data collection. The research findings are then derived from the descriptive statistics and regression and correlation results of the responses coded. The demographics and background information are presented first and the later sections present the main research findings.

#### **4.1 Response rate and composition of respondents**

In this section, the researcher first presents the response rate for the research instruments used. The research mainly collected data using Google Forms in cognizance of the Covid-19 pandemic lockdown measures. The researcher ensured that all questionnaires were all fully completed by putting the ‘all questions required’ on Google Forms which mandated the respondents to give answers to all questions before proceeding to the other sections of the questionnaire. A total of 33 questionnaires were distributed to Steward bank’s employees from different departments like Retail Banking, Risk department, Asset and Liability and Credit Risk. After the questionnaires were completed and returned, the researcher checked for their completeness.

The formula that the researcher used in calculating the response rate was borrowed from Saunders (2016) where the number of responses on Google Forms was divided by the sample size. The higher the response rate, the lower the sampling error and therefore the more reliable the findings are. To achieve good response rates, the researcher had to invest much time in following up on research questionnaires that had taken more than expected time. Table 4.1 presents the response rates of questionnaires.

**Table 4.1: Response rate and composition of respondents**

<b>Department</b>	<b>Sample size</b>	<b>Actual respondents</b>	<b>Response rate</b>
Retail Banking	15	13	87%
Risk department	7	7	100%
Asset and Liability	6	5	83%
Credit Risk	5	5	100%
<b>Total</b>	<b>33</b>	<b>30</b>	<b>91%</b>

**Source: Primary Data, 2021**

The researcher got response rates of 87% from Retail banking, 100% from Risk department, 83% from Asset and Liability management department as well as 100% from credit risk management department. The overall response rate was 91%. Looking at the response rates of the questionnaires used; the overall response rate was eligible to render the research findings reliable and valid. This is because most research scientists propound that for research findings to be reliable; the response rate should be at least 70%. According to Kothari (2014), the departmental response rates and the overall 91% were high enough to render results valid and reliable. Therefore, the researcher is very convinced that the research findings are valid and reliable to the research stakeholders.

#### **4.2 Reliability statistics of the research questionnaire**

Pursuant to Chapter 3, the researcher tested the research questionnaires in order to ascertain how reliable and valid it was in collecting relevant data for the study. This was meant to ascertain if the research instrument was reliable enough to validate the research findings with respect to the effectiveness of innovative credit risk management strategies and loan delinquencies at highly innovative and digitized Steward bank. Table 4.2 below is an articulation of the Reliability statistics of the research questionnaire.

**Table 4.2: Reliability statistics of the research questionnaire**

Cronbach's Alpha	N of Items/Questions
.947	20

**Source: Primary Data, 2021**



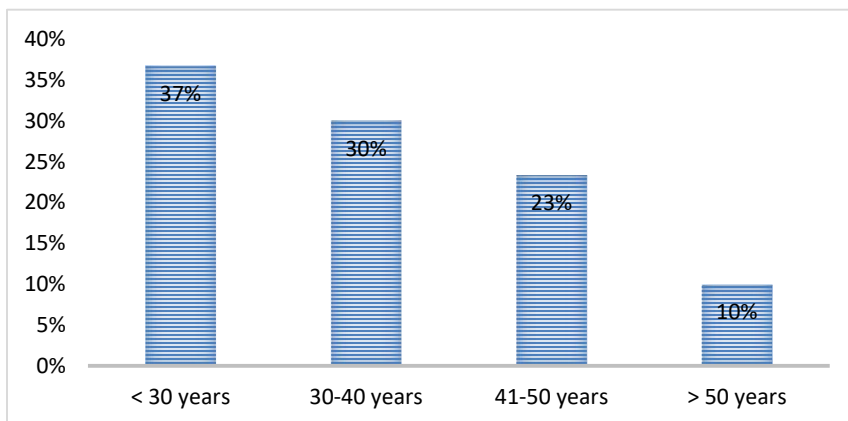
The researcher ran a Cronbach's Alpha test on SPSS Version 20.0 to find out if the research questionnaire was consistent during the data collection process. Table 4.2 shows the reliability results where a Cronbach's Alpha of 0.947 for the questionnaire was found. The results were good enough to render the research instrument consistent and reliable for the study. This follows the suggestion by Johnston (2017), Gujarati (2004) and Taber (2018) that a questionnaire is reliable if its consistency coefficient as measured by Cronbach's Alpha is at least 0.7.

### 4.3 Demographic and background information of respondents

From the questionnaire, the second section of the research the research instrument after the administrative section had demographic and background information of respondents. Therefore, before asking respondents the key questions of the research study, the researcher started by asking the demographic and background information and features of all the respondents who took part in the survey. These were of interest to the researcher to find out ages, experience and level of education of Steward bank employees. This was believed to have direct influence on the quality of responses. The background and demographic aspects are presented in the sections that follow.

#### 4.3.1 Age of Respondents

The researcher wanted to establish if it can be ascertained that the banks had such mixes within these departments. The results are presented in the bar graph below.

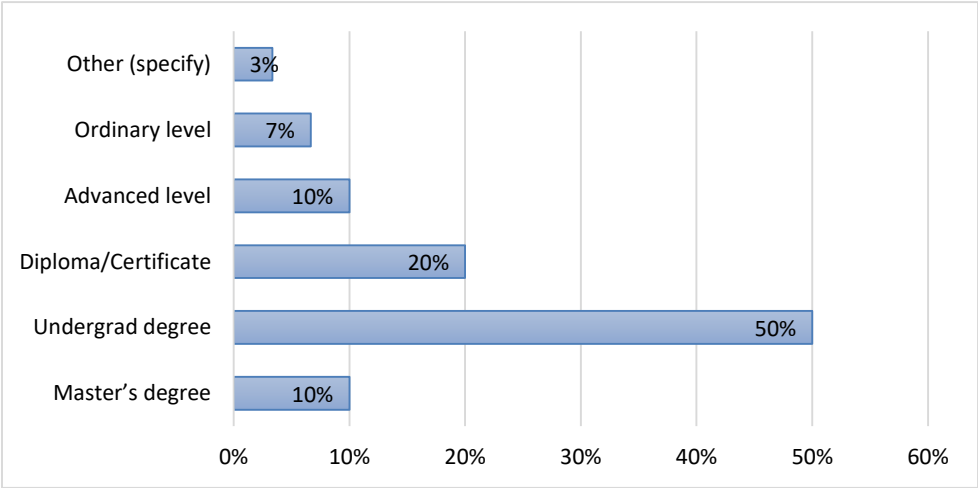


**Figure 4.1: Age of Respondents**  
**Source: Primary Data, 2021**

Figure 4.1 shows that of the 30 respondents, 37% were of the less than 30 years age group, 30% were of the 30 to 40 years age group, 23% were of the 41 to 50 years age group and the remaining 10% were above 50 years of age. The indication is that these four departments of Steward bank comprise of age with much dominance in the youthful ages. Generally, the distribution of age groups was skewed towards the young that is below 50 years of age showing the most employed ages and those that are economically active. Therefore, the findings of this research are reliable as they were contributed by people of different ages as stipulated by Creswell (2016).

