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CREATING FINANCIAL INCLUSION FOR THE INFORMAL SECTOR AND SMALL AND MEDIUM-SIZED ENTERPRISES IN GHANA

THESIS

B.Sc. Management Information Systems

Munira Adam

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THESIS

Thesis submitted to the Department of Computer Science, Ashesi University in partial fulfillment of the requirements for the award of Bachelor of Science degree in Management Information Systems.

Munira Adam

2020

DECLARATION

I hereby declare that this [capstone type] is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:

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Candidate's Name:

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Date:

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I hereby declare that preparation and presentation of this thesis were supervised in accordance with the guidelines on supervision of thesis laid down by Ashesi University.

Supervisor's Signature:

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Supervisor's Name:

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Date:

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Abstract

The Informal sector of Ghana together with the Small and Medium-Sized Enterprises (SMEs) contributes the most to the Gross Domestic Product of the country. Many countries in sub-Saharan Africa rely heavily on this sector of the economy. Think of the street hawkers, shop owners, bus drivers, etc. These are the drivers of our economy. Alas, they are also the most poorly financed sector of the economy. For a sector that could be termed as the backbone of the economy, it is unfortunate that they are not equipped financially enough to continue to provide support to the economy. This paper focuses on the reasons for the poor financing of this sector. The most prevalent concern was found to be the poor record-keeping system that exists which makes it difficult for financial institutions to make decisions to give credit to them. Thus, this project seeks to solve the problem of poor record-keeping in this sector as a means to create financial inclusion for this sector of the economy.

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Chapter 1: Introduction

The economy involves all production and consumption-related activities [5]. This is directly related to goods and services made available and how the general public uses them for their benefit. Usually when the economy is mentioned, many think about “men in suits”, governments and other influential bodies. However, the economy is comprised of both the formal and the informal – thus, the “men in suits” and the street hawkers are both contributors to the economy of nations. The growing awareness of the size and influence of informal economies has led to the proliferation of research to explore the relationship between the two and their respective contributions to the economy. The following definitions by the International Labor Organization (ILO) should be understood.

i. The formal sector comprises employees that have recognized income sources or regular wages from registered institutions.

ii. The informal sector comprises the production and employment of unregistered enterprises [24].

In sub-Saharan Africa and many developing regions in the world, the informal sector contributes much more to the economy than the formal sector. This can be attributed to high illiteracy rates that do not make many fit for white-collar jobs in the formal sector [7].

From the table below, it is observed that a lot of developing countries can attribute more than 20% of their Gross Domestic Product (GDP) to the informal sector. As countries continue to progress economically, this percentage decreases as in the case of South Africa [26]. With its huge impact on the economy one might believe that it is supported enough to continually help improve the economy. Alas, this sector is also the most poorly financed in developing countries [6]

Table 1 : The Informal Sector as a Percentage of the Economy

Countries (years)	Informal sector as % of total GDP	Informal sector as % of non agricultural GDP	Size of shadow economy as % of total GDP 1989-90
Tunisia (1995)	20.3	22.9	45.0
Morocco(1986)	24.9	30.7	39.0
North Africa	**22.6**	**26.8**	**42.0**
Tanzania (1991)	21.5	43.1	31.0
South Africa (1995)	6.9	7.2	9.0
Sub-Saharan Africa*	**27.0**	**40.9**	
Philippines (1995)	25.4	32.5	50.0
Thailand (1994)			71.0
South Korea (1995)	15.9	16.9	38.0
India (1990-91)	32.4	48.1	22.4
Asia *	**27.7**	**37.3**	**45.3**
Mexico (1998)	12.7	13.4	49.0

Sources: Charmes J. (1999) : Informal sector, Poverty and Gender. A Review of Empirical Evidence, Background paper for the World Development Report 2001, Washington, The World Bank, 44p.
For the size of the shadow economy, see Schneider F. and Enste D. H. (2000), Shadow Economies: Size, Causes, and Consequences, Journal of Economic Literature, Vol XXXVIII (March 2000), pp. 77-114.

1.1 Background

In June 2017, the United Nations Development Program (UNDP) reports revealed that 90% of jobs in developing countries are created by the Small and Medium-scaled Enterprises (SMEs) and the informal sector. These areas were said to be major backers of poverty reduction and economic development. In the report, Barbara Pesce-Monteiro, Director of the United Nations (UN) and UNDP office in Brussels said, the development of SMEs is one of the principal solutions to the growth challenges faced by African countries. In the world's developing markets, about half of the estimated 400 million SMEs, still have unmet credit needs totaling US$2.1 to US$2.6 trillion [22].

Avortri et al stated in their study of the financial climate of Ghana that, due to the crucial roles played by the informal sector and SMEs in the encouragement of entrepreneurship, employment generation and producing quick returns, they have become the forefront of policy debates in developing countries and Ghana is no exception [6]. The significance of these sectors of the economy cannot be overlooked since they are not only

seen as a tool for economic development but also, as a force that can become a countervailing force against the economic power of larger enterprises.

If the informal sector and SMEs are indeed this powerful, why are they so poorly supported and funded? Banks in the financial sector play the role of provision of debt capital to SMEs and the informal sector. They do so by providing short, medium, and long-term loans and other credit facilities that will be essential in credit procurement. But can developing countries boast of the support of the financial sector in this field that has been proven to be a booster of economic progress? Quaye et al speak on the presence and nature of a "finance gap" for small firms and the informal sector [18]. Their findings revealed that small firms were usually under-capitalized unlike microenterprises and large firms. There happened to be a barrier to rapid development in the former sector due to a shortage of both debt and equity financing.

The causes of this gap in financing were said to include perceived high risks, lack of collateral, and poor information flow. With regards to poor information flow, SMEs and the informal sector do not publish the same quantity or quality of Financial Information held in larger firms. Information on their earnings, financial condition, and earnings prospects are usually incomplete or inaccurate. This uncertainty leads to the denial of credit even of firms that are credit-worthy but are unable to document it [28].

In trying to bridge the finance gap, this paper proposes an effective way the informal sector and SMEs can document effectively to merit debt and equity financing. The traditional way of record-keeping in books is still widely used in SMEs and the informal sector, there is hardly any form of record-keeping [1].

1.2 Research Aim and Objectives

Using a simple, digitalized, and automated form of record-keeping in the form of an Enterprise Resource Planning (ERP) tool, that documents cash flows and generates seasonal income statements in the informal sector and for SMEs could be a way to solve the crisis in

record keeping. Thus, this thesis aims to – ***investigate the role that Enterprise Resource Planning (ERP) adoption and implementation has in the informal sector and SMEs, in assisting these sectors to obtain debt and equity financing.***

With this aim in mind, the objectives of the project will include -

i. Investigating factors influencing ERP adoption and implementation in the informal and SME sector.
ii. Understanding other factors that contribute to obtaining finance for debt and equity.
iii. Using the knowledge obtained above to develop an ERP model that would potentially solve the documentation problem and grant finance to SMEs and the informal sector and observe its impact.

