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Design and Development of a Lending and Credit Management System for a Micro Finance Company

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Abstract: This study aims to investigate the effectiveness of online lending and credit management systems on loan performance among microfinance institutions in Zambia. Microfinance institutions (MFIs) play a vital role in providing loans to the rural communities and unbankedand underserved population thereby bridging the financing gap in the mainstream financial sector. However, the high incidence of risks associated with the high levels of nonperforming loans by MFIs in the past years, threatens their growth and sustainability. The effectiveness of online lending and credit management systems is critical to the success of MFIs as most of their income is generated from interest earned on loans extended to small and medium entrepreneurs. Past studies have focused on loan application models used by MFIs and the impact on their profitability, but there has been lack of proven studies on credit recovery systems.

The findings of this study could help improve online lending and credit management systems in MFIs and enhance their ability to provide access to credit for the rural unbanked and unserved population.

Keywords*: Microfinance Institutions, Credit Risk, Credit Management Systems, Loan Performance, Rural Unbanked Population, Non-Performing Loans.*

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I. INTRODUCTION

A Lending and Credit Management System is basically an online platform that helps Microfinance Institutions process loan applications with ease. The system has different modules such as customer information module, loan application module, loan approval or rejection module, loan repayment module and reports. All these modules make it easy for MFIs to make informed decisions in the management of loans. Microfinance institutions may largely benefit from this system as they are able to access customer information and other related information on borrowers that have defaulted in the repayments of loans. Microfinance is an important tool for inclusive entrepreneurship and access to affordable loans because it provides access to start-up capital to people that have no access to banks and mainstream financial markets. These loans are typically offered by Microfinance institutions (MFIs) that are dedicated to serving specific target client groups, but it can also be offered by financial institutions, governments and other financial actors. The concept of credit can be traced back in history and it was not appreciated until after the Second World War when it was largely appreciated in Europe and later Africa (Armendariz, B., & Morduch, J., 2010). Banks in USA gave credit or loans to customers with high interest rates and demanded for collateral which sometimes discouraged borrowers hence the concept of credit was not popular (Ditcher, 2013). In Africa the concept of credit was largely appreciated in the 1950's when most banks started opening the credit sections and departments to give loans to white settlers. In Zambia credit was initially given to the rich people and big companies and was not popular to the poor. In 1990s loans given to customers did not perform which called for an intervention. In the late 2000s the concept of credit has become popular due to an increase in the number of MFIs that have been established.

II. METHODOLOGY

A. Baseline Study

The methodology will cover system analysis, system modelling and methodology used in the design and development of the system. This gives an outline of the methodology that was used in the design and development of the lending and credit management system. It provides information on the baseline study, the target population for

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the research and the research design. The researcher describes the development design that was chosen for developing the system and the reasons for this choice. The tools that were used for data collection and also the procedures that were followed to carry out the development are included. Lastly, several ethical considerations were considered to ensure that the study and ultimately development was conducted in an appropriate manner (Babbie & Mouton 2021). To comply with ethical considerations as discussed by (Leedy & Neuman, 2020) in conducting research, all participants provided verbal consent to be interviewed and to participate in the research. The participants therefore willingly participated in the study after they were approached by the researcher (Leedy & Neuman, 2020) and the research purpose and process were explained to them.

Prototyping approach to be used will be to deliver the first model. In prototyping model, a system that mimics the real system is given to the users and the real system is developed by basing on the prototype or by improving on it (Edward, 2017). Thus, the users to use the system in part will see whether they find it a good system or not. To give users time to learn how to use and interact with the system. Oral and written interviews or questioners will be used to collect requirements and information from the locals since the other possible means like observation requires an existing system to learn from it.

B. System Analysis

What is system analysis? (Lonnie D. Bentley p.160 7th edition.) defines system analysis as "the process of studying a procedure or business in order to identify its goals and purposes". Another view by (Horne 2007) sees system analysis as a problem-solving technique that breaks down a system into its component pieces for the purpose of studying how well those component parts work and interact to accomplish their purpose (Lonnie D. Bentley p.160 7th edition.). This also describes the plan that the investigator will undertake to develop the ways of solving problems and provide guidance in various steps of undertaking the research (Horne 2007).

C. Data Collection

The data collection process is a critical step in empirical research as it provides the foundation upon which analysis and conclusions are built (Horne 2007). For this study, the data collection will be comprehensive, encompassing both primary and secondary data sources to assess the effectiveness of credit management systems on loan performance among microfinance institutions.

➢ *Sources of Data*

Primary Data Collection Surveys: Designing structured questionnaires that will be distributed to selected participants from the rural unbanked population who have borrowed from MFIs, as well as to MFI staff responsible for credit or loan management. The surveys will aim to collect data on: Borrower satisfaction, Repayment discipline and challenges. The perceived impact of credit management systems on loan accessibility and repayment Interviews: Conducting semi-structured interviews with key informants, including MFI managers, loan officers, and financial analysts. The interviews will focus on: Insights into the credit management processes, Strategies for credit risk assessment and monitoring, Challenges faced in loan recovery, Perspectives on the effectiveness of existing credit management systems.

