



# **Zambia University College of Technology**

**Advancing Knowledge and Innovation**

**BACHELOR'S DEGREE IN INFORMATION TECHNOLOGY**

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## **FINAL YEAR PROJECT PROPOSAL**

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**STUDENT NAME : KATONGO BUPE**

**STUDENT NUMBER : 2010100**

**SUPERVISOR : MR. C. SILWIZYA**

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### **PROJECT TITLE:**

**DESIGNING AND DEVELOPING A CENTRALIZED LOAN APPLICATION  
MANAGEMENT SYSTEM FOR MICRO-FINANCE COMPANIES (A CASE  
STUDY OF ZAMBIAN MICRO – FINANCE INSTITUTIONS)**

## Abstract

The concept of microfinance, involving the provision of small loans to underprivileged individuals and businesses, has emerged as a potent strategy for poverty alleviation. This research endeavors to address the challenge of poverty reduction by establishing a system that offers secure and unsecured loans to individuals, thereby granting them a pathway to economic empowerment. According to Morduch and Wydick (2005), Microfinances are particularly advantageous in developing countries such as Zambia, where microfinance institutions (MFIs) have become the primary funding source for microbusinesses, thus ensuring sustainable access to financial resources. However, a critical problem arises from the lack of a centralized platform for comparing interest rates and services across various MFIs, leading to inefficiencies in the loan application process.

The primary objective of this study is to develop a Centralized Loan Application Management System that harmonizes multiple microfinance institutions on a singular platform. Additionally, the project aims to create a Cross-Platform Centralized Loan Application Management System, automating the Loan Application Process. Moreover, the research endeavors to devise a Centralized Loan Application Management System that effectively mitigates the risk of loan defaults experienced by microfinance institutions.

This study tackles the question of how a Centralized Loan Application Management System can be created to accommodate multiple microfinance institutions on a single platform. It also delves into the development of a Cross-Platform Centralized System and explores strategies to reduce the occurrence of loan defaults within microfinance institutions. The scope of this research centers on clients and debtors in the context of a specific microfinance institution located in Ndola, Zambia. The proposed system will offer essential functionalities including login/registration, search, view, update, and application submission, presented through a user-friendly interface on both iOS and Android platforms. The application will be built using React Native and Node.js for the frontend and backend respectively, with SQLite serving as the database management system.

## CHAPTER ONE

### 1.0 Introduction

The concept of "microfinance" refers to the lending of small sums of money to under-privileged business people and ordinary people, this study intends to develop a system for reducing poverty by giving the individuals access secured and unsecured loans.

Microfinance has many advantages for developing countries like Zambia. This particular type of lending has been around for a while. In Africa and other developing nations, Microfinance institutions (MFIs) have become the primary source of funding for microbusinesses in many developing countries, providing sustainable access to financial resources (Zimba, M. 2016)

In the modern day and age, internet has become essential to everyone. This project focuses on the creation of a mobile application for an online centralized platform for microfinance Institutions.

### 1.1 Background of the Study

The concept of microfinance has gained prominence as a powerful approach for tackling poverty by providing small loans to disadvantaged individuals and businesses. This strategy aims to empower recipients economically and contribute to poverty alleviation. Microfinance institutions (MFIs) have become crucial in developing countries, including Zambia, where they serve as primary sources of funding for microbusinesses. However, the lack of a centralized platform for comparing services and interest rates across different MFIs has led to inefficiencies in the loan application process. These institutions play a pivotal role in ensuring consistent access to financial resources for microbusinesses, contributing to sustainable economic growth. Despite these benefits, challenges persist, such as the risk of loan defaults experienced by MFIs.

## 1.2 Aim

This study aims at designing and developing an effective Centralized Loan Application Management System that will centralize various MFIs, alleviating the challenge of comparing interest rates, digitizing the Loan Application process and automating payment reminders and Credit Scoring to reduce the risk of loan defaults experienced by microfinance institutions.

## 1.3 Problem Statement

The inflexibility of comparing interest rates and services between different microfinance Institutions becomes a challenge. According to Charity Munsaka and Felix Chileshe (2020). The challenges of accessing microfinance in rural areas in Zambia. The study found that one of the challenges is the inflexibility of comparing interest rates and services between different microfinance institutions. The study also found that borrowers in rural areas often have to travel long distances to access microfinance services. Additionally, Borrowers having access to the internet have to look up every microfinance company on the internet, this is time consuming and inefficient.