1.3 Relevance of the Study

It has been established that poor financing in the informal sector stifles the progress of economies in a lot of developing countries, particularly African countries. Among other factors, the issue of record-keeping is the most challenging to overcome [2]. If this issue is handled effectively and efficiently, the chances of obtaining credit from financial institutions by the informal sector will increase. Slowly other banes will be lifted. As the main setback of the informal sector is dealt with, their contributions to the GDP of the country will be more pronounced. Other benefits of a working informal sector and hence this research include –

i. Increase in employment. This sector employs 80% of Ghanaians [15]. An increase in employment improves the livelihood of citizens and contributes positively to the GDP of a country.
ii. Increase in innovation and productivity. Since a majority of the population finds themselves within this bracket, properly financing it would mean the nature of their work increases and improves. This will boost the cyclical nature of the

economy, increase standards of living, and economic growth. Oscar et.al on studying how some third world countries changed their trajectory and are now classified as first world, stated that they paid attention to the sector that fed their economy the most – the informal sector and this led to unprecedented innovation [4].

1.4 Outline of Research

After understanding the relevance and import of the study, this research will be carried out in five main parts. The first – an introduction, which has been expounded above. The second chapter would entail a literature review of previous work that might be useful in building upon this work. Insights and recommendations from chapter two would be built upon in subsequent chapters. Chapter three would entail the methodology of the project – the "how" of this work would be discussed there, including research methodology employed, sampling techniques, etc. The next chapter, (Chapter 4) would summarize the results of the work, and the research question will be answered there. The work would be brought to a close with Chapter 5 that would entail conclusion and recommendations.

Chapter 2: Literature Review

2.1 Introduction

There exists a plethora of research documenting the state of financial inclusion in Ghana and Africa as a whole. Various technologies have sprung up to help facilitate the inclusiveness of SMEs particularly in the financial space but not as much work done when it comes to the informal sector in developing countries [18].

2.2 Previous research work

Tagoe et al in a study of Financial Sector Liberalization in Ghana revealed that SME investor relations skills, record keeping, and provision of collateral improve SME access to formal credit [21]. Although these findings apply to the Ghanaian setting, they are not unique to the country. The study also revealed that many informal businesses in the country including cab driving and petty trading face the same problems particularly when it comes to record-keeping.

After establishing the significant roles SMEs have in the economic development of developing countries in terms of the creation of jobs, innovation of new ideas and contribution to the Gross Domestic Product (GDP), Affum-Osei's research proposes alternative means of financing the informal sector. Even though he does not rule out the role of financial institutions like the banks, he focuses on financing through an immediate network and then preparing to meet the requirement of formal financial institutions [3]. He also proposes a model to liberalize the lender requirement similar to the one that exists in Tagoe's study.

In assessing the contributions of the informal sector and SMEs in Ghana, Brako concluded that proper infrastructure and technological advancement will improve the sector and make it more appealing for credit and financing [7]. He proposed that existing Technologies are either too complicated or not useful enough for the sector. There was a need for a simple yet effective tool to be used by the sector.

By sampling 100 SMEs in the Accra, the Capital of Ghana, Avortri et al. revealed only 56% have ever tried assessing funds from financial institutions [6]. The low figure was due to the demand for collateral, the risk associated with loans, and other requirements they felt they did not meet.

Quaye and Quartey both studied how to bridge the finance gap that exists for SMEs and the informal sector. If the business. Landscape can be visualized as a pyramid; the finance gap is observed to exist for SMEs, unlike larger firms as seen in figure 1.

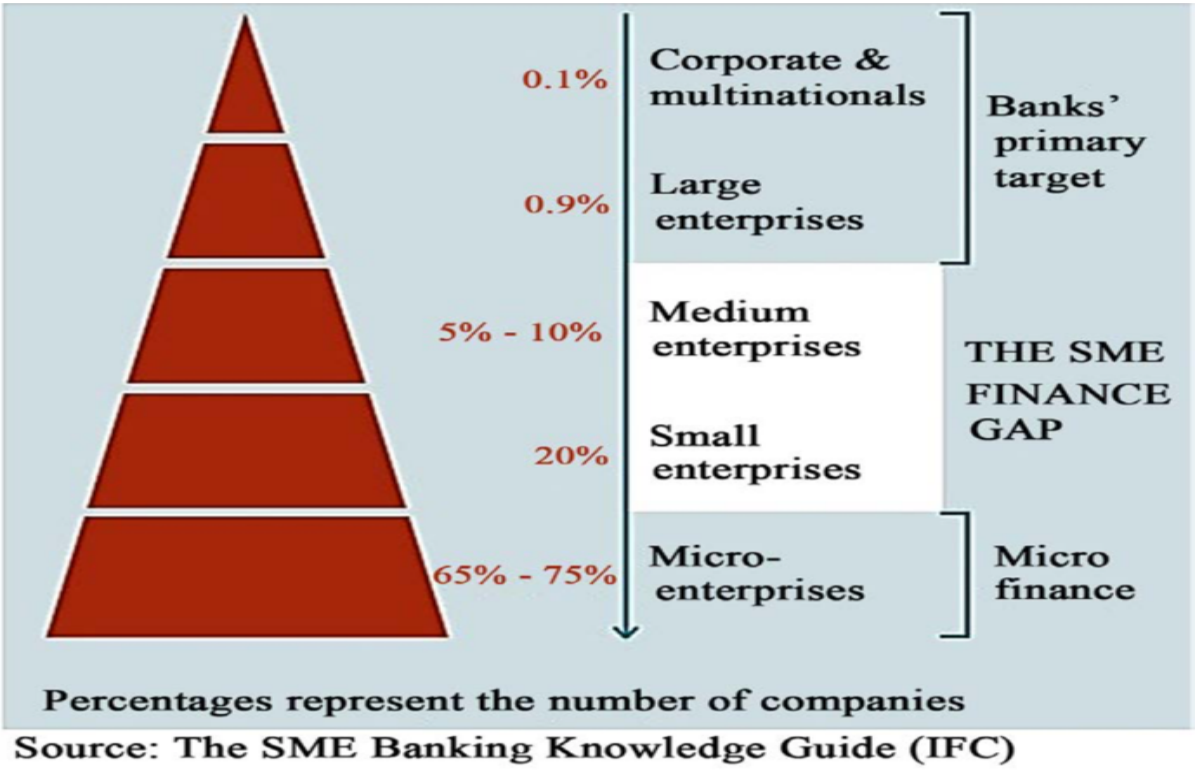

Figure 1 Composition of Business Structure Emerging Economies

The gap exists due to both the inability of microfinance to finance them and the fact that they do not meet the requirement of Banks especially when it comes to documentation and good recordkeeping. [18][17].

Agyapong presents a ranking of the criteria used in assessing SME loan application. The intended purpose of the loan was ranked as the most crucial factor in assessing borrowers. [28] Therefore, banks are interested in knowing that the intended purpose is

strictly adhered to. A recommendation that was made was that an efficient way of documenting and record-keeping is designed to make smaller enterprises and the informal sector more credit-worthy.

Ackah and Vuvor in their study of the challenges faced by SMEs and the informal sector in Ghana, revealed that inadequate finance was ranked the most crucial bottleneck to their development. Out of a sample of 100 SMEs, 74% of the SMEs ranked finance as the major constraint to their growth. The results reinforce previous work that details the challenges faced by this sector in Ghana [27] [18] [6].