- Focus Groups: Organizing focus group discussions with borrowers to gain a deeper understanding of their experiences with MFI loans. Discussions will explore:

✓ The impact of loan terms on repayment capability
✓ Awareness and understanding of credit management policies
✓ Suggestions for improving credit management systems Secondary Data Collection Financial Records: Analyzing financial statements and loan books of the MFIs to gather quantitative data on:

- Loan disbursement and recovery rates
- Patterns in non-performing loans
- 3.Financial health indicators relevant to credit risk Reports and Publications: Reviewing published reports, academic papers, policy documents, and industry analyses to understand the broader context of microfinance credit management and to compare the findings from primary data with existing literature.

III. KEY FINDINGS

Under key findings, the developer will give the analysis of the survey from the questionnaire before the system was designed and developed and after.

In efforts to improve the existing lending and credit management systems in Zambia, observation on the problems and opportunities from the existing systems both in Zambia and outside had been conducted. With that, it is recommended that an integrated system of solutions that attempts to rectify many of the existing problems in the current lending and credit management systems be developed and develop an innovative way to enhance the services provided by MFIs.

Therefore, the goal of the developed Lending and Credit Management System is to provide a revolutionary way to interact effectively in a one stop venue. Furthermore, with this system, customers will be able to obtain a wider choice of MFIs.

In short, with the developed system, MFIs can now be involved in making loan transactions convenient, cost effective and finally can do away with the manual/conventional methods of approving and disbursing loans. Therefore, the developed system will be superior and function as a catalyst in the competitive business environment regardless of the geographic barricades among the MFIs.

A. Intended Users

The system has the public and SMEs (as Customers), super system Administrator, Cashiers, and Manager's (as MFIs). These are identified as the main users of the system. This is because this system can only be successful when there

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is a customer to apply for a loan and MFIs to provide their services.

B. Analysis of the Developed System

The system function can be divided into two sections, the Staff section (Administrators), and the Customer section. In the Administrator section, the system allows Administrators to edit/register staff, a cashier manages all payment activities while a manager handles loan approvals or rejections and generates reports, view user logs and activity logs.

In the Customer section, the customer can view the home page to create a profile with their ID number, personal details and password. After creating a profile, the customer can then log in to apply for a loan.

C. Functional Requirement

A Functional Requirement (FR) is a description of the service that the software must offer. It describes a software system or its component. A function is nothing but inputs to the software system, its behaviour, and outputs. It can be a calculation, data manipulation, business process, user interaction, or any other specific functionality which defines what function a system is likely to perform as defied by

- The system is user friendly and consistent
- The system provides an attractive graphical interface for the user

(Mathew Martin, 2021). Staff (MFIs) and Customers (public and SMEs) use this developed Lending and Credit Management System. A clear and detail functional system requirements for this system are the Staff section and Customer section. These are described as following;

➢ *The Functional Requirements of the Lending and Credit Management System are:*

- The user can create a profile
- Users can apply for a loan according to the desired amount up to the maximum specified by the MFI.
- Users can receive their funds (loans) through any of the mobile network operators or banks.

D. Non-Functional Requirements

Non-functional requirements address aspects of the system other than the specific functions it performs. These aspects include system performance, costs, and such general system characteristics as reliability, security, and portability. The non-functional requirements also address aspects of the system development process and operational personnel. It includes the following:

- The system allows developer access to installed environment
- The system is targeted to the customer base