**4.3.2 Educational qualifications of respondents**

The researcher was interested in the level of education of respondents. The respondents were asked to indicate their highest level of education so that the researcher can get answers that are knowledgeable and objective with regards to the effectiveness of credit risk management strategies employed by the bank to mitigate loan delinquencies. Literacy rate is critical when it comes to the way questions are interpreted. It would not be meaningful to share the research questionnaire with people who cannot read and write. The respondents were assumed to be educated and well versed with the concepts related to lending processes, credit risk management strategies as well as the effectiveness of such innovative strategies in mitigating loan delinquencies. The results are presented in the clustered bar graph below.

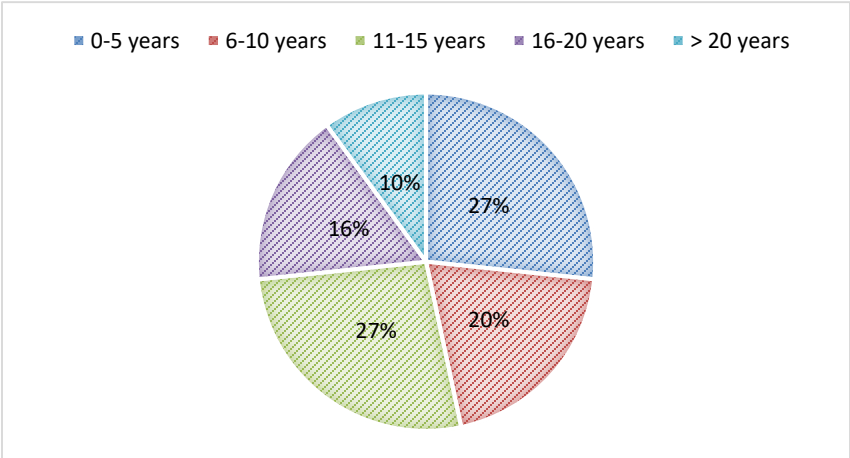


**Figure 4.2: Educational qualifications of respondents**  
**Source: Primary Data, 2021**

Figure 4.2 shows that majority of Steward bank workers (50%) at the selected departments from the Head office are Undergrad degree holders. This is followed by 20% who constituted the Diploma/Certificate. The next two categories have Advanced level and Master’s degree who constituted 10% each. In addition, 7% of the respondents indicated that their highest level of education was Ordinary level whilst the remaining 3% indicated another category. From the other category, it emerged that some are holders of various qualifications like Doctorate degree, professional certificates like ACCA, CIMA and CFA. The observation was that Steward bank employees are educated people who have good academic qualifications. This gave the researcher confidence backed by the view of Goldstein (2019) who stipulates that a better qualification can help one to gain more knowledge for and building critical thinking which is necessary in gathering meaningful responses for research.

**4.3.3 Experience of work**

This section presents findings with respect to respondents’ experience that is the number of years they have served at their respective departments or the bank in general. This was critical for the researcher who wanted to establish if Steward bank workers were giving responses out of their work-related experience or were just speaking their minds and feelings. The researcher had strong belief in responses that are given by respondents who had first-hand experience with the lending processes and the subsequent credit risk management strategies. The results are presented below.



**Figure 4.3: Experience of work**  
**Source: Primary Data, 2021**

The results about experience of Steward bank employees in Figure 4.3 shows that 27% of the respondents had 0 to 5 years and 11 to 15 years each, 20% of the respondents had 6 to 10 years, 16% of the respondents had 16 to 20 years, and the remaining 10% of the respondents had above 20 years of experience within the field of banking particularly in retail, credit risk, asset and liability and risk management departments. The availability of majority who have reasonable experience with the departments and processes gives the researcher the light that the findings are worthy reliable.

#### 4.4 Forms of innovative Credit risk management strategies at Steward Bank

The study asked respondents about the forms of innovative credit risk management strategies at Steward bank. The statistics were generated from Likert scale that stretched from strongly disagree to strongly agree. A mean score between 1.00 and 2.49 show that respondents were disagreeing to a given scenario. A mean score between 2.50 and 3.49 show that respondents were neutral to a given scenario. A mean score between 3.50 and 5.00 show that respondents were agreeing to a given scenario. The results about the nature and forms of innovative credit risk management strategies are presented in Table 4.3.

**Table 4.3: Innovative Credit risk management strategies at Steward Bank**

<b>Statement</b>	<b>SD</b>	<b>D</b>	<b>N</b>	<b>A</b>	<b>SA</b>	<b>Mean</b>
Steward bank has digitized loan management systems that can assess the personality/character of a prospective borrower of loans.	40%	33%	3%	7%	17%	<b>2.27</b>
Steward bank has digitized loan management systems that can value the collateral security provided by a prospective borrower of loans.	20%	23%	13%	30%	13%	<b>2.93</b>
Steward bank has digitized loan management systems that can determine the capacity of a prospective borrower to repay the loan.	17%	10%	7%	37%	30%	<b>3.53</b>
Steward bank has digitized loan management systems to supervise and monitor borrower's actions.	17%	13%	7%	27%	37%	<b>3.53</b>
Steward bank has digitized loan management systems that facilitate repayment of loans and collection of amounts due from clients.	7%	10%	13%	33%	37%	<b>3.83</b>

Steward bank uses financial tools such as credit default swaps and total return swaps to reduce credit risk of default.	30%	23%	10%	20%	17%	<b>2.70</b>
<b>Overall</b>	<b>39</b>	<b>34</b>	<b>16</b>	<b>46</b>	<b>45</b>	<b>3.13</b>

The study asked if Steward bank has digitized loan management systems that can assess the personality/character of a prospective borrower of loans. Table 4.3 shows that 40% of the respondents strongly disagreed, 33% of the respondents disagreed, 3% were neutral, 7% of the respondents agreed and 17% of the respondents strongly agreed to the statements above. The researcher used the mean value to establish the overall position. The mean value obtained from the aggregated responses of this question was 2.27 which showed that the respondents were generally disagreeing that the bank has digitized loan management systems that can assess the personality/character of a prospective borrower of loans. The generalisation here means that Steward bank do not have the digitized loan management systems in place to perform prospective borrower appraisal.

Secondly, the study asked a question regarding the forms of innovative credit risk management strategies which was sought to ascertain if Steward bank has digitized loan management systems that can value the collateral security provided by prospective borrowers of loans. The results show that 20% of the respondents strongly disagreed, 23% of the respondents disagreed, 13% were neutral, 30% of the respondents agreed and 13% of the respondents strongly agreed to the assertion that the bank has digitized loan management systems that can value the collateral security provided by a prospective borrower of loans (Table 4.3). From these mixed responses, the researcher used the mean value to then establish the overall position with respect to this form of innovative strategy. The mean value obtained on this question was 2.93 which showed that the respondents were generally neutral to the existence of this form. There is therefore no basis to state that the bank has or does not has digitized loan management systems that can value the collateral security provided by a prospective borrower of loans.