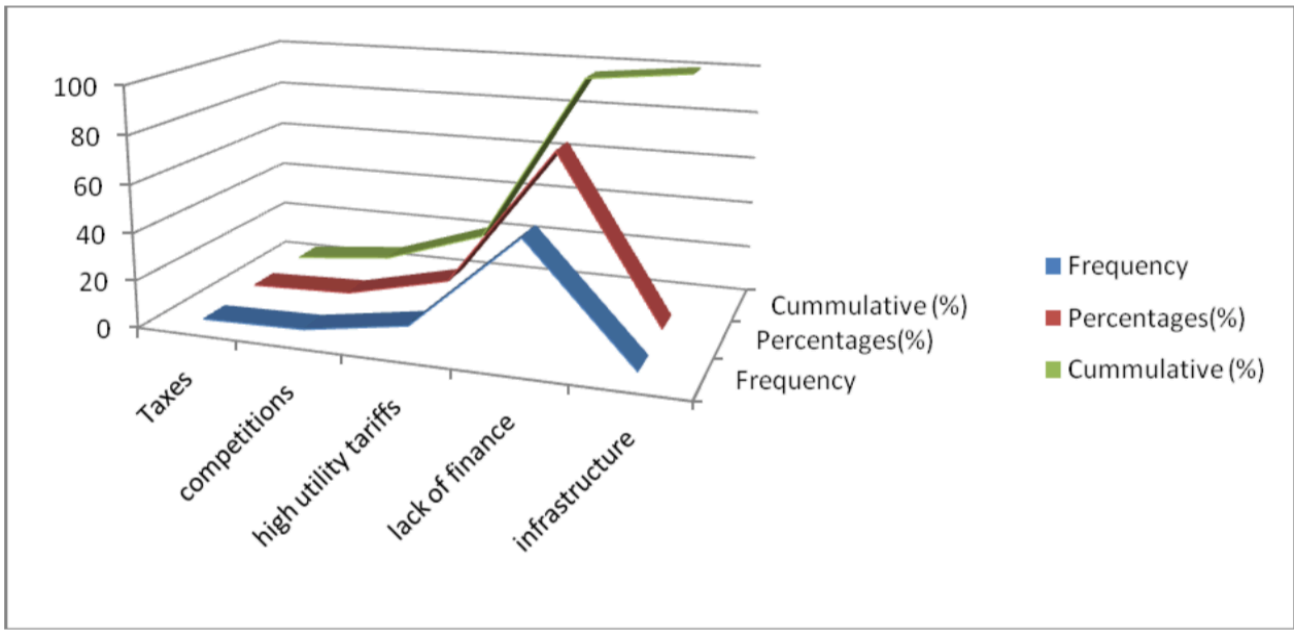

Figure 2 : Ranking of Challenges Faced by SMEs

The study also revealed that out of the number of sampled businesses, only 25% had sought and obtained credit as seen in figure 2.

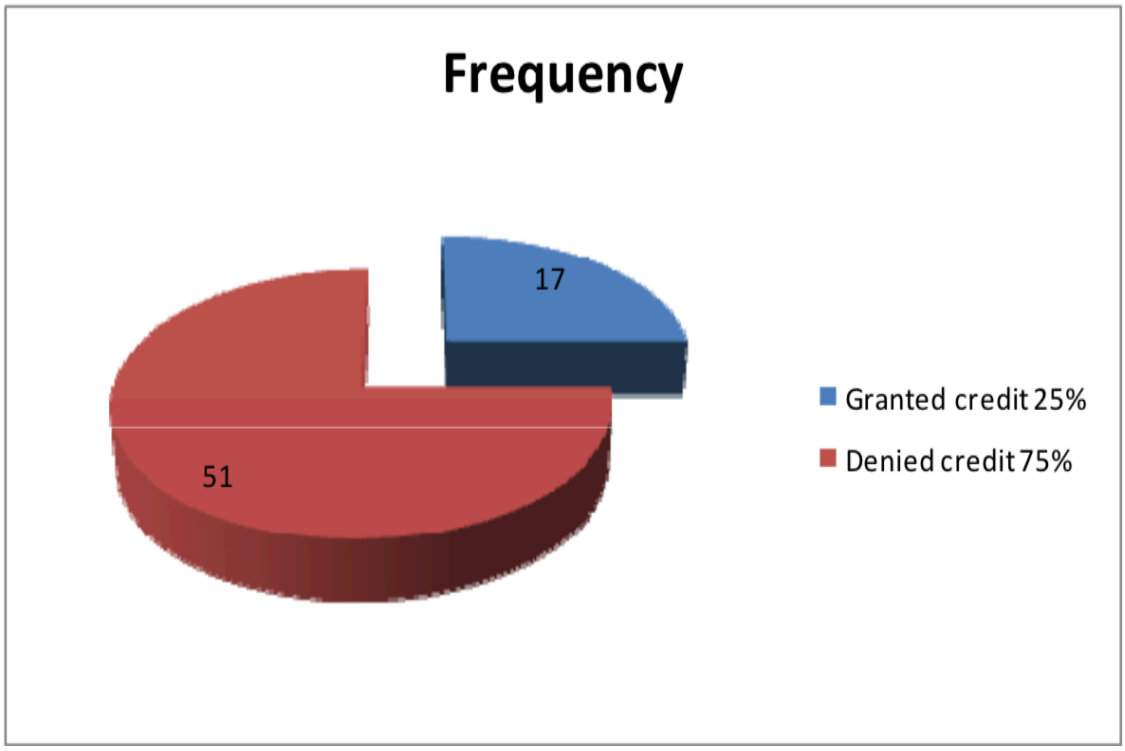

Figure 3 : Businesses Granted or Denied Access to Credit

Even though numerous factors accounted for these figures, the research was in line with the conclusion of previous work [1] [11] [21] that a good system of record-keeping would be beneficial for this sector of the economy and aid in credit acquisition.

In evaluating the performance of SMEs in India, a survey of 130 SMEs revealed that, 73% of the businesses with some form of a digital tool or ERP, performed better in terms of improving communication, keeping inventory and even obtaining credit [9]. This is supported by Mutongwa and Rabah who purport that, when effectively utilized, ERPs can simplify business processes and give people and organizations a cost-competitive edge [12].

A study in Tanzania proved a strong positive correlation between companies and persons who used some a tool to track cash flows and obtaining credit from banks [19]. Various studies have shown that there is a need for good record-keeping for SMEs and the informal sector in their journey towards credit acquisition. This study aims to develop a simple ERP system to aid this process, to consequently improve the credit-worthiness of SMEs and particularly the informal sector. Existing technologies are either too complicated

or not sophisticated enough and many of them have to be tweaked to suit various businesses[1]. A universal simple cashflow tracker would be useful not only for some SMEs but for the informal sector in credit acquisition. Thus, the gap this study seeks to fill is with regards to including the Informal sector in credit acquisition and developing a model that is found in the intersection of ‘’easy to use” yet useful. enough in keeping good records for credit-worthiness.