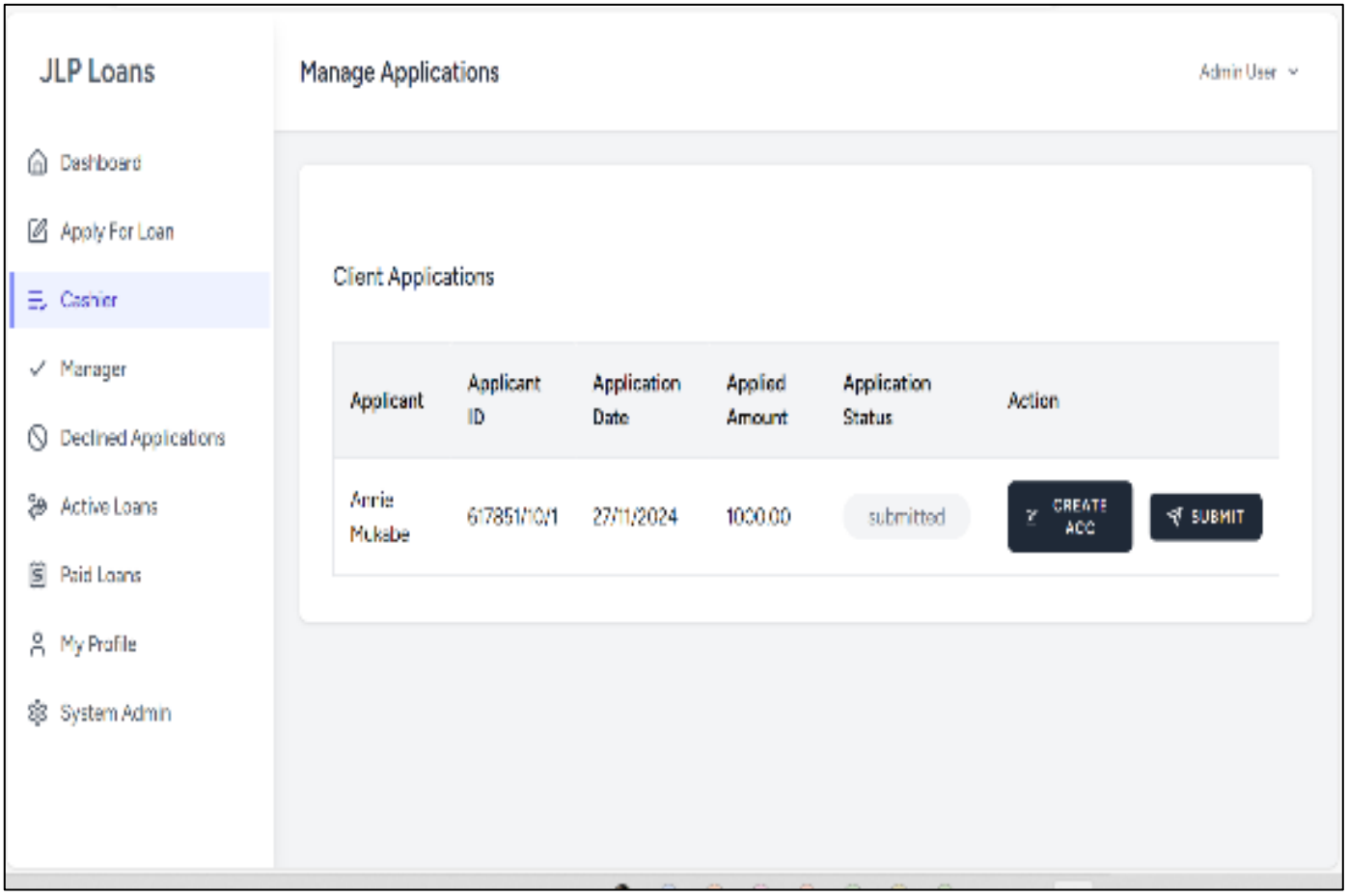

Fig 2: Staff Interface
Source: Author 2024

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Figure 2 shows the interface of the cashier for the online lending and credit management system that has been developed. The cashier is able to create accounts for customers who apply for the loans. This ensures that customers do not provide their personal information every time they want to apply for a loan. The cashier is also able to see the loans that have been approved and rejected in order to disburse funds to those customers whose loans have been approved. The cashier is also able to update the payment history of customer who have repaid their loans. The ensures that loan repayment is easily monitored and tracked.

➢ *The other Modules Included in the System are Discussed Below:*

The functional requirements for the staff' section is divided in to three functions which are: (a) Administrator (b) Manager (c) Cashier.

- Administrator: Administrator is a super person that has the overall control of company staff which includes:
- Manager: Manager is a company staff who manages company activities and can perform the following functions:
  - Manage Customers: Manager can view, edit, delete, and search all the customer information in the register with the company.
  - Activity Logs: Manager can view all the activities performed in the system.
  - User's logs: Manager can view all the activities performed by the staff and customers.
  - Generate report: Manager can generate report by using a particular date or range base on approved and disbursed amount, number of loan applications and print it.
- Cashier: Cashier is a finance department person that disburses funds and accepts loan repayments from customers.

➢ *Customers*

The customers are able to access some of the functions in this system, which includes the main page module, registration module.