In addition, the study also asked Steward bank employees from the selected departments a question which sought to establish if Steward bank has digitized loan management systems that can determine the capacity of a prospective borrower to repay the borrowed loan. The results show

that 17% of the respondents strongly disagreed, 10% disagreed, 7% remained neutral, the majority 37% were in agreement whilst the other 30% were strongly agreeing to the existence of digitized loan management systems that can determine the capacity of the prospective borrower to repay the borrowed loan at Steward bank (Table 4.3). This was also supported by the mean value of 3.53 which is closer to 4. The generalization of the findings here is that the majority of respondents were in agreement with the existence of that form of strategy. This shows that Steward bank's digitized systems are able to determine the capacity of prospective borrowers of loan by calculating and forecasting cash flow reports and incomes of customers.

The fourth question that was asked by the study to further clarify the forms of innovative credit risk management strategies adopted by the bank was to establish if Steward bank has digitized loan management systems to supervise and monitor borrower's actions after disbursing the money. Table 4.3 shows that 17% of the respondents strongly disagreed, 13% disagreed, 7% remained neutral and 37% were in agreement whilst the majority 37% were strongly agreeing to the existence of digitized loan management systems to supervise and monitor borrower's actions after disbursing the money (Table 4.3). From these mixed responses, the researcher used the mean value to then establish the overall position with respect to this form of innovative strategy and the mean value obtained on this question was 3.53 which is closer to 4. The generalization of the findings here is that the majority of respondents were in agreement with the existence of that form. This shows that Steward bank has digitized systems that are able to monitor and supervise the actions of borrowers for instance the red flag dashboard which shows if the customer is maintaining sufficient bank balance every month which will enable the bank to recover its part principle and interest payments on a monthly basis.

Further, the study also asked Steward bank employees if the bank has digitized loan management systems that facilitate repayment of loans and collection of amounts due from clients. About 7% were strongly disagreeing, 10% just disagreed, 13% were neutral, 33% were in agreement and the majority 37% were strongly agreeing to the nature of digitized loan management system identified above (Table 4.3). The calculated mean value of 3.83 shows the general level of agreement that Steward bank has in place digitized loan management systems that enable the repayment of loans and collection of amounts due from clients. This corresponds to the systems in place to monitor

and supervise the actions of clients as well as the existence of systems to determine the capacity of prospective borrowers. Therefore, it is expected that the bank is able to enforce repayment and recover the amounts due from clients.

The last question that the researcher asked here sought to determine if Steward bank uses financial tools such as credit default swaps and total return swaps to reduce credit risk of default. Table 4.3 shows that 30% strongly disagreed, 23% were disagreeing, 10% remained neutral, 20% were in agreement and the remaining 17% strongly agreed to the statement that the bank utilises credit derivatives (financial tools) such as credit default swaps and total return swaps to reduce credit risk. The researcher also used the mean value to then establish the overall position with respect to the existence of this form of innovative strategy. The responses here yielded a mean value of 2.70 showing the neutral position with regards to this form. The finding here implies that there is no justification to conclude that Steward bank utilises financial tools/credit derivatives to mitigate NPLs. Probably, the bank at times utilise the tools or those that disagreed and remained neutral were from retail banking who are now much aware of these products and when they are applied.

In a study by Benmelech and Frydman (2015) that digitized and highly innovative banks have digitized systems (Advanced credit-scoring models like the Linear Discriminate Model) which automatically generate an underwriting report for the lender's assessment of the risk, insurance value, capacity, capital, loan particulars and all the necessary information that will aid credit officer to make an assessment.

#### **4.4.1 Principal component factor analysis of the innovative credit risk management strategies at Steward Bank**

The researcher ran principal component analysis of the innovative credit risk management strategies at Steward Bank to establish the strategies that best explain credit risk management at the bank. The strategies were organised in order 1 to 6 as follows: (1) Steward bank has digitized loan management systems that can assess the personality/character of a prospective borrower of loans. (2) Steward bank has digitized loan management systems that can value the collateral security provided by a prospective borrower of loans. (3) Steward bank has digitized loan management systems that can determine the capacity of a prospective borrower to repay the loan.

(4) Steward bank has digitized loan management systems to supervise and monitor borrower's actions. (5) Steward bank has digitized loan management systems that facilitate repayment of loans and collection of amounts due from clients. (6) Steward bank uses financial tools such as credit default swaps and total return swaps to reduce credit risk of default.

**Table 4.4: Principal component factor analysis results**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.265	87.748	87.748	5.265	87.748	87.748
2	.421	7.019	94.768			
3	.183	3.043	97.811			
4	.074	1.233	99.044			
5	.038	.640	99.684			
6	.019	.316	100.000			

Extraction Method: Principal Component Analysis.

The results in the Table indicate that, of the 6 strategies that are used at Steward bank, the first strategy is the one (Steward Bank has digitized loan management systems that can assess the personality/character of a prospective borrower of loans) with Eigenvalue greater than 1 (Eigenvalue =5.265). The criterion is that a high Eigenvalue is acceptable as a predictor of the underlying unobserved variable, in this case credit risk management. According to Gujarati (2009), the common criteria in principal component factor analysis is to select components of factors whose Eigenvalue is at least 1. Therefore, it can be confirmed that of all the strategies used by Steward Bank in its credit risk management, the systems are most effective in assessing the personality and character of borrowers.

From the open-ended questions asked in the questionnaire, the researcher asked respondents about the other innovative credit management strategies used by Steward bank to reduce loan default rates. The summary of other forms indicated include text messages and SMS auto reminders to clients. The respondents indicated that the bank uses the database to send text messages and SMS alerts reminding customers to pay their instalments.



#### 4.5 Effectiveness of Steward Bank’s innovative credit risk management strategies

The study also aimed at determining the effectiveness of Steward Bank’s innovative credit risk management strategies in mitigating loan delinquencies. The statistics were generated from Likert scale that stretched from strongly disagrees to strongly agree. A mean score between 1.00 and 2.49 show that respondents were disagreeing to a given scenario. A mean score between 2.50 and 3.49 show that respondents were neutral to a given scenario. A mean score between 3.50 and 5.00 show that respondents were agreeing to a given scenario. The results are presented on Table 4.5 below.

**Table 4.5: Effectiveness of Steward Bank’s credit risk management strategies**

<b>Statement</b>	<b>SD</b>	<b>D</b>	<b>N</b>	<b>A</b>	<b>SA</b>	<b>Mean</b>
Steward bank strictly provides loan to good character borrowers.	30%	23%	10%	17%	20%	<b>2.73</b>
Steward bank fairly values collateral security provided by a prospective borrower.	10%	7%	3%	43%	37%	<b>3.90</b>
Steward bank perfectly assesses capacity of a prospective borrower to repay the borrowed loan before giving out a loan.	23%	13%	3%	20%	40%	<b>4.60</b>
Steward bank closely monitors the borrower’s actions after giving out a loan.	40%	7%	7%	17%	30%	<b>2.90</b>
Steward bank timely collects principal repayments and interests due from clients.	13%	10%	7%	33%	37%	<b>3.70</b>
<b>Overall</b>	<b>40</b>	<b>20</b>	<b>9</b>	<b>37</b>	<b>44</b>	<b>3.17</b>

**Source: Primary Data, 2021**

Table 4.5 shows that majority of the respondents were neutral to the view that Steward bank strictly provides loan to good character borrowers. This is shown by 30% of the respondents who strongly disagreed and the other 23% who just disagreed, 10% were neutral, the other 17% were agreeing whilst the remaining 20% were strongly agreeing with the assertion. From the responses, the obtained mean of 2.73 reflects the general neutral position. The results here imply that there is no strong basis to argue that the innovative credit risk management systems at Steward bank are effective enough to guide the loan officers to strictly grant loans to good character borrowers. This is probably because the bank at times offers loans to very good character customers whilst the high

level of NPLs indicate the bad character clients hence the mixed responses which result in the overall neutral position.