2.3 Existing Technologies in the Space

A myriad of technology exists today that are contributing to the financial inclusion space especially for SMEs. A lot of the tools that exist are based on ERPs. Due to the saturation of ERP’s in larger firms, ERP vendors are now exploring SMEs and smaller businesses. The issue is, smaller organizations have specific requests which create an adaptation problem [20][8]. Some technologies that exist within the space include the following:

i. **Shoeboxed**. Shoeboxed is an expense tracking tool that enables the easy tracking of receipts. It keeps business cards and eliminates manual data-entry operations. It generates automatic responses and emails alerting users of expenses. It is beneficial for personal use.

ii. **Abacus**. The abacus helps organizations to capture the financials of employees that relate to businesses. From travel accommodation, feeding and general maintenance from business trips. It makes the process of reimbursement easier by tracking all expenses made by employees, speeding up the process. It is also a great tool for the reconciliation of corporate credit cards and the implementation of expense policies.

iii. **Quickbooks**. This tool enables easy creation of invoices, management of cash flows, and keeps track of profits and losses. It can be connected to a banking app to facilitate expense tracking. What makes it stand out is its advanced billing

management tool. It makes it possible to set up recurring bills that might have been paid through other means including checks.

iv. **Gusto**. This documents company's payroll and payment of taxes and other obligations. It also manages inline employee onboarding. All new hire reporting, automatic tax deductions are digitized using Gusto.

v. **Wave**. Wave, being the closest to what this research seeks to achieve. It is a software for smaller businesses. It is suitable for independent business owners or sole proprietors with fewer than 10 employees. Wave tracks expenses, sales, manages invoices, customer payments, tracks payment of employees among others. It is compatible with Mac and PCs as well as android devices [13], [22].

With the availability of all these, a question might arise about why the Informal sector still has a problem with record keeping. Most people within that sector prefer to write what they make in a day on a piece of paper or in a book because it is less complicated, saves time and always available for reference [17]. However this method is not reliable, does not have longevity and proves futile when it comes to obtaining credit as banks doubt the credibility [3].

Another problem with these existing solutions is they are tailored for organized institutions in the formal sector, thus, they are too complicated for most people in the informal sector. This research thus seeks, to develop a simple, user-friendly tool to suit the demographic of the informal sector in Ghana and other developing countries.

Chapter 3: Methodology

3.1. Introduction

This chapter enlists the methodology and approach of the research. It includes the strategies and process to test the hypothesis – can a simple ERP increase the credit-worthiness of SMEs and the informal sector? The chapter is divided into four main sections. The first includes the kind of research approach to be used. Next, the research design which details the research methods, sampling techniques, data gathering and analysis. Without losing sight of the implementation and building of the ERP system itself, a section is dedicated to the methodology and architecture of the tool that was built. The chapter is concluded with a quick summary and challenges.

3.2. Research Approach

As stated in chapter 1, one of the aims of this paper is to understand the various factors affecting how the informal sector and SMEs obtain credit. Furthermore, the study focuses on understanding the correlation between technology and the credit acquisition process in the banking sector. These both require deep analyses and investigation into both sectors. For these reasons, the study used a **Qualitative Research** approach. The qualitative research approach or model is an approach used for exploring and understanding the meanings groups or individuals ascribe to certain problems [29]. This process involves emerging questions and procedures. Concerning understanding the common occurrence of rejection of financial support in this sector, this approach seems to be both helpful and essential. The research is focused on both the financial sector and the informal sector. Understanding the motivations of the banks in withholding credit as well as the pains and coping strategies of the informal sector and SMEs would both require some level of emersion and understanding. Thus, the qualitative research approach was chosen as appropriate for this study.

3.3. Research Design

The research design includes a framework of methods and techniques to combine various components of the research in a reasonably logical manner. This study includes both an **Experimental Design and Phenomenological Interpretivism.** The experimental research design is used to establish a relationship between the cause and effect of a situation [25]. It deals with the relationship between an independent and a dependent variable. For this study, since the analysis would be on trying to figure out the relationship between a simple record keeping ERP system and the potential for credit. *Is credit-worthiness reliant on having a digitized record-keeping system?* Essentially, credit-worthiness is the dependent variable whereas the recordkeeping ERP is the independent variable. In the technical field, experimental methodologies are used to evaluate new solutions for problems. It is often divided into two phases an exploratory phase in which questions about the system under testing are asked and then an evaluation phase where these questions are answered.

For phenomenological interpretivism, a naturalistic approach of data collection such as interviews and observations are used. The subsequent sections will elaborate on data collection techniques to be used. The major advantage of this type of design is that, primary data generated via interpretivism studies are associated with a high level of validity because data in such studies tend to be trustworthy and honest [12].

3.3.1 Data sources

Data exists in two main forms in terms of research, primary data and secondary data. Primary data includes first-hand data collected whereas secondary data is from literature and past research. For this study, primary data was relied on heavily. This is to facilitate the validity of data. Further, the nature of research design, being interpretive and an experiment would require data subjects to give data that would be relevant and provide new

perspectives. This is not to say secondary data was not implored. The structure of the data collection techniques would be based on secondary data from previous research.

3.3.2 Sampling

Data subjects were chosen through a non-probabilistic approach known as **purposive sampling**. In purposive sampling, subjects are chosen based on certain characteristics they possess. It is important data subjects are chosen carefully in this study to derive true results. The data subjects for this research are divided into two main groups – the financial sector, and the informal sector and SMEs. For the informal sector, 8 different groups of people would be sampled with two participants per group making 16 in total. This number has been proven to be a good average when sampling groups of people [10]. These groups included typical cases that have applied for some form of official support but not limited to them. The kind of purposive sampling used was typical case sampling where a particular trend that relates to all groups (i.e. need for credit) would be studied.

For the financial sector, purposive sampling was used again for banks that had specifically been contacted for credit, the requirement requested and why there was a decline. This method of sampling is desired to produce the best result and be representative of the populations to be studied.

Sample Population in Financial Sector

Purposive sampling was used for these as stated earlier. The description and reasons for selection are listed in table 2 below.

Table 2 : Sample Population from Financial Institutions

Bank	**Description and Purpose for Selection**
Ecobank	Ecobank is the leading regional banking group in West Africa and has launched many projects including the Omni-lite Digi banking app for the informal sector. Thus, they are doing their quota to improve financial inclusion.

Fidelity Bank	Fidelity bank is a commercial bank in Ghana. Recently it launched a project dubbed “Leaving no one Behind” geared at improving financial inclusion for SMEs and the informal sector.

Sample Population for Informal sector (Data Subjects)

The selection of data subjects as mentioned earlier was done purposively and intentionally. In trying to diversity, the sample, the selection was done from people representing 8 different jobs in this sector. We ended up with a total of 16 participants with a minimum of 2 for each field.