According to Michael Mumba and Bright Mwape (2020). The use of physical loan application forms in microfinance in Zambia. The study found that physical loan application forms are still widely used in Zambia, despite the availability of digital alternatives. The study also found that physical loan application forms can be time-consuming and inefficient, and can also lead to errors. A client/debtor has to submit hard copies of NRC and other required documents to a microfinance institution for a Loan application to be processed.

Handling loan defaults is a massive challenge most microfinance institutions face. According to Patrick Zulu and Charles Mulenga (2020). This study examines how local microfinance institutions in Zambia handle loan defaults. The study found that local microfinance institutions use a variety of methods to manage loan defaults, including: Credit scoring, where borrowers are given a score based on their credit. This score is used to determine the borrower's risk of defaulting on a loan. Personal visits, Lender may visit borrowers to discuss their loan repayment status, and Phone calls, Lenders may call borrowers to remind them of their loan repayment due dates.

### 1.3 Research Objectives

1. To develop a centralized loan application management system that shall allow borrowers to compare interest rates between different microfinance institutions.
2. To implement a cross platform mobile app that shall Digitize the Loan Application Process.
3. To develop a system that shall automate payment reminders and Credit Scoring in order reduce the risks of loan defaults experienced by micro-finance institutions.

### 1.4 Research Questions

While the research was being undertaken, a mirror of research questions has been identified using the objectives specified in the proposal.

1. How can a centralized loan application management system allow borrowers to compare interest rates between different microfinance institutions?
2. How can a cross platform mobile app Digitize the Loan Application Process?
3. How can automated payment reminder and Credit Scoring reduce the risks of loan defaults experienced by micro-finance institutions?
- 4.

### 1.5 Significance of the Study

The significance of this study can be understood in the context of the following key points:

1. Streamlining Interest Rate Comparison:  
The inability to compare interest rates and services between different microfinance institutions has been identified as a significant challenge. This study's objective of developing a centralized loan application management system that facilitates easy comparison of interest rates will greatly benefit both borrowers and MFIs. By providing a unified platform for borrowers to assess interest rates, they can make more informed decisions about loan options, contributing to increased financial literacy and more competitive lending practices.

## 2. Digitization of Loan Application Process:

The reliance on physical loan application forms in microfinance processes, despite the availability of digital alternatives, poses inefficiencies and barriers. The implementation of a cross-platform mobile app to digitize the loan application process is a significant step toward reducing administrative burdens, eliminating errors associated with manual data entry, and expediting application processing. This digitization not only enhances the user experience for borrowers but also modernizes the operational landscape of MFIs, aligning them with contemporary technological trends.

## 3. Automation of Payment Reminders and Credit Scoring:

The challenge of managing loan defaults is a pressing concern for microfinance institutions. By developing a system that automates payment reminders and credit scoring. Automated payment reminders can improve borrower accountability, reducing instances of delinquency, while credit scoring mechanisms enhance the accuracy of risk assessment, enabling MFIs to make more informed lending decisions. This contributes to the financial sustainability of both borrowers and MFIs.

### 1.6 Conceptual Framework



### 1.7 Purpose of the Study

The purpose of this study is to design and implement an innovative Centralized Loan Application Management System for microfinance institutions (MFIs) in Zambia. This system aims to address critical challenges within the microfinance sector, specifically focusing on the inefficiencies in interest rate comparison, the need for digitizing the loan application process, and the imperative to automate payment reminders and credit scoring. By achieving these objectives, the study seeks to contribute significantly to the enhancement of operational efficiency, user experience, and risk management within the microfinance landscape.

### 1.8 Scope of the Study

The scope of this study encompasses the design, development, and implementation of a Centralized Loan Application Management System tailored for microfinance institutions (MFIs) in Zambia. It includes the creation of a digital platform facilitating borrowers to conveniently compare interest rates and services offered by different MFIs. The study involves the development of a user-friendly cross-platform mobile application that streamlines and digitizes the loan application process, encompassing online forms and document uploads, thereby eliminating the need for physical paperwork. Additionally, the scope covers the design and implementation of automated systems for sending payment reminders to borrowers and assessing credit scores, contributing to enhanced borrower accountability and risk assessment for MFIs.