Secondly, the study asked the respondents if Steward bank fairly values collateral security provided by a prospective borrower. About 10% strongly disagreed, 7% disagreed, 3% were neutral, 43% were agreeing whilst the remaining 37% were strongly agreeing with the assertion (Table 4.5). The study also calculated the mean value from the responses to establish the overall position regarding this question. The obtained mean of 3.90 shows the general level of agreement that the digitized loan management systems at Steward bank are effective in valuing collateral security offered by prospective borrowers. Therefore, the bank's innovative credit risk management strategies are said to be effective in placing the correct market value of collateral security offered the borrower before granting the loan. This will help mitigating the potential for default rates.

Further, the study asked respondents if Steward bank perfectly assesses capacity of a prospective borrower to repay the borrowed loan before giving out a loan. The results show that, 23% of the respondents strongly disagreed, 13% of the respondents disagreed, 3% were neutral, 20% of the respondents agreed and 40% of the respondents strongly agreed to the assertion that the bank perfectly assesses capacity of a prospective borrower to repay the borrowed loan before giving out a loan (Table 4.5). From these mixed responses, the study used the mean value to then establish the overall position with respect to this form of innovative strategy. The mean value obtained on this question was 4.60 which showed that the respondents were generally in agreement. Therefore, it can be stated that the bank's digitized loan management systems are effective enough to guide the loan officers to perfectly assess the capacity of a prospective borrower. The bank's systems are able to accurately determine the cash flows or incomes as well as calculating if the customer is not over borrowed.

The study also asked Steward bank respondents if the bank closely monitors the borrower's actions after giving out a loan. Table 4.5 indicates that 40% strongly disagreed, 7% were disagreeing, 7% remained neutral, 17% were in agreement and the remaining 30% strongly agreed to the statement that after disbursing the monies, the bank is able to closely monitor and supervise the borrower's actions. The study also used the mean value to establish the overall position. The responses here

yielded a mean value of 2.90 showing the neutral position with regards to effectiveness of the bank's innovative credit risk management in mitigating loan delinquencies. The finding here indicates that there is no basis to argue that Steward bank's innovative credit risk management strategies or loan management systems are effective in reducing NPLs through rigorous monitoring and supervising clients' actions after borrowing. This could mean that the level of the bank's NPLs is attributed partly to poor strategies after loan disbursement or during the loan period like having a system that provides early warning systems to depressed cash flows and account balances.

Lastly, the study also asked if Steward bank timely collects principal repayments and interests due from clients. Table 4.5 shows that about 13% of the respondents strongly disagreed, 10% of the respondents disagreed, 7% were neutral, 33% of the respondents agreed and 37% of the respondents strongly agreed to the assertion that the bank timely collects principal repayments and interests due from clients. From these mixed responses, the study aggregated the responses and the mean value obtained on this question was 3.70 which showed that the respondents were generally in agreement with the effectiveness of the innovative strategies in assisting the bank to recover its money. Therefore, Steward bank's innovative credit risk management strategies or policies are effective in loan recovery which limits the potential for high default rates.

Similarly, on overall position concerning the effectiveness of innovative credit risk management strategies used by the bank to mitigate loan delinquencies, the researcher aggregated the responses for all the questions that were asked. The findings show that of all the 5 questions asked, 40 responses were on the strongly disagreeing side about the 5 questions, 20 responses were on the disagreeing side about the 5 questions, 9 responses were neutral about the 5 questions, 37 responses were on the agreeing and 44 responses were on the strongly agreeing side about the 5 questions (Table 4.5). In the same manner the mean was used in the whole list of questions, the obtained mean was 3.17 which showed that most bank employees were neutral about the effectiveness of the loan management systems in mitigating loan delinquency at Steward Bank.

This finding here to some extent agrees with the findings of Ahmed and Malik (2015) and Kairaria (2017) that some of these innovative strategies are too complex to use and can mislead the officers in rating prospective borrowers. This was cited as one of the causes of the Global Financial Crisis

of 2008/09 where complex financial instruments drove the high NPLs due to poor ratings. Some of the information cannot be quantified and therefore cannot be fed into the model. However, the findings contradicted to those of Ofonyelu and Alimi (2013) and Mburu and Muathe (2020) that innovative and complex credit-scoring model like the linear discriminate and neural networks provide effective solutions in reducing the probability of disbursing loans to undeserving customers which may lead to high default rates. These innovative models were believed to be fast and effective in providing early default warning signs and correctly forecasting and predicting the likelihood of the client to default.

#### **4.5.1 Principal component factor analysis of effectiveness of Steward Bank’s credit risk management strategies**

The researcher ran principal component analysis to find out the areas the credit risk management strategies are successful. The areas of success of the credit risk management strategies are organised in order 1 to 5 as follows: (1) Steward bank strictly provides loan to good character borrowers. (2) Steward bank fairly values collateral security provided by a prospective borrower. (3) Steward bank perfectly assesses capacity of a prospective borrower to repay the borrowed loan before giving out a loan. (4) Steward bank closely monitors the borrower’s actions after giving out a loan. (5) Steward bank timely collects principal repayments and interests due from clients.

**Table 4.6: Principal component factor analysis results**

Comp onent	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.398	87.965	87.965	4.398	87.965	87.965
2	.458	9.166	97.131			
3	.067	1.334	98.465			
4	.055	1.104	99.569			
5	.022	.431	100.000			

Extraction Method: Principal Component Analysis.

The results in the Table indicate that, of the 5 areas credit risk management strategies are successful (Steward bank strictly provides loan to good character borrowers) with Eigenvalue greater than 1

(Eigenvalue = 4.398). The criterion is that a high Eigenvalue is acceptable as a predictor of the underlying unobserved variable, in this case effectiveness of credit risk management strategies. According to Gujarati (2009), the common criteria in principal component factor analysis is to select components/factors whose Eigenvalue is at least 1. Therefore, it can be confirmed that of all the areas credit risk management strategies are successful, the bank provides loan to good character borrowers.

From the open-ended questions under this section, the researcher also asked respondents to describe the effectiveness of Steward Bank's innovative credit risk management strategies in mitigating loan defaults. The majority of responses were that the strategies are good, satisfactory and very effective in mitigating loan defaults with very few indicating that they are below standard.

#### **4.6 Regression and Correlational Analysis**

The researcher ran Linear Regression and Correlation Coefficient analysis tests on SPSS from the responses taken from the questionnaires. Regression and Correlation results were critical in quantifying the effectiveness of Steward bank's innovative credit risk management strategies in mitigating loan delinquencies. The results are shown in the following subsections below.