Table 3 : Demographics of Informal Sector Data Subjects

Names	Field of work	Business focus
1. Bediako Philp	Bus owner	Philip owns two buses that operate on the Madina-Aburi road. His drivers give him a daily breakdown of sales via text
2. Akosua Sereboo	Dressmaker	A self-employed seamstress who rents a shop for business. Married with three kids. She has no means of keeping record of her sales.
3. Amina Amadu	Dressmaker	Amina sews clothes mainly for kids in a shop at Madina. She takes a record of her daily sales by writing them in a notebook.
4. Aberantie Ofori	Bus Owner	Ofori owns three buses that operate on the Madina-Adenta road. His drivers give him a daily breakdown of sales via text

5. Musa Ibrahim	Shop owner (provision)	Musa has a shop in Madina, he obtains his goods sometimes on credit and sells in the same manner. He has no record-keeping tool.
6. Makafui Awuku	S.M.E	Makafui runs a small social enterprise that has an environmental advocacy wing.
7. Khadija Buabeng	Shop owner (Provision)	She has a shop in Madina and another in Kantamanto. She keeps a receipt book and that is her form of record keeping.
8. Selorm Mansah	Mechanic shop owner	Selorm owns a mechanic shop with 4 workers who report to him daily on work via text or calls.
9. Nana Kwame Koranteng	Ice cream vendor	He owns two bicycles he uses to sell icecream in neighborhoods. Does not keep record of sales.
10. Bernice Agyare	S.M.E	Bernice runs a small business that makes palm oil and palm wine for local consumption. She has no means of record keeping.
11. Fatima Diallo	Head potter	Fatima a head potter from the Northern part of Madina works daily for her maintenance and makes enough to send her family mobile money weekly. She does not keep track of her earnings.
12. Akosua Frimpong	Mobile Money vendor	She owns a mobile money and airtime kiosk at Zongo junction at Madina. She documents her earnings in a notebook.

13. Ingus Narttey	Mechanic shop owner	Narttey owns a mechanic shop with 6 workers who report to him daily on work via text or calls.
14. Farida Boateng	Head potter	Farida a head potter from the Northern part of Madina works daily for her maintenance and makes enough to send her family mobile money weekly. She does not keep track of her earnings.
15. Kwaku Abusuah	Ice cream vendor	He owns a bicycle he uses to sell ice cream in neighborhoods. Does not keep record of sales.
16. Barima Offei	Mobile Money vendor	Ofori also owns a mobile money and airtime kiosk at Zongo junction at Madina. She documents her earnings in a notebook.

3.3.3 Data collection techniques

Data collection methods of qualitative research were used in this study. Particularly interviews, focus group discussions and surveys. Primary surveys were conducted for the financial sector to ascertain data collected from secondary research. During this process, representatives from two major banks in the country – Fidelity Bank and Ecobank were contacted. The purpose of this survey was to ensure that data received from the secondary research were verified. Questions from this survey are found in the appendix of this paper. From the surveys, the loan application process was detailed. It was ascertained that indeed, record-keeping was a huge bane for the informal sector to gain credit because it is proof that they can payback. Both banks confirmed this.

Interviews were the main tool used for data collection. The interviews were unstructured to facilitate getting as much from participants as possible. The purpose of the

interviews was to explore the experiences of people in the informal sector who have sought financial assistance in any way prior to using the technology to be designed. Some participants who had never sought for loans were not left out. It was important to capture what their fears may be and why they are hesitant to apply for loans.

Data analysis from the initial conversations revealed the following about our data subjects.

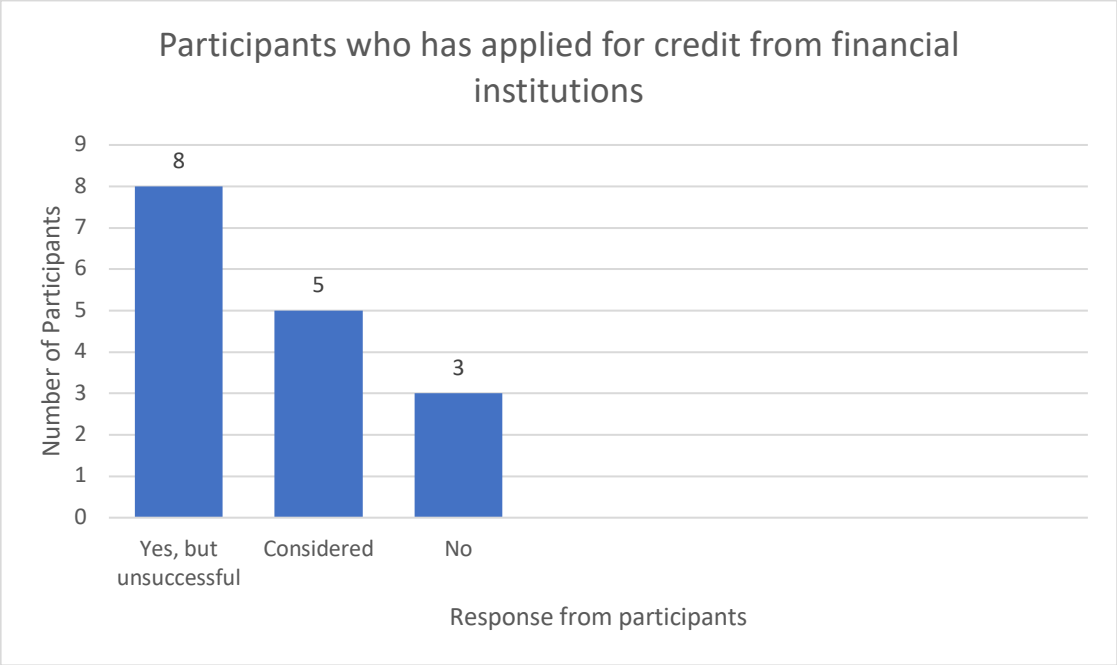

Figure 4 : Participants loan status

The primary interviews revealed that half of our participants had applied for some sort of credit from financial institutions, many had considered and the few that said no claimed it was because they knew they would not be successful.

The interviews also helped in diving deep into the requirements of the financial sector and the feasibility and significance of a technology to aid record keeping. Interviews and focus group discussions were held before the introduction of the ERP and after. This is to track the impact of the tool and aid in answering the research question posed. Findings recorded before and after are documented in the subsequent chapter of this paper.

3.4. Architecture and Design of ERP

Business processes can be very complex. Thus, in many cases, analysis cannot be done directly on real-world applications. Modeling requirements of an ERP aims at reducing the complexity of the reality to better understand business processes and their requires software support [30]. This requires Modelling methods or methodologies for systems, especially ERPs. The Unified Modelling Language (UML) and Integrated Definition for Process Description Capture Method (IDEF) have become popular in industrial and academic circles with regards to designing and modeling systems [23]. While UML can be used to generate computer-executable models that encode key aspects of software engineering projects, IDEF comprises a suite of graphical modeling techniques designed to formally specify and communicate important aspects of systems and ERP projects [16].

Generally, both the IDEF and UML can be used to model almost any useful view of a business. However, the IDEF has around 30 years of development while the UML is a young modeling language as compared to the IDEF [14]. This research makes use of the IDEF approach in modeling the ERP software to be used in the thesis.