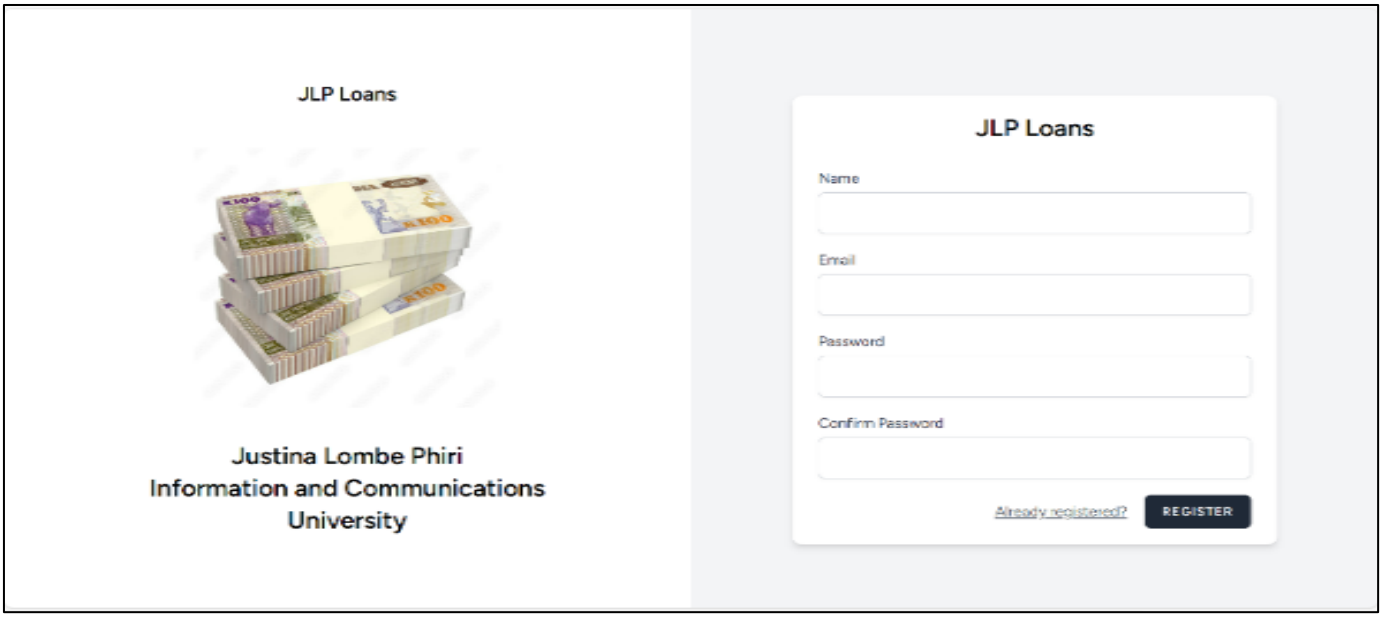

Fig 3: User Interface Design
Source: Author 2024

Fig 3 shows the user interface design for all the users of the system. These users are; cashier, system administrator, manager and cashier. The user interface is used to create accounts to login into the system. Users accounts are useful for accountability and audit trails. Users can also reset their passwords in the user interface.

➢ *The Functional Requirements for the Customers Section are as Follows:*

- Loan Application: During loan application, a customer performs the following activities:
  - Creates an account on the system with the personal details i.e identity number, first name and last name, employment status. The customer also creates a password which they would use whenever they want to log into the system.
  - After successful registration with validations from the system, a customer proceeds to apply for a loan by selecting which MFI they want to borrow from and specifying the amount they wish to borrow.

➢ *Reset Password:*

Customers are also able to reset their password if they can't remember the previous one or feel it may have been compromised.

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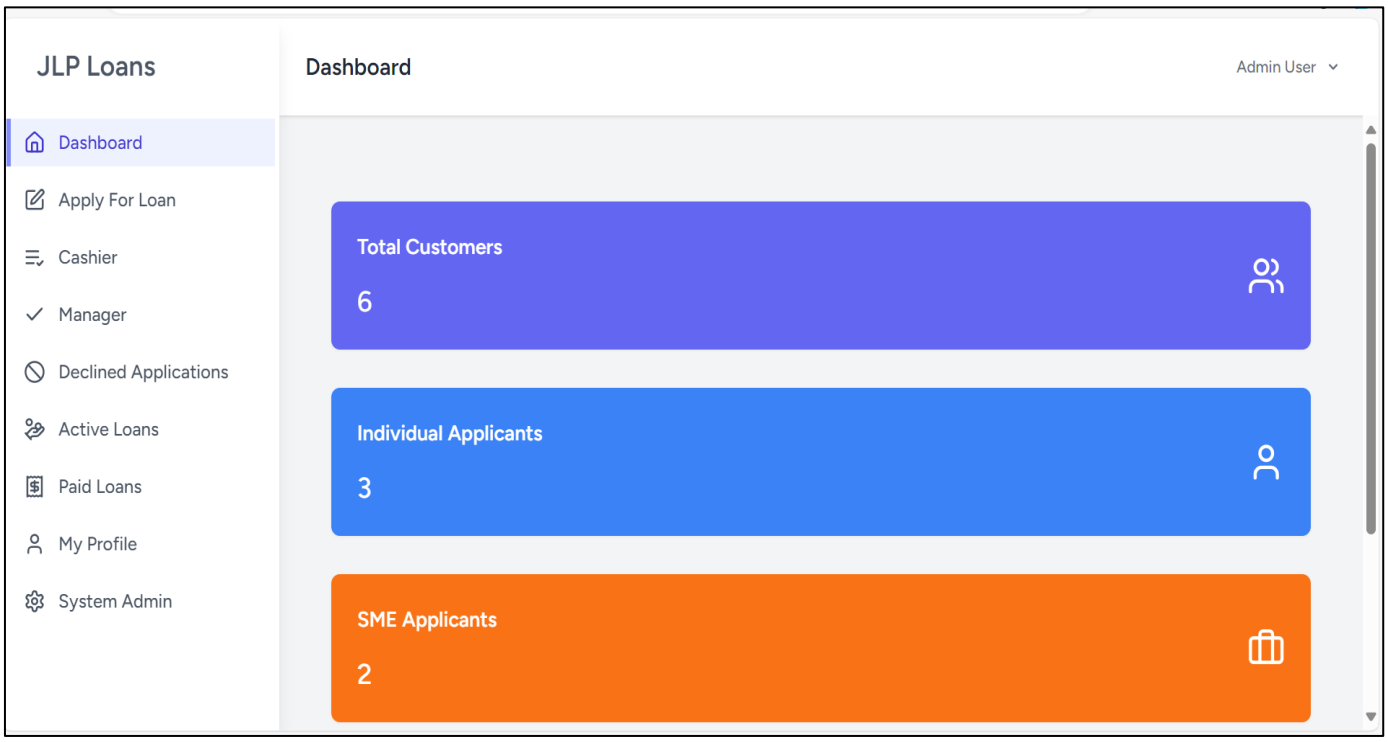

Fig 4: Dashboard
Source: Author 2024

Fig 4 shows an analytical dashboard for the number of total customers which are classified as individual customers and small and medium enterprise customers.