##### **4.6.1 Correlation Coefficient Results**

Correlational Coefficient test results here show the direction and strengths of the effectiveness of Steward bank's innovative credit risk management strategies in mitigating loan delinquencies using Pearson's Correlation Coefficient which is non-parametric as shown in Table 4.5 below. According to Gujarati (2004), if the significance value is less than the level of significance used (if  $p < 0.05$  in this case) it means the relationship is statistically significant.

**Table 4.5: Correlation Coefficient Results**

		CRM	efCRM
CRM	Pearson Correlation	1	.918*
	Sig. (2-tailed)		.028
	N	30	30
efCRM	Pearson Correlation	.918*	1
	Sig. (2-tailed)	.028	
	N	30	30

\*. Correlation is significant at the 0.05 level (2-tailed).

From Table 4.5, the results show a Pearson correlation coefficient ( $r$ ) of 0.918. The correlation coefficient shows a strong positive relationship between innovative credit risk management strategies (CRM) and the level of loan delinquency (efCRM). This test results here implies that innovative credit risk management strategies are effective in mitigating loan defaults at the bank. The significant value obtained is 0.028. This shows that the relationship is statistically significant at the 0.05 significance level (95% confidence interval where the p value of 0.028 is less than 0.05). The generalisation of the findings here is that loan management systems are effective in reducing or mitigating loan defaults.

#### 4.6.2 Regression

The regression model here presents innovative credit risk management strategies (CRM) as an independent variable and loan default rate (efCRM) as the dependent variable. For the purposes of this research, the adjusted r-squared was critical to show the extent of effectiveness of innovative credit risk management strategies in mitigating loan delinquency. The results are presented in the Table 4.6 below.

**Table 4.6: Regression Results**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.918 <sup>a</sup>	.843	.790	6.81353

a. Predictors: (Constant), CRM

The results show an R Square of 0.843 and an Adjusted R-square of 0.790. The R-squared is a statistical measure that represents the proportion of the variance for a dependent variable that is explained by an independent variable(s) in a regression model. It also explains to what extent the variance of one variable explains the variance of the second variable. Therefore, R-Squared of 0.79 here mean that approximately 79% of the observed variation in loan delinquencies at the bank can be explained by the model’s inputs of innovative credit risk management strategies.

#### 4.6.3 Analysis of Variance (ANOVA) Results

The researcher ran ANOVA test to establish the fitness of the model to explain the dependent variable. The results are presented in the Table 4.7 that follows.

**Table 4.7: ANOVA Results**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	746.727	1	746.727	16.085	.028 <sup>a</sup>
	Residual	139.273	3	46.424		
	Total	886.000	4			

- a. Predictors: (Constant), CRM
- b. Dependent Variable: efCRM

The F-value of 16.085 which is positive with a significant value of 0.028 ( $p=0.028 < 0.05$ ) shows that the model was fit to explain the dependent variable.

#### 4.7 Challenges faced by Steward Bank in its credit risk management strategies

The study also sought to find out the challenges affecting Steward Bank in implementing its innovative credit risk management strategies that it uses in mitigating loan delinquencies. Table 4.9 is an articulation of the results.

**Table 4.9: Challenges faced by Steward Bank in its credit risk management strategies**

<b>Statement</b>	<b>SD</b>	<b>D</b>	<b>N</b>	<b>A</b>	<b>SA</b>	<b>Mean</b>
It is not possible for Steward bank to get complete information about the borrower in loan decisions despite using digitized loan management systems.	37%	20%	7%	13%	23%	<b>2.67</b>
Changing business environment makes it difficult for Steward bank to fix weights and criteria for judging creditworthiness of borrowers.	23%	17%	7%	23%	30%	<b>3.20</b>
There are heavy costs associated with installation and use of digitized loan management systems that weigh on Steward Bank.	7%	13%	10%	23%	47%	<b>3.90</b>
There are poor networks and information communication technology in Zimbabwe that limit the capacity of Steward bank to fully utilize its digitized loan management systems.	37%	23%	7%	20%	13%	<b>2.50</b>
At times, digitized loan management systems as programmed softwares give Steward bank misleading output reports about loan decisions.	27%	20%	13%	23%	17%	<b>2.83</b>

**Source: Primary Data, 2021**

Regarding the challenges faced by the bank in implementing its innovative credit risk management strategies that it uses in mitigating loan delinquencies, the study asked if it is not possible for Steward bank to get complete information about the borrower in loan decisions despite using digitized loan management systems. Table 4.9 indicates that about 37% strongly disagreed, 20% disagreed, 7% were neutral, 13% were in agreement and the other 23% strongly agreed to the challenge. The study also used the mean value to establish the overall position. The mean value obtained on this question was 2.67 which showed that the responses were generally neutral. Therefore, there is no justification to argue that it is not possible for Steward bank to get complete information about the borrower in loan decisions despite using digitized loan management systems.

Secondly, the study asked if the changing business environment makes it difficult for Steward bank to fix weights and criteria for judging creditworthiness of borrowers. About 23% of the respondents strongly disagreed, 17% of the respondents disagreed, 7% were neutral, 23% of the



respondents agreed and 30% of the respondents strongly agreed to the challenge that the changing business environment in Zimbabwe makes it difficult for Steward bank credit officers to correctly fix weights and criteria for judging creditworthiness of borrowers (Table 4.9). The mean value obtained on this question was 3.20 which showed that the responses were neutral. There is therefore no basis to say that the turbulent economy is affecting the bank in its endeavours to accurately ascertain weights on prospective borrowers.

Thirdly, the study asked if there are heavy costs associated with installation and use of digitized loan management systems that weigh on Steward Bank. Table 4.9 shows that about 7% of the respondents strongly disagreed, 13% of the respondents disagreed, 10% were neutral, 23% of the respondents agreed and 47% of the respondents strongly agreed that there are heavy costs associated with the procurement, installation and use of these innovative credit risk management systems. The researcher also used the mean value to establish the overall position. The mean value obtained on this question was 3.90 which showed that the responses were in agreement. Therefore, high costs such as training costs, procurement and installation costs militate against the bank's efforts to effectively implement and use these digitized loan management systems.

To further understand the challenges faced by the bank, the study also asked if there are poor networks and information communication technology in Zimbabwe that limit the capacity of Steward bank to fully utilize its digitized loan management systems. About 37% of respondents who participated in the survey strongly disagreed, 23% just disagreed, 7% remained neutral, 20% were in agreement and the other 13% were strongly agreeing to the mentioned challenge (Table 4.9). From the mixed responses, the aggregated responses yielded an average value of 2.50 which shows the neutral position. This position has no basis to say that there are poor networks and information communication technology in Zimbabwe that limit the capacity of Steward bank to fully utilize its digitized loan management systems. This is probably because sometimes the network might be down whilst in some instances there are no such problems.

Lastly, Table 4.9 shows that the majority of respondents were neutral that at times, digitized loan management systems as programmed softwares give Steward bank misleading output reports about loan decisions as reflected by the mean value of 2.83. The statistics there show that 27% strongly disagreed, 22% just disagreed, 13% remained neutral, 23% were in agreement and the other 17%

were strongly agreeing to the mentioned challenge. The implication of the finding here is that the study cannot conclude that digitized loan management systems as programmed softwares sometimes give Steward bank misleading output reports about loan decisions.