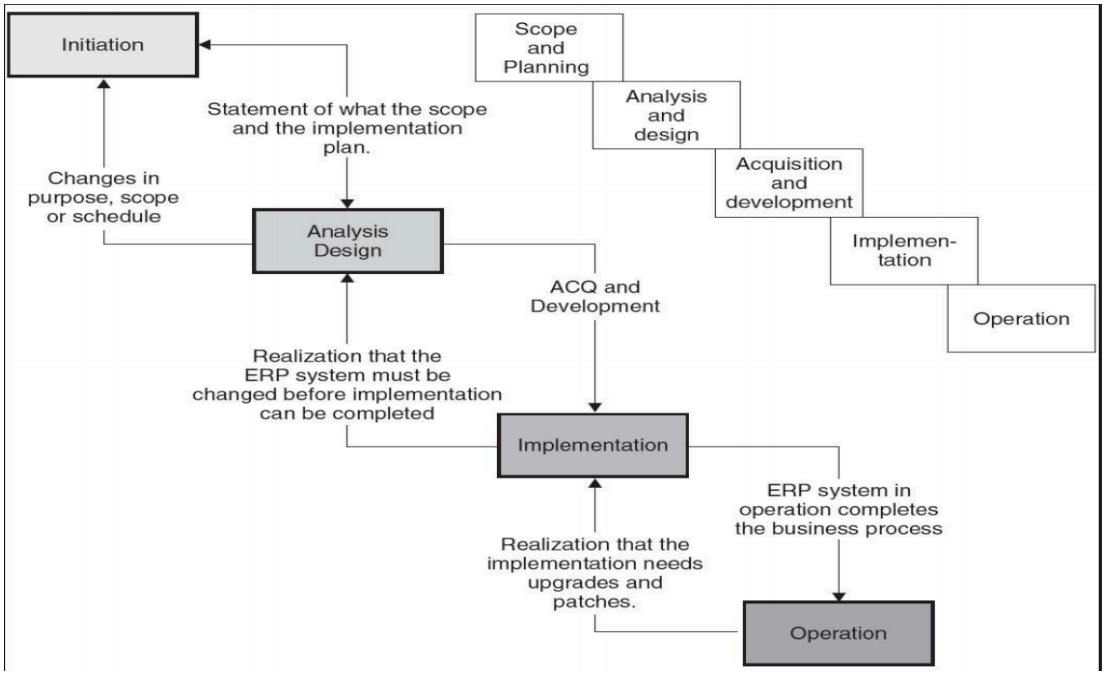

Figure 5 : ERP development lifecycle

Per figure 5, the following steps were taken at each stage of the development cycle when building the record-keeping tool.

i. **Initiation.** This is the first step in the process that involves setting a scope and planning. Planning for the development of the tool involved gathering requirements from both the financial institutions and data subjects on the primary functionalities. After this process, a scope was developed, and a schedule laid out for the development.

   - The tool had to aid in daily record keeping or weekly.
   - It needed to be very simple and easy to use by the people in the informal sector as most of them had not attained a high level of education.
   - Over 90% of participants used an android device, hence the development was done in an android environment.

ii. **Analysis and Design.** After the plans were made with information from the two parties involved in the research, a design for the development was created. A prototype was created and shown to the participants for feedback. Find a few images from the prototype which was shown to the participants for their consideration.

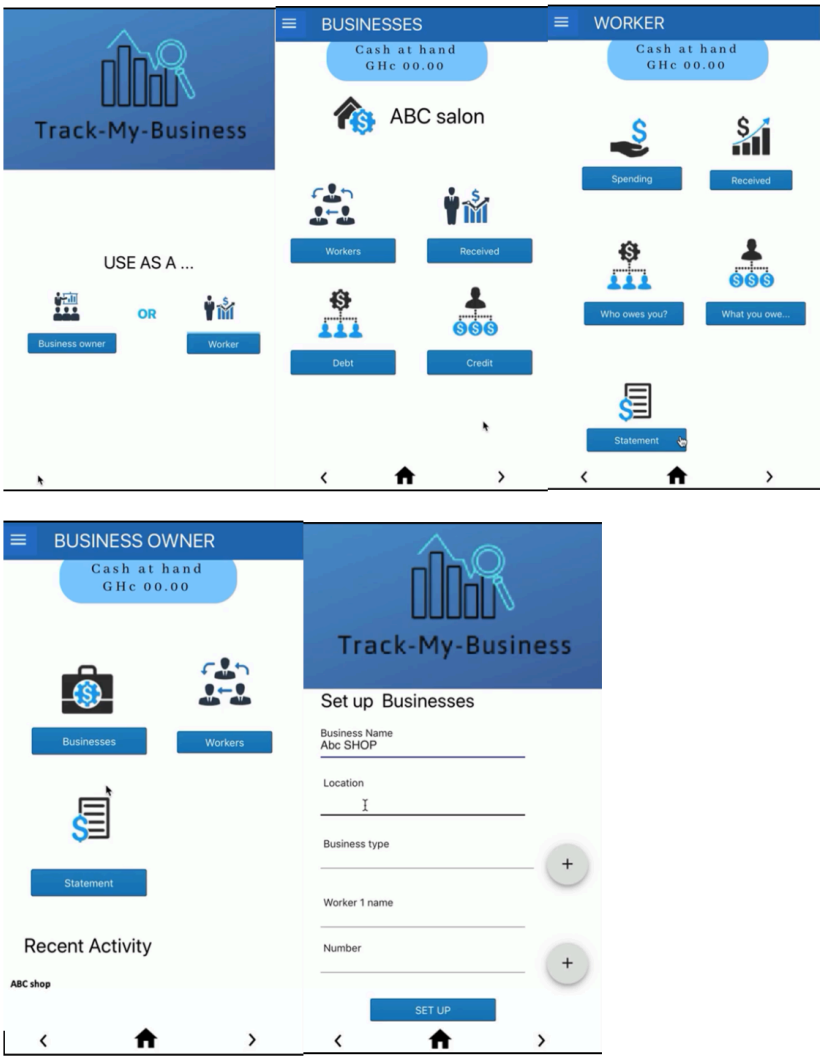

Figure 6 : Snapshots from Prototype

This prototype was created using Framer, an efficient prototyping tool. Data subjects had the opportunity to assess the prototype and assess functionalities. After approving, development began. The process of development was iterative as shown in the cycle. Hence participants were fully involved at every stage.