The system will be equipped with components to login/register, search, view, update and apply on the application while providing a custom user-friendly interface on both platforms (iOS & Android). The android/IOS application will be developed using React Native and Node.js as back-end language and Mongo DB as the database management system.

## CHAPTER TWO

### Literature Review

#### 2.0 Introduction

The Literature was reviewed in three (3) phases corresponding to the objectives of this project.

1. The utilization of software systems for comparing loan rates across multiple microfinance institutions has garnered significant attention in recent years due to its potential to transform the microfinance landscape.

Kariuki and Mutua's research on comparing loan rates across multiple MFIs is explored in two distinct studies. In their work published in the *Journal of Financial Technology* (2022), the authors conduct a comprehensive review of software systems designed to facilitate loan rate comparison. They delve into the functionalities, usability, and potential benefits of these systems for borrowers, shedding light on their role in enhancing informed decision-making. This study contributes to an understanding of the technological landscape that aids borrowers in selecting suitable loan options.

Their earlier research, featured in the *Journal of Financial Regulation and Compliance* (2019), shifts focus to a case study conducted in Kenya. Kariuki and Mutua analyze the practical implications of utilizing software systems for comparing loan rates across multiple MFIs. Through empirical research, they demonstrate how such systems improve transparency, allowing borrowers to make well-informed decisions. The study uncovers the positive impact on market competition, ultimately benefiting borrowers by providing access to fairer terms and conditions.

Malhotra and Seth (2018) contribute to the discourse by investigating the efficiency gains resulting from software systems for comparing loan rates. In their study, published in the *Journal of Development Studies*, the authors assess the extent to which these systems enhance borrower decision-making processes. Through empirical analysis, they reveal that borrowers utilizing these systems are more likely to secure loans with favorable terms, thus improving their financial efficiency. The study underlines the crucial role of technology in empowering borrowers, especially in contexts where information asymmetry is a concern.



Ferreira, Fernandes, and Raposo's systematic review (2020) adds depth to the understanding of technology adoption in microfinance. Although not solely focused on loan rate comparison, their study demonstrates how information and communication technologies (ICTs) are integrated into various microfinance processes. This broader context underscores the interconnected nature of technology's impact on different aspects of microfinance, including loan rate comparison systems.

2. The use of technology to digitize the loan application process in microfinance is a rapidly growing field. The five articles reviewed here provide an overview of the current state of the art, as well as insights into the potential benefits and challenges of this approach.

Siwale and Godfroid (2022) present a nuanced examination of the digitization process in microfinance and its effects on the sector's traditional human-centric approach. The authors argue that as MFIs embrace digital platforms for loan application processing, there exists a risk of diminishing the personalized and empathetic interactions that have long characterized these institutions. They emphasize that maintaining the 'human face' of microfinance is essential for fostering client trust, particularly among vulnerable and underserved populations.

Singh, Jha, and Singh (2022) contribute empirical evidence through their study on the impact of digitization on the loan application process within Indian microfinance institutions. Their research analyzes how digitization influences operational efficiency, accessibility, and loan approval turnaround time. The study reveals that while digitization can enhance efficiency and reduce processing time, it also unveils challenges related to digital literacy, especially among clients from remote and economically disadvantaged regions.

Akter, Chowdhury, and Islam (2022) provide a comprehensive literature review on the digitization of the loan application process, offering insights into the broader implications of this transition. Their analysis highlights the diverse impacts of digitization on both the supply and demand sides of microfinance. By synthesizing findings from various studies, the authors underline the need for a holistic understanding of digitization's effects, including its potential to reshape client interactions, streamline operations, and influence financial inclusion.

Kariuki and Mutua (2019) employ a case study approach to examine the digitization of the loan application process in Kenya. Their research showcases the positive outcomes of digitization, such as improved transparency, reduced processing times, and enhanced outreach to marginalized communities. Despite these advantages, the study also reveals challenges like data security concerns and the need for continuous technological support to ensure the sustainability of digitization efforts.

3. The use of automated credit scoring and payment reminders is a growing trend in microfinance. These technologies can help microfinance institutions (MFIs) to reduce loan defaults by more accurately assessing the creditworthiness of borrowers and by reminding borrowers of their loan repayment obligations.

Chowdhury and Haque (2020) present a randomized controlled trial investigating the role of technology in improving loan repayment behavior. By employing personalized digital communication and reminders, the study demonstrates a significant decrease in loan defaults, indicating the potential of technology in positively impacting loan portfolio performance. This finding underscores the practical implications of technology adoption for enhancing the financial stability of both MFIs and clients.