**4.7.1 Principal component factor analysis of challenges faced by Steward Bank in its credit risk management strategies**

The researcher ran principal component analysis to find out the most critical challenges faced by Steward Bank in its credit risk management strategies. The challenges derived from literature reviewed are organised in order 1 to 5 as follows: (1) It is not possible for Steward bank to get complete information about the borrower in loan decisions despite using digitized loan management systems. (2) Changing business environment makes it difficult for Steward bank to fix weights and criteria for judging creditworthiness of borrowers. (3) There are heavy costs associated with installation and use of digitized loan management systems that weigh on Steward Bank. (4) There are poor networks and information communication technology in Zimbabwe that limit the capacity of Steward bank to fully utilize its digitized loan management systems. (5) At times, digitized loan management systems as programmed softwares give Steward bank misleading output reports about loan decisions.

**Table 4.7: Principal component factor analysis results**

Comp onent	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.593	91.852	91.852	4.593	91.852	91.852
2	.291	5.823	97.675			
3	.057	1.140	98.815			
4	.037	.739	99.554			
5	.022	.446	100.000			

Extraction Method: Principal Component Analysis.

The results in the Table indicate that, of the 5 challenges tested (It is not possible for Steward bank to get complete information about the borrower in loan decisions despite using digitized loan management systems) with Eigenvalue greater than 1 (Eigenvalue = 4.593). The criteria is that a high Eigenvalue is acceptable as a predictor of the underlying unobserved variable, in this case the

most critical challenges faced by Steward Bank in its credit risk management strategies. According to Gujarati (2009), the common criteria in principal component factor analysis is to select components/factors whose Eigenvalue is at least 1. Therefore, it can be confirmed that of all the most critical challenges faced by Steward Bank in its credit risk management strategies, getting complete information about the borrower in loan decisions despite using digitized loan management systems is the most critical challenge at Steward Bank.

From the open-ended questions that the researcher asked regarding other challenges that are faced by Steward Bank in its loan management decisions; the respondents indicated that defaults, Technology, network challenges and unfavourable government policies such as directed lending and controlled interest rates are other factors militating the efforts. This can be explained to mean that despite the effectiveness of digitized loan management systems, unfavourable government policies which are not consistent over a long period tend to cause destabilisation and random changes in the variables of the model and affecting the 5Cs of a borrower. In addition, other factors mentioned include depressed sales revenue of companies, turbulent economic, socio-political and legal operating environment of Zimbabwe, too much data which makes it complicated to feed into the model, the problem of information asymmetry, lack of rule of law and delays in the delivery of justice, incompetence and lack of training on the part of credit officers to use the systems. These factors work to reduce the efforts of the bank in implementing its innovative credit risk management strategies that it uses in mitigating loan delinquencies.

#### **4.8 Chapter Summary**

The study presented the research findings from the analysis made and can comment that the research objectives were successfully accomplished. The major research findings that the study presented are that Steward bank uses digitized loan management systems to appraise prospective borrowers, to monitor and supervise clients during the loan cycle as well as during collection and recovery stages. Regression and Correlation analysis show that these innovative credit risk management strategies are very effective in mitigating loan delinquencies. However, the chapter also noted that there are some challenges that are encountered by the bank in trying to implement its innovative credit risk management strategies that it uses in mitigating loan delinquencies. The

next chapter presents the summary of findings, their conclusions and the recommendations to Steward bank, the banking sector and other regulatory authorities and for future researchers.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.0 Introduction**

This last chapter of the study pays particular attention to the summary and conclusions of the major research findings which emanated from the preceding Chapter 4 where data was presented, analysed and discussed in line with the research objectives. It laid a strong foundation for this chapter which dwells much on the summarization of such findings, conclusion and recommendations to be made to different stakeholders. The chapter also shows the extent to which each of the study objectives has been met and fulfilled. The chapter also elaborates on the conclusions to the research objectives on the basis of the summaries of the major research findings. Recommendations for future and further researches were also highlighted in this chapter.

#### **5.1 Summary of results**

The major objective of the study was to analyse the effectiveness of credit risk management strategies and loan delinquencies in highly innovative and digitized banks using Steward bank as a case study. The primary objective was supported by other secondary objectives which were to establish forms of innovative credit risk management strategies used by Steward Bank in mitigating loan delinquencies; to determine the effectiveness of Steward Bank's innovative credit risk management strategies in mitigating loan delinquencies; to find out challenges affecting Steward Bank in implementing its innovative credit risk management strategies that it uses in mitigating loan delinquencies and after that to determine ways that Steward Bank can use to address challenges affecting it in implementing its innovative credit risk management strategies in mitigating loan delinquencies. Therefore, the following summaries and conclusions were made per each sub-objective.

### **5.1.1 Forms of innovative credit risk management strategies used by Steward Bank**

Regarding this objective, the study found out that Steward bank has digitized loan management systems that assist credit or loan officers to determine the capacity of prospective borrowers to repay the loan, systems that are able to supervise and monitor borrower's actions as well as digitized loan management systems that facilitate repayment of loans and collection of amounts due from clients. The research also found out that these innovative credit risk management systems such as Neural Networks, CAMPARI model and other sophisticated softwares help the officers to perform the prospective borrower appraisals using the 5Cs criterion. The use of text messages and SMS auto reminders to remind clients to pay their installments were also found out to be other forms of digitized loan management systems used by the bank.

However, the study also found out mixed responses with regards to innovative credit risk management systems that are able to assess the personality/character of prospective borrowers of loans, systems that can value the collateral security provided by a prospective borrowers of loans as well as the uses of credit derivatives of financial tools such as credit default swaps and total return swaps to reduce credit risk of default. This probably means that the systems are in place but are not regularly used or else some respondents especially from the retail banking section might not be aware of the tools and when they are used.

### **5.1.2 The effectiveness of Steward Bank's innovative credit risk management strategies in mitigating loan delinquencies**

From the Regression and Correlational results, the study found out that statistically there is a strong positive relationship between innovative credit risk management systems and loan delinquencies that is the digitized loan management systems are very effective in mitigating and reducing the level of NPLs. Pursuant to this, the study found out that the digitized loan management systems were effective in fairly valuing collateral security provided by a prospective borrower as well as perfectly assessing the capacity of a prospective borrower to repay the borrowed loan before giving out a loan.

Contrastingly, the same digitized loan management systems were found out to be not very effective in correctly determining the character of borrower hence the bank was not able to strictly provide loan to good character borrowers. The study found out that the innovative credit risk management systems were not effective in closely monitoring and supervising the borrower's actions after giving out a loan as well as timely collection of principal repayments and interests due from clients. These were probably due to the challenges that were found out to be militating against the bank's efforts to effectively use these systems to reduce loan defaults.

### **5.1.3 Challenges affecting Steward Bank in implementing its innovative credit risk management strategies that it uses in mitigating loan delinquencies**

With regards to this objective, the researcher found out that information asymmetry meaning the bank cannot get complete information about the borrower in loan decisions despite using digitized loan management systems, the turbulent and changing business environment makes it difficult for Steward bank to fix weights and criteria for judging creditworthiness of borrowers. These factors affect the efforts by the bank in implementing and effectively using the digitized loan management systems to reduce the level of NPLs.