High-level IDEF Physical Model for the ERP

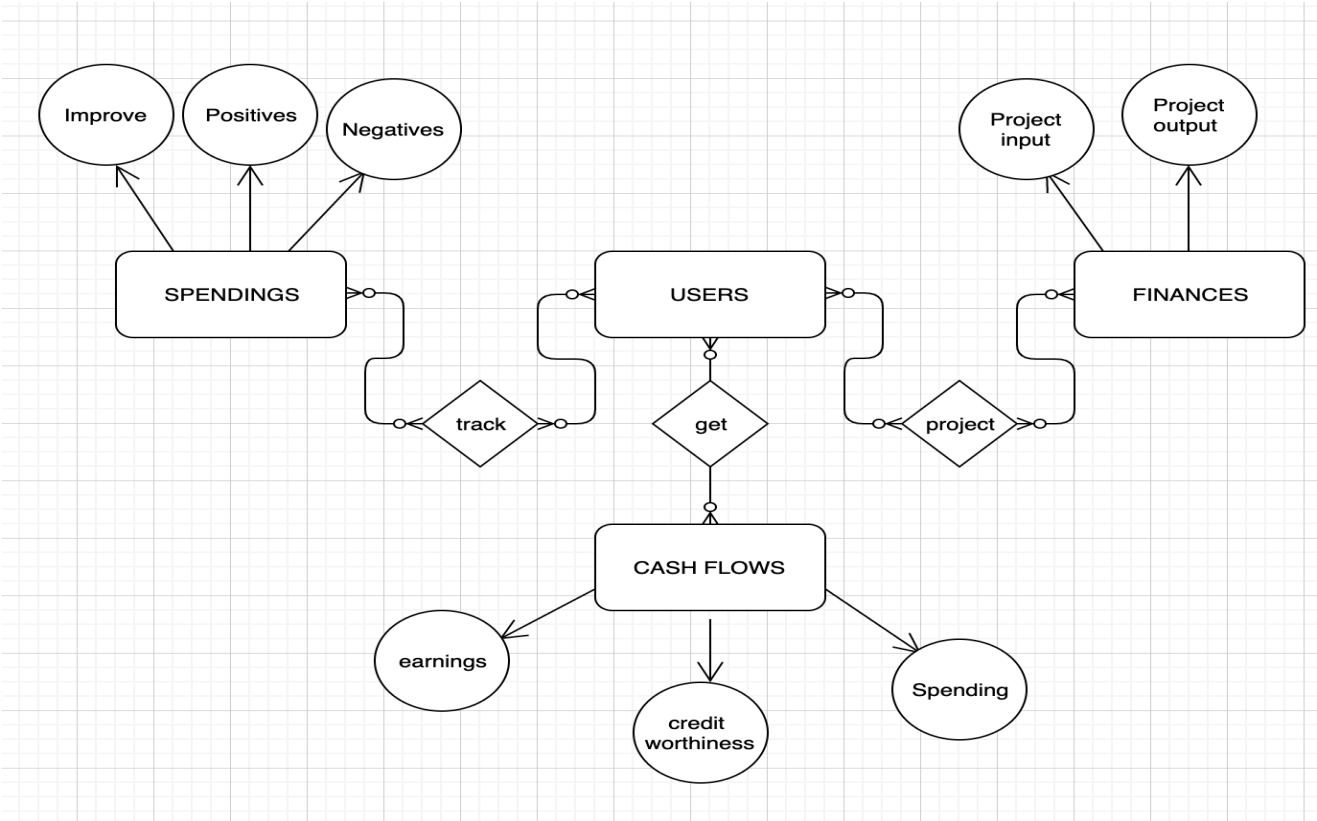

Figure 7 : High-level IDEF Physical model for the ERP

The prototype showed the user interaction of the model. However, a simple IDEF was used to determine its functionalities for development. From figure 7 above, users would be able to track their spending and get cashflow statements. They can also measure areas that need improvements or take advantage of their major income streams. All this would be documented to ensure that they are on their way to credit-worthiness. Short reminders would be made available to remind users to make necessary inputs.

iii. **Implementation.** The implementation was done using android studio. The decision to develop in android studio was informed from a focus group discussion with data subjects mentioned earlier. The three-tier architecture was implored in building the tool. This comprises the physical layer, application layer and database layer.

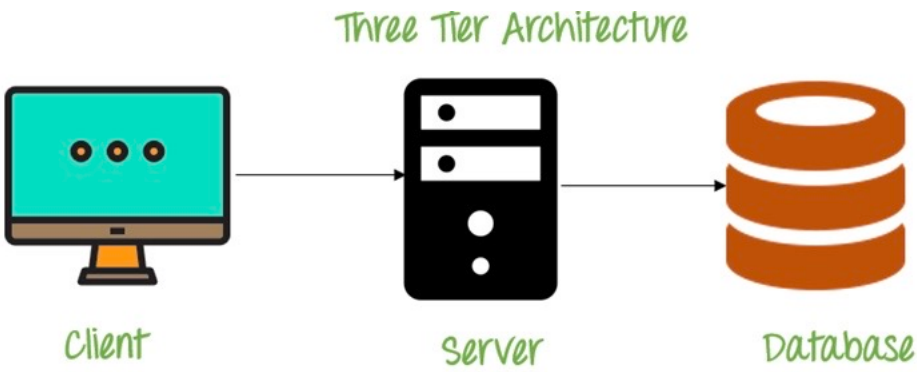

Figure 8 : Three-tier architecture

The **first layer** as observed from figure 9 comprises of the interaction the tool has with the clients, what they see and the ease with which they can communicate with it to achieve desired results. The application layer for the tool was done using Extensible Mark-up Language (XML). XML is a language that has a set of rules for encoding documents that can be read by both humans and machines. XML being in-built in android studio, facilitated an easy build of the presentation layer. Below are two snapshots showing the presentation layer of the application using an android emulator in android studio. An emulator is a virtual android device that helps in testing.

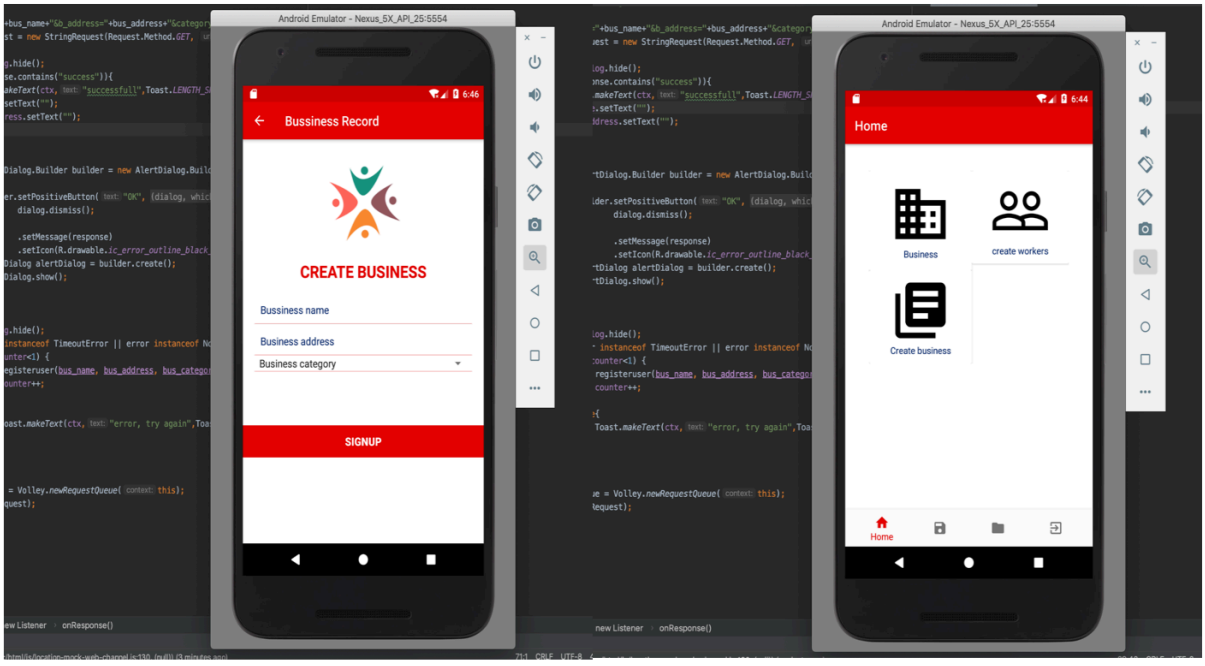

Figure 9 : Snapshots from the presentation layer

The **second layer**, the application tier is also referred to as the logic layer. For this layer, java was used. It contains the business logic that supports the application's main functions. All basic functionalities were defined in this layer and encoded in java. Below is a snapshot of some processes.