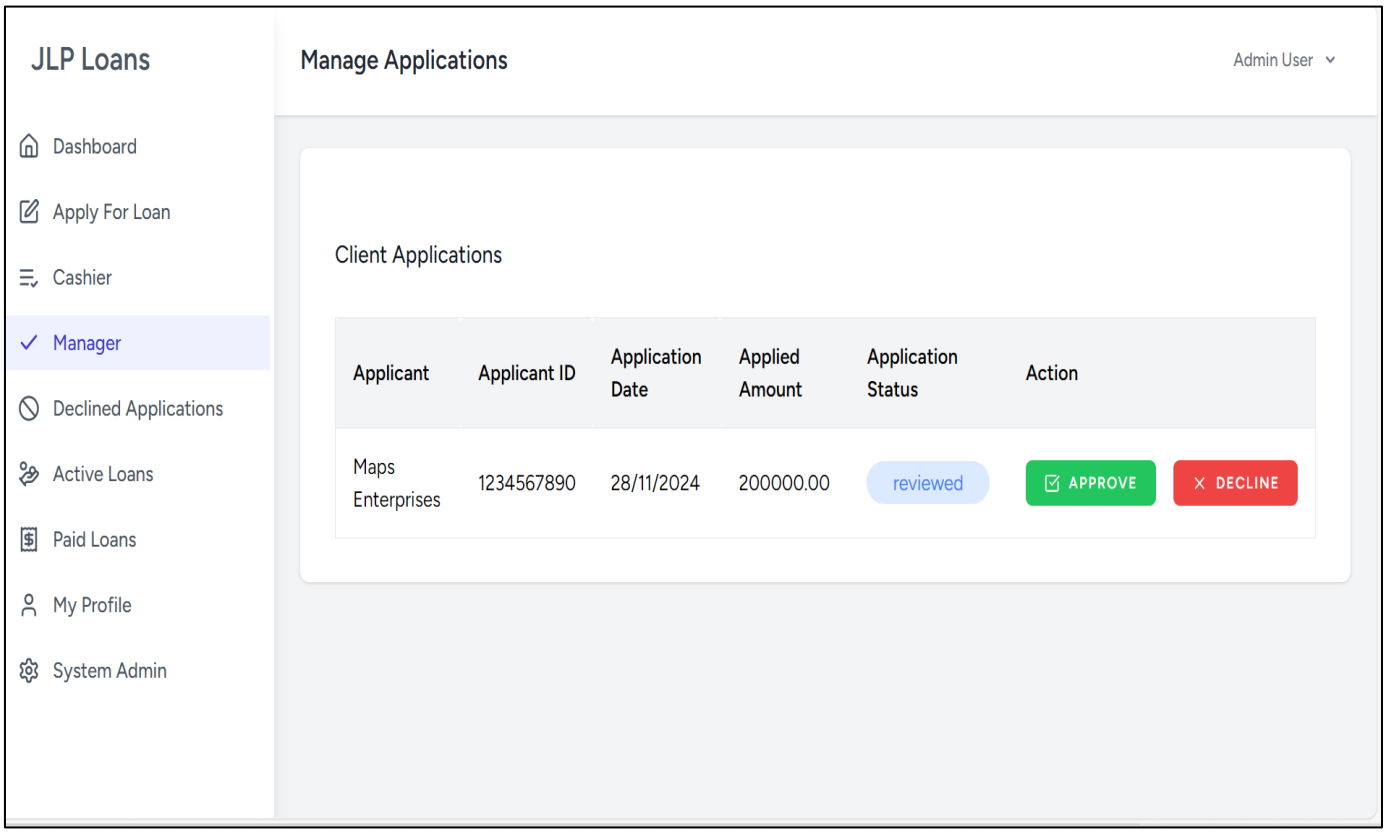

Fig 5: Manager Interface
Source: Author 2024

Fig 5 is the interface for the manager where he can approve or reject loan applications.