In addition, the study also found out that there are heavy costs associated with installation and use of digitized loan management systems that weigh on Steward Bank, at times there are poor networks and information communication technology in Zimbabwe that limit the capacity of Steward bank to fully utilize its digitized loan management systems as well as that digitized loan management systems as programmed softwares sometimes give Steward bank misleading output reports about loan decisions. Apart from that, unfavourable government policies such as directed lending and controlled interest rates, depressed sales revenue of companies, too much data which makes it complicated to feed into the model, lack of rule of law and delays in the delivery of justice and lack of training on the part of credit officers to use the systems challenges the efforts of the bank in implementing its innovative credit risk management strategies that it uses in mitigating loan delinquencies.

## **5.2 Conclusions**

In this section, the conclusions were also drawn under each objective of the study same applies with the findings above. These conclusions were based on the above presented summaries.

### **5.2.1 Forms of innovative credit risk management strategies used by Steward Bank**

From the findings under this sub-objective, the study concluded that Steward bank has adopted highly innovative and digitized credit risk management systems to manage and mitigate loan delinquencies. These systems are concluded to be applied during the screening of potential borrowers so that loans are granted to most deserving and good character clients. The study also concluded that the digitized systems are also applied throughout the lending process.

### **5.2.2 The effectiveness of Steward Bank's innovative credit risk management strategies in mitigating loan delinquencies**

The study concluded that the digitized loan management systems are effective in assessing prospective borrowers using the 5Cs for instance fairly valuing collateral security provided by a prospective borrower as well as perfectly assessing the capacity of a prospective borrower to repay the borrowed loan before giving out a loan. The study also concluded that the same digitized loan management systems are not very effective in correctly determining the character of borrower, closely monitoring and supervising the borrower's actions after giving out a loan as well as timely collection of principal repayments and interests due from clients. The study also concluded that there is a strong positive relationship between innovative credit risk management systems in banks and loan delinquencies that is the digitized loan management systems are very effective in mitigating and reducing the level of NPLs. Despite the strong positive relationship found out on Regression results, the study concluded that the ineffective part of these systems could be another reason for the high NPLs encountered at Steward Bank which ranged above 15% in 2019.



### **5.2.3 Challenges affecting Steward Bank in implementing its innovative credit risk management strategies that it uses in mitigating loan delinquencies**

The study concluded that the challenge of getting complete information about the borrower in loan decisions, the turbulent and changing business environment makes, heavy costs associated with installation and use of digitized loan management systems such as Business Intelligence Softwares, Cloud computing, hiring IT specialists (programmers) and poor networks and information communication technology in Zimbabwe limit the capacity of Steward bank to fully utilize its digitized loan management systems. The study also concluded that digitized loan management systems as programmed softwares sometimes give Steward bank misleading output reports about loan decisions. In addition, from the findings, the study concluded that unfavourable government policies such as directed lending and controlled interest rates, depressed sales revenue of companies, too much data which makes it complicated to feed into the model, lack of rule of law and delays in the delivery of justice and lack of training on the part of credit officers to use the systems challenges the efforts of the bank in implementing its innovative credit risk management strategies that it uses in mitigating loan delinquencies.

The study also concluded that limitations associated with Credit Scoring Models like Neural Networks, Linear Discriminate Models and Regression analysis include the definition of an abnormal or insolvent company since different “degrees of insolvency” exist (Beaudry, Doms and Lewis, 2010). A model can define an insolvent company differently according to the information provided and this can have potential implications on credit rating, hence rejecting a solvent company is better than accepting an insolvent company as a result of computational bias.

### **5.3 Recommendations**

From the conclusions above, the following recommendations were made to Steward bank, the banking sector and the regulatory authorities so as to reduce the level of NPLs to an internationally acceptable level of below 5% through the use of innovative credit risk management systems.

### **5.3.1 Recommendations to Management of Steward Bank**

Basing on the conclusions that Steward bank's current digitized borrower appraisal techniques are slightly above average, the researcher recommends that the bank should be thorough in its digitized borrower appraisal techniques. The banks should continuously refine its systems and remodel them so that they become very effective and thorough in all the tenets of the 5Cs when assessing the potential borrowers. Their models should be all-rounders that are also easy to adjust in line with changes in exogenous variables. This is in line with the views of Unaefe and Orgboi, (2013) and by Musyoki and Kabuko (2015) that banks need to be quite thorough in the borrower appraisal process in order to reduce the risk of high non-performing loans. Being thorough will reduce the risk of bad debts since the borrower will ensure that they repay the loan without fail.

In addition, according to the conclusion that Steward bank has innovative credit risk management techniques but are not very thorough in managing the credit after loan issuance; the study recommends that the bank should devise online dashboards that are capable of effectively supervise and monitor the borrower's actions and financial statements movement after issuance. For instance, the bank can create online dashboards that timeously monitor the changes in account balances and for it to red flag if the balance falls below the required amount to cover monthly instalments. This will help them to note any changes in the financial cash flows of the customer so that loan repayment is ensured.

Also, it is recommended that digitized validation of the collaterals after loan issuance is encouraged. Assets have a useful economic life hence as time moves they will be depreciating and losing value so the bank has to validate these assets so as to get the same value for loans issued. The bank should come up with digitized validation systems which gives early warning signs to changes in the market value of collateral when any factor that affects the value of the collateral changes so that quick actions can be taken to replenish the value of collateral. This will limit the exposure of the bank to credit risk should the customer defaults.

Based on the conclusion that innovative credit risk management systems are significantly and positively related to loan repayment performance (low delinquency levels/NPLs) the study

recommends that the Steward bank and other commercial banks should continue to carry out the credit risk management process as thoroughly as possible as lending is the prime or core business of banks. Credit risk management help curb possible default by borrower and hence the loan repayment performance is ensured.

Regarding the heavy costs associated with installation and use of digitized loan management systems such as Business Intelligence Software, Cloud computing, hiring IT specialists (programmers), the study recommends the bank to outsource these services from specialised suppliers for instance from China and or Russia and benefits from the managerial and technical expertise supplied. This will help the banks to cut costs whilst leaning on the benefits of the systems.

### **5.3.2 Policy recommendations**

The study recommends that all financial institutions particularly commercial banks in Zimbabwe should regularly evaluate and update their digital lending practices relating to debt collection policy, client appraisal and lending policy that are capable of ensuring that all credit risks are identified and recorded from departmental level to the institution at large. This is critical because of technological innovations and digitalisation taking place in the banking sector such as mobile lending that may limit commercial banks' ability to evaluate and manage credit management using traditional methods. Therefore, Enterprise Risk Management Framework is of paramount to every commercial bank or financial institution that offers loans to customers.

Despite the fact that the avenues for using credit derivatives/ financial tools like CDS, CDOs and TRS are not conducive in Zimbabwe, the study recommends that the relevant regulatory authorities such as RBZ, Ministry of Finance and the Deposit Protection Corporation (DPC) should consider setting up institutional and regulatory frameworks (conducive environment) to enable the use of such products to leverage credit losses by banks. In addition, the use of structured products and crypto currencies should be allowed and regulated to ensure liquidity for the trading of these products in a secondary market. Securitisation will go a long way in reducing credit losses.