Eisenbeis (1996) presents a pioneering contribution to the domain of credit scoring techniques. The study focuses on the evaluation of commercial loans and explores the application of credit-scoring techniques as a means of assessing creditworthiness. The author underscores the significance of accurate credit evaluation, demonstrating how such techniques can enhance the lending process and mitigate potential risks associated with loan defaults. This research lays a foundational understanding of credit-scoring practices, thereby paving the way for subsequent developments in the field.

Teles et al. (2020) delve into the realm of credit scoring with a distinct focus on collateral-backed loans. Through the application of classification methods, the study addresses the complex task of credit assessment in scenarios involving collateral.

The authors emphasize the practical implications of classification methods in enhancing the accuracy of credit risk evaluation. This work extends the understanding of credit-scoring techniques, highlighting their adaptability to diverse loan structures and risk profiles.

In the context of emerging technological trends, Nor and Yusof (2002) explore the novel concept of loan assessment through the Internet. The study introduces the integration of technology into the lending process, emphasizing the potential for online platforms to streamline credit assessment. By discussing the advantages of this approach, such as improved accessibility and efficiency, the authors anticipate the broader adoption of technological solutions in microfinance institutions.

Shen Tao (2010) addresses credit risk control within the micro-loan sector through the utilization of soft information. The study underscores the importance of considering qualitative data alongside quantitative metrics to enhance credit assessment accuracy. By incorporating non-traditional indicators into credit evaluation, the research contributes to the evolving landscape of credit-scoring methodologies. This holistic approach reflects the growing recognition of the multifaceted nature of creditworthiness determination.

Title	Author & year	Work Done	Gap	Proposed
Comparative Analysis of Software Systems for Loan Rate Comparison: A Kenyan Case Study	Kariuki and Mutua (2019)	<ul style="list-style-type: none"> <li>- Reviewed software systems for loan rate comparison.</li> <li>- Explored functionalities, usability, and benefits.</li> <li>- Analyzed practical implications in a Kenyan case study.</li> </ul>	The lack of a centralized platform for comparing interest rates and services across MFIs.	Developing a Centralized Loan Application Management System.

"Impact of Digitization on Loan Application Processes in Indian Microfinance Institutions	Singh, Jha, and Singh (2022)	- Analyzed the impact of digitization on loan application processes in Indian MFIs. - Explored operational efficiency, accessibility, and processing time.	The development of a cross-platform mobile application for users.	Developing a Cross Platform Centralized Loan Application Management System that automates the Loan Application Process
Credit Scoring Techniques in Collateral-Backed Loans: A Classification Approach	Teles et al. (2020)	Evaluated credit-scoring techniques for assessing creditworthiness in commercial loans. - Emphasized the importance of accurate credit evaluation.	Adaptability of credit-scoring techniques to various risk profiles. Potential benefits of online platforms in credit assessment.	Developing a System for Automated Payment Reminders and Credit Scoring.

## System Review

Many systems around the globe have been created to sustain the main objectives of this system through different technologies such as mobile applications and web-applications, based on my research conducted we have outlined a number of systems and articles related to the underlined project topic.

ZAMCASH is a microfinance institution operating in Zambia. Provides unsecured loans in Zambia through their website and android app and payment methods include MTN and Airtel Money. The system has no reliable way to handling loan defaults and manually reminds clients/debtors to replay their loans. While it serves a crucial role in providing financial services to underserved populations, it currently does not support multiple microfinance institutions, lacks automated payment reminders, and offers limited cross-platform compatibility. This poses challenges in terms of borrower flexibility and efficient loan management.

IZWE LOANS, another MFI in Zambia, faces similar limitations. It does not support multiple microfinance institutions, lacks automated payment reminders, and does not offer cross-platform compatibility. These limitations may impact borrower experiences and the institution's competitiveness.

LUPIYA is a microfinance institution in Zambia that, while not supporting multiple MFIs, stands out by offering automated payment reminders. This feature can enhance borrower experiences and contribute to improved loan repayment rates. Provides the user with options to choose from custom interest rates and checks eligibility of Client/Debtor to get a loan. The system is not cross platform, only a website is available

FINCA, operating in various countries, including Zambia, currently does not support multiple microfinance institutions, lacks automated payment reminders, and offers limited cross-platform compatibility. Addressing these limitations could enhance its service offerings. Provides Secured loans, checks eligibility in person with the client/Debtor. Payment methods include Hard cash, VISA, Debt Card, MTN and Airtel Money. Handles loan application procedure using traditional methods such as pen and form on paper, and manually reminds clients/debtors to replay their loans.