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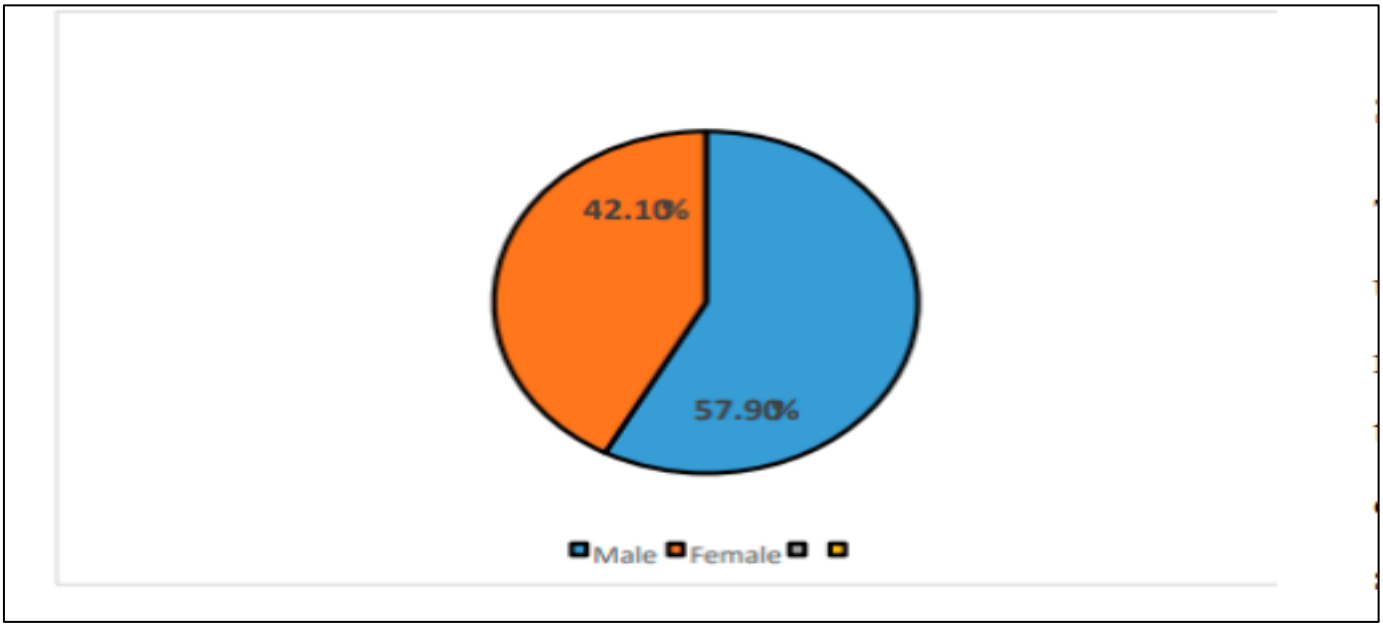

Fig 5: Sex of Respondents
Source: Justina Phiri

Fig 5 shows the respondents from the survey that was conducted. The respondents consisted of 57.9% male and 42.1% female. The distribution of different numbers in terms of responses was because of the purposive sampling method that was used to select the sample for the research.