In addition, the RBZ together with government should promulgate favourable policies that support banks and other financial institutions for instance the risk adjusted minimum capital requirements. These policies should be time consistent and credible for a longer period of time to enable banks to accurately forecast and make informed decisions before granting loans to bad character clients. This is because these policies also have an effect on the character, capacity and influences the conditions as tenets of the 5Cs.

The literature also highlighted that the failure by the Zimbabwean banks to comply with the Basel and the RBZ Credit Risk Management principles also lie in the political interference where the government sometimes direct banks to lend to a certain sector like Agriculture and mining for instance without following due processes enshrined in the frameworks. Therefore, the study recommends that government should limit directed lending policies and politically exposed persons (PEPs) to have majority shares or a say in the running of financial institutions.

In addition, weak regulatory practices by the regulator and regulatory arbitrage by banks also cause some banks to be less compliant in terms of following the sound principles of effective credit risk management. Therefore, the RBZ should improve its risk based supervision compelling all banks to meet their minimum capital requirements (risk adjusted capital).

The Reserve Bank of Zimbabwe should also recapitalize or adequately capitalizing the Zimbabwe Asset Management Corporation (ZAMCO) or rather making it independent so that it will be able to diligently perform its mandate of absorbing NPLs from banks. This is a Special Purpose Vehicle (SPV) that was created to securitize and absorb the deserving NPLs from commercial banks. However, the institution is not adequately capitalised and its decisions are affected by the regulator (who is the mother company).

#### **5.4 Contribution to the body of knowledge made by the study**

The research will also contribute to the body of knowledge as it shall somehow fill the research gap identified. The college may also find this useful to as a library resource for future researchers and other interested parties who may be reading for the purposes of doing other researches or for the purposes of attaining knowledge on the subject.

## **5.5 Areas for further research**

Future researches can also conduct their studies with the research topic, analyzing the effectiveness of credit risk management strategies and loan delinquencies in highly innovative and digitized banks but focusing on other banks as case studies. Future researchers may also use either purely qualitative or a mixed method than the quantitative one used in this research.

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## APPENDICES

### Appendix 1. 1: Research Questionnaire for Steward Bank Employees

#### University Of Zimbabwe



#### Research Questionnaire for Steward Bank Employees

My name is Brian Semwayo [STUDENT NUMBER: R1810244]. I am a post graduate student at the University of Zimbabwe, undertaking a Master Degree in Business Administration. In partial fulfilment of my studies, I am supposed to carry out a research. In compliance with this requirement, I have chosen to do a research titled **“Credit risk management strategies and loan delinquencies in highly innovative (digital) banks: The Case of Steward Bank”**.

I kindly ask you to help me with information so that I can complete my dissertation. All the information that you may provide shall be used for academic purposes only and shall be treated with strict confidentiality.

**My contact details: Cell: +263773985612**

#### **Instructions/Information**

1. Please do not write your name or contact details on this questionnaire.
2. Please respond by ticking [✓] the appropriate box (es) where applicable and write in full in the spaces provided where specified.
3. Kindly answer all questions in this questionnaire
4. There is no right nor wrong answers.

## **SECTION A: DEMOGRAPHICS AND BACKGROUND INFORMATION**

**A1.** Indicate your age group.

< 30 years	1
30-40 years	2
41-50 years	3
> 50 years	4

**A2.** Indicate your highest level of education.

Master's degree	1
Undergrad degree	2
Diploma/Certificate	3
Advanced level	4
Ordinary level	5
Other (specify)	6

**A3.** Indicate your department of work

Retail	1
Business Risk	2
Asset and Liability	3
Credit Risk	4
Other	6

**A4.** Indicate your level of working experience at Steward Bank.

0-5 years	1
6-10 years	2
11-15 years	3
16-20 years	4
> 20 years	5

**Section B: Credit risk management strategies at Steward Bank**

Show your level of agreement or disagreement with each of the questions relating to innovative credit risk management strategies at Steward Bank. Use the given key. 1 = Strongly Disagree (SD), 2=Disagree (D), 3=Neutral (N) 4=Agree (A) and 5=Strongly Agree.

Statement		SD	D	N	A	SA
		1	2	3	4	5
<b>B1</b>	Steward bank has digitized loan management systems that can assess the personality/character of prospective borrowers of loans.					
<b>B2</b>	Steward bank has digitized loan management systems that can value the collateral security provided by a prospective borrowers of loans.					
<b>B3</b>	Steward bank has digitized loan management systems that can capacity of the prospective borrower to repay the borrowed loan.					
<b>B4</b>	Steward bank has digitized loan management systems to supervise and monitor borrower’s actions.					
<b>B5</b>	Steward bank has digitized loan management systems that facilitate repayment of loans and collection of amounts due from clients.					
<b>B6</b>	Steward bank uses financial tools such as credit default swaps and total return swaps to reduce credit risk of default.					

**B7.** What other innovative credit management strategies are used by Steward bank to reduce loan default rate besides the strategies highlighted in the table above? Indicate your answer in the space provided below.

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**Section C: Effectiveness of Steward Bank’s credit risk management strategies**

Show your extent of agreement and disagreement with the following statements in the following table with respect to effectiveness of Steward Bank’s innovative credit risk management strategies. 1 = Strongly Disagree (SD), 2=Disagree (D), 3=Neutral (N) 4=Agree (A) and 5=Strongly Agree.

Statement		SD	D	N	A	SA
		1	2	3	4	5
C1	Steward bank strictly provides loan to good character borrowers.					
C2	Steward bank fairly values collateral security provided by a prospective borrower.					
C3	Steward bank perfectly assesses capacity of a prospective borrower to repay the borrowed loan before giving out a loan.					
C4	Steward bank closely monitors the borrower's actions after giving out a loan.					
C5	Steward bank timely collects principal repayments and interests due from clients.					

**C8.** How else can you describe the effectiveness of Steward Bank's innovative credit risk management strategies in mitigating loan defaults? Indicate your answer in the space provided below.

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### **Section D: Challenges faced by Steward Bank in its credit risk management strategies**

Show your level of agreement or disagreement with the following statements relating to the possible challenges that Steward Bank can be facing in its loan management decisions. Use the given key. 1 = Strongly Disagree (SD), 2=Disagree (D), 3=Neutral (N) 4=Agree (A) and 5=Strongly Agree.

	Statement	1	2	3	4	5
D1	It is not possible for Steward bank to get complete information about the borrower in loan decisions despite using digitized loan management systems.					
D2	Changing business environment makes it difficult for Steward bank to fix weights and criteria for judging creditworthiness of borrowers.					
D3	There are heavy costs associated with installation and use of digitized loan management systems that weigh on Steward Bank.					

<b>D4</b>	There are poor networks and information communication technology in Zimbabwe that limit the capacity of Steward bank to fully utilize its digitized loan management systems.					
<b>D5</b>	At times, digitized loan management systems as programmed softwares give Steward bank misleading output reports about loan decisions.					

**D6.** What other challenges are faced by Steward Bank in its loan management decisions? Use the space below.

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**THE END: THANK YOU**

## Appendix 1. 2: Turnitin In Report

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