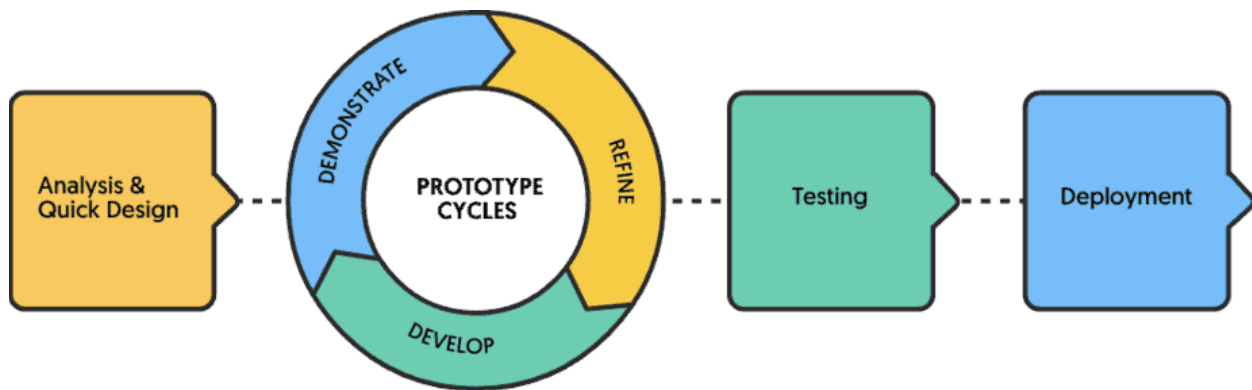
EXISTING SYSTEMS	SUPPORTS MULTIPLE MICROFINANCE INSTITUTIONS	AUTOMATED PAYMENT REMINDERS	CROSS PLATFORM
ZAM-CASH	X	X	X
IZWE LOANS	X	X	X
LUPIYA	X	√	X
FINCA	X	X	X
PROPOSED SYSTEM	√	√	√

## CHAPTER THREE

### RESEARCH METHODOLOGY

#### Choice of methodology:

Rapid Application Development (RAD) is a software development methodology that prioritizes speed and agility in delivering software solutions. RAD focuses on reducing development time and accelerating the delivery of functional software by emphasizing prototyping, iterative development, and close collaboration with customers.



**A typical RAD cycle**

#### 3.3 Layout

A complete description of the behavior of a system to be developed and may include a set of use cases that describe interactions the user will have with the software; in addition, it also contains non-functional requirements. Nonfunctional requirements impose constraints on the design or implementation (such as performance engineering requirements, quality standards or design constraints).

### 3.5 Functional Requirements

#### 1. User Authentication and Authorization:

- Users should be able to register and log in to the system.
- Different user roles (e.g., admin, applicant) should have varying levels of access and permissions.

#### 2. Loan Application Management:

- Applicants should be able to submit loan applications through the system.
- Loan officers should be able to review, approve, or reject loan applications.
- The system should support different types of loan products (e.g., personal loans, business loans).

#### 3. Data Management:

- The system should securely store and manage applicant and member data.
- Loan officers should have the ability to update applicant information.

#### 4. Loan Processing:

- The system should facilitate the processing of loan requests, including verifying applicant eligibility and creditworthiness.
- Loan officers should be able to calculate loan amounts, interest rates, and repayment terms based on predefined criteria.

#### 5. Document Upload and Management:

- Applicants should be able to upload necessary documents for loan processing.
- Loan officers should have access to uploaded documents for review.

#### 6. Communication and Notifications:

- The system should send notifications to applicants regarding the status of their loan application.

### 3.6 Non-Functional Requirement

1. Security:

- The system should ensure secure data transmission and storage, including encryption of sensitive information.
- User access should be protected through robust authentication mechanisms.

2. Usability and User Experience:

- The system should have an intuitive user interface to enhance user experience.
- It should be accessible from both Android and iOS devices.

3. Performance and Scalability:

- The system should be able to handle a high volume of concurrent users and loan applications.
- Response times should be reasonable even during peak usage.