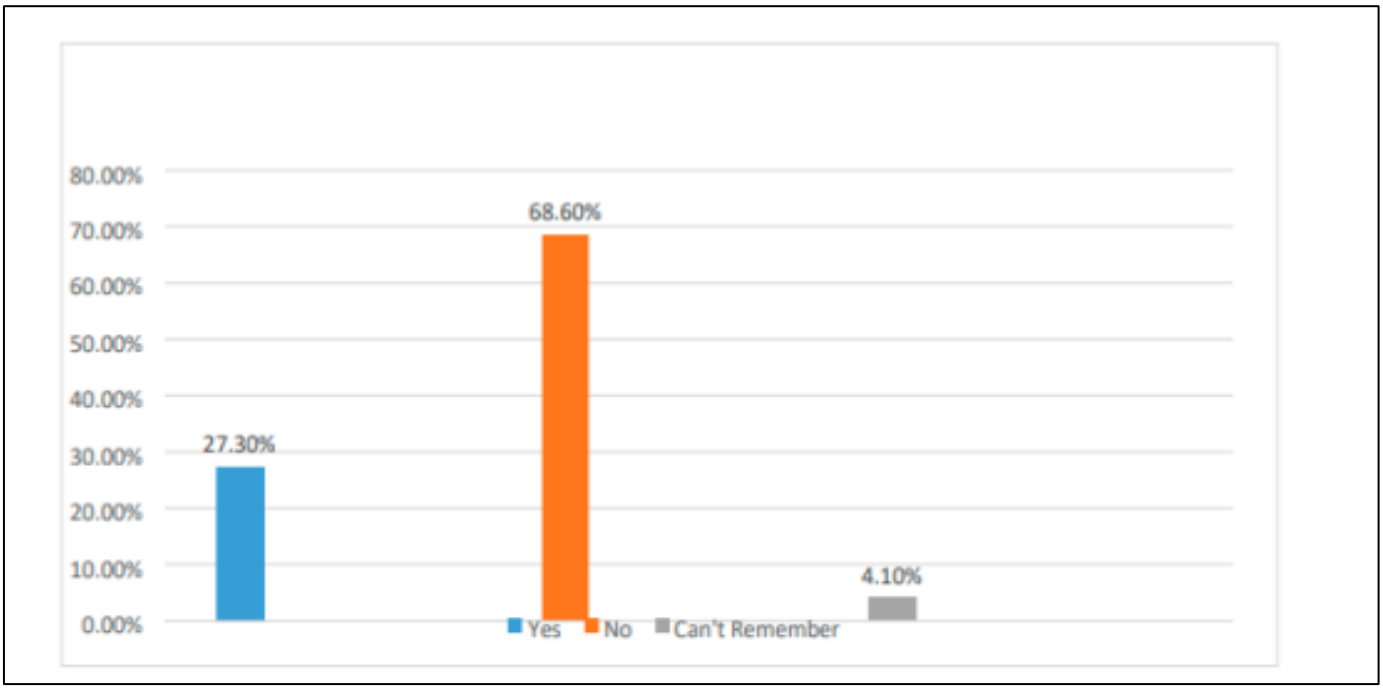

Fig 6: Graph of Respondents
Source: Justina Phiri

Fig 6 shows the graph of the respondents. The respondents were asked if they had ever used any ICT systems in their daily work of rending and credit management. 68.6% said they had never used any ICT systems in their daily work, 27.3% said they had, while 4.1% said they could not remember.

Figure 7: Responses in percentages on the awareness of the respondents of any Lending and credit management systems in Zambia.

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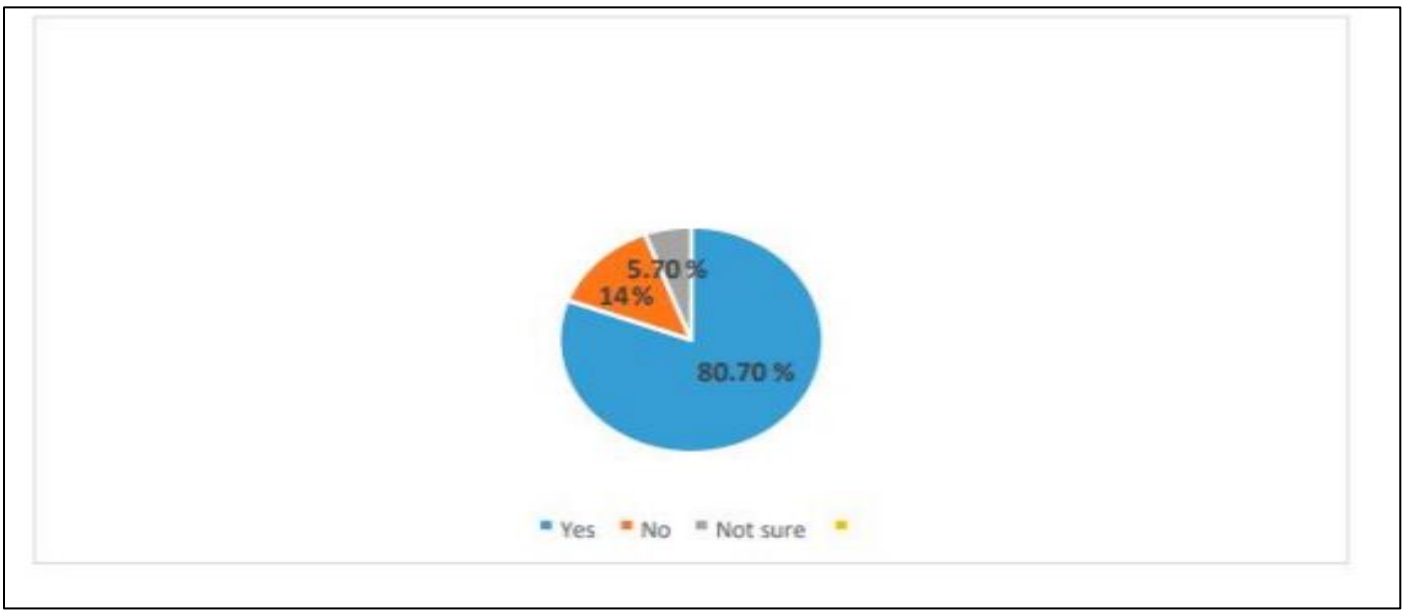

Fig 7: Responses in Percentages for Respondents Awareness of Online MFIs
Source: Justina Phiri

➢ *System Implementation Results*

(Ojo A., and Longe, O. 2017) define implementation as the stage in the project where there are several activities involved, while implementing a theoretical design is turned into a working system. The implementation phase constructs, installs and operates the new End user training. The officers will be imparted the necessary training on the new technology. End User training start after the implementation and testing is over. When the system is found to be more difficult to understand and complex, more effort is put to educate the end user to make them aware of the system, giving them lectures about the new system and providing them necessary documents and materials about how the system operates. Training of application software after providing the necessary basic training on the computer awareness, the users will have to be trained upon the new system such as the screen flows and screen design, type of errors while entering the data, the corresponding validation check at each entry and the way to correct the data entered. It should then cover information needed by the specific user or group to use the system.

IV. CONCLUSION AND RECOMMENDATION

A. The Baseline Study

Requirement analysis as explained by (Ahuja, P., & Kulkarni, P., 2014) is the most important and fundamental stage in SDLC. The researcher performed tasks by carrying out baseline study and the information was used to plan the basic project approach (Ahuja, P., & Kulkarni, P., 2014). The method used in fact finding were outlined.

B. Use of Technology

(Ali A., and Safi S., 2019) explain that to create a Web system, a huge set of rules and technology are used so that the website looks and function as you wish them to, and that the familiarization with web technologies help one to achieve it. The technological tools come down to knowing 3 main languages: JavaScript, CSS, and HTML. And while it sounds quite complicated, once you know what you are doing, understanding web technology and the way it works becomes significantly easier (Mailos: 2019). This system is designed to work on the following hardware and software configuration. DOS VER 3.0 or higher (it is recommended that the user use Ms –DOS 3.0 or a higher version. The program can work with disk formatted by any version of Dos. Processor: IBM Ps 12 all models, pc, at, xt and most IBM compactable and higher Output design: LCD, CRT, VGA, EGVA, MONOCHROME. Storage devices: 20MB and above (Higher capacities will be most Ideal). Memory requirement: At least 512kb base memory.

C. Development of the System as a Solution

The programming languages chosen for the development of the system are JAVA, CSS and HTML. The languages were chosen because it enables the creation of applications with a graphical user interface, containing controls such as text fields, combo box, labels, command buttons, (Sangeeta, 2016).

D. Comparison with other Similar Works

➢ *A Comparison with Manual Systems was Conducted and it was Found That:*

- It involves a lot of paper work during transaction
- It is inefficient, tedious and time consuming. This part consists of the methods used in evaluating the proposed system in terms of Accessibility, Accuracy and Efficiency. The availability of the specification should be identified with the proposed system if it is technically feasible or not. (Chakrabarty, K., & Khan, F.,2017) states that it is in technical feasibility where the researchers see to it that the new system can be adopted by the user. Operational Feasibility is the method of evaluation used to determine whether the proposed system is effective or

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not as explained by (Chakrabarty, K., & Khan, F.,2017). The proposed system will be tested and evaluated whether the software is fully functional. If the results of the evaluation are satisfactory, it is considered operationally feasible (Basu S., 2015). The proponents evaluated the operational feasibility of both the existing and proposed system through the following criteria: Accessibility. (Holton M., 2024) refers to accessibility as the ability of the system to be easily accessed and used by as many users as possible at any place and time.

- Accuracy. (Holton M., 2024) refers to accuracy as the ability of a system to give correct, exact and precise information to the user.
- Efficiency. (Holton M., 2024) defines efficiency as the ability to do something well or achieve a desired result without wasted energy or effort. Economic Feasibility. The proponent computed the system development cost to determine the expenses covered in the development of the system (Hulme, D., 2000).

E. Possible Application

Over the years Money lenders / Micro finance managers have had a problem in maintaining and managing their customers and their own records (Hulme, D., 2000). Management has become difficult because of issues that include:

- Data growth. Storing and maintaining all data manually is very difficult. The developed system can be used to store huge electronic data.
- Lack of computerized system. currently most money lenders / micro finance managers use the manual system in recording and maintaining their property and customers data
- Data security is not assured in a manual way, data is recorded on books / papers which may easily get damaged leading to loss of data. The developed system is secure and there is no security breach.
- There is no database to store information. potential of data loss or damage is very high because data is stored on tangible files. The developed system has a database which stores information securely.

Lack of these crucial requirements makes management of loan applicants very difficult. For these reasons the developed computerized lending system will have positive impact in the community: This project work is to design and develop a functional lending management and service maintenance electronic platform.

F. Recommendations

- MFIs should develop their systems in modular components (e.g., loan application, repayment tracking, reporting) to ensure scalability and flexibility. This allows for easy upgrades and additional features in the future.
- Microfinance institutions should Implement machine learning algorithms to assess credit risk based on historical data. This helps automate the decision-making process, improving speed and consistency.
- Provide borrowers with a real-time view of their loan status, including amounts owed, upcoming payments, and a history of previous transactions. This promotes financial literacy and self-management.

G. Summary

With the numerous advantages of computer systems over manual system in terms of speed, accuracy, organization, ease of update and timely and efficient report for managerial use, the new online lending and credit management system with its organization and structure will eliminate the problem of inefficiency in service delivery due to the use of manual systems. The MFI management will be provided with routine performance report of the organization for effective control and decision making.

H. Conclusion

Based on our research and design and development efforts, we have successfully designed and developed a lending and credit management system for the microfinance company in Zambia. The system is user-friendly, efficient, and can handle large volumes of data. We believe that the implementation of this system will significantly improve the MFIs lending and credit management processes, resulting in improved customer satisfaction and increased profitability. We also found that the incorporation of digital financial services, analytical tools can further enhance the efficiency and accessibility of the lending and credit management system. Therefore, we recommend that microfinance institutions in Zambia should explore the use of digital financial services such as mobile banking, online payments, and electronic record-keeping in its operations**.**

I. Future Work

Once the software has been "rolled out" and any necessary user training has been completed, it will be necessary to monitor the performance of the system over time to ensure that it is behaving as expected IX I would like to thank my Almighty heavenly father for the gift of life, strength sustenance and good health he has rendered to me during the course of doing my project.

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