4. Reliability and Availability:

- The system should have a high level of uptime and minimal downtime for maintenance.
- Backup and recovery mechanisms should be in place to prevent data loss.

5. Scalability:

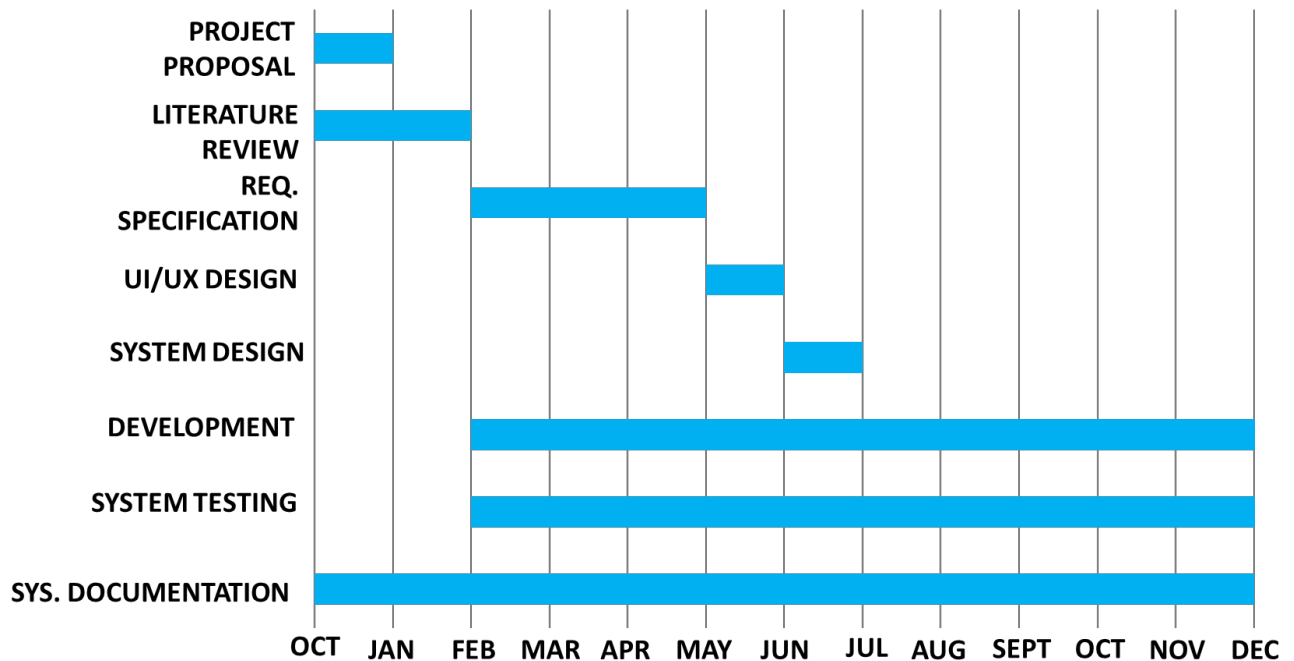
- The system should be designed to accommodate future growth and additional features.



### 3.2 Development Tools

DEVELOPMENT	DESIGN	HARDWARE
<ul style="list-style-type: none"> <li>React js, React Native, Node.js.</li> <li>SQLite3, json-server</li> <li>Microsoft Visual Studio Code (IDE)</li> <li>Git and GitHub</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft Visio</li> <li>FIGMA and Adobe XD</li> </ul>	<ul style="list-style-type: none"> <li>Toshiba Satellite Pro Laptop R50-b (core i3, 4th gen, ram 8gb, 1.70 ghz)</li> <li>Google Pixel 1</li> <li>iPhone X, 6s+ &amp; 5s</li> </ul>

### 3.3 Schedule of Activities



### 3.4 Budget

Item Description	Budget (ZMW)
<b>Equipment and Software</b>	
- Computers and Laptops	<b>K6,500.00</b>
- Mobile Devices for Testing	<b>K7,500.00</b>
<b>Project Documentation and Training</b>	
- Documentation and Manuals	<b>K2,500.00</b>
<b>Travel and Accommodation</b>	
Miscellaneous Expenses	<b>K1,500.00</b>
<b>Total Project Budget</b>	<b>K 18,000.00</b>

CHAPTER FOUR

RESEARCH RESULTS AND ANALYSIS