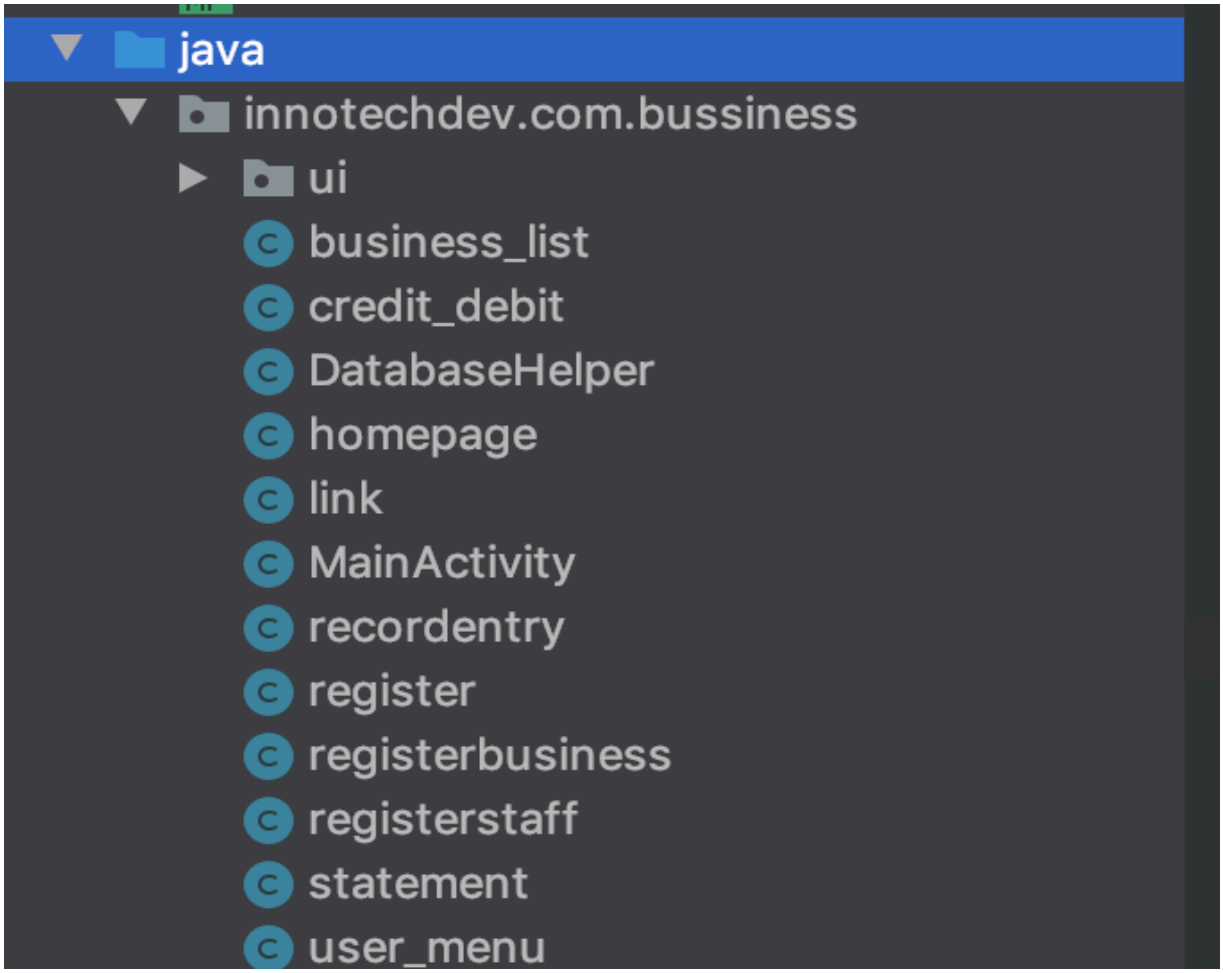

Figure 10 : Snapshot of app processes

The **Data-tier** consists of databases that store created data and make it available for retrieval. It can also be referred to as the storage layer. For this tier, Mysql was used and all data stored in the cloud. After all the development was done, there was **testing** to check the correctness and functionality of all the components built. Unit testing – testing each section as it was built and well as component and system testing were done. This was to ensure all main sections and the entire system run without faults and fulfilled the requirement set out by the data subjects.

iv. **Operation.** There was a six-week period set aside for operationalization. A link to the application was generated so it can easily be shared with data subjects for use. They were then led through a few steps to help them install the application on their phones. After the installation, they began their daily record keeping routines on the app. The first week was a pilot week as many had questions and needed some tutorials on the use of the product. Thankfully by week two, all data subjects were well acquainted with the software.

3.5 Summary and limitations

This methodology details how the research was carried out, from the experimental design which was used, to the choice of sampling and justifies the choices made. It also gives a high-level account of how the system was implemented. All this in a bid to test the hypothesis of the research. A few identified challenges of the methodology were time constraints, the willingness of ready participants and the accuracy of information from all participants.

Chapter 4: Results and Findings

4.1 Introduction

The previous chapter details how the project was carried out. Focus group discussions were held before the introduction of the business tracker and after. The sample population has a period of six-week to use the tool and its effectiveness was assessed. This chapter answers the research questions posed initially – will this tool help in increasing the credit-worthiness of the informal sector? What would its contributions to financial inclusion be? The chapter takes into account the effect of the tool on the participants and its effect on players in the financial sector.

4.2 Adjusting to the Tool

Research participants had a period to test and use the application. At the end every week there was a check-in to assess the impact of the tool. The first week was for adjustments as the participants were new to the technology. All calls and concerns were addressed accordingly. For some participants, there was the need to manually install the application on their phones and run them through its operation. When all participants were well acquainted, weekly check-ins began.

4.3 Weekly check-ins

As mentioned above, these were to ensure that all participants are using the tool to fulfill its objectives. It was also a good time to address any challenges faced by them.

4.3.1 Week 1 check-in

Again, check-in questions are located in the appendix of this paper. At the end of the first week, participants were conversant with the application. However, there was a conversion challenge that was noted. Many participants still resorted to manually typing their daily spending as they were used to this way. The switch needed to be gradual. In figure 11 below, we notice that over 70% of participants were still using their old means of recording keeping by week 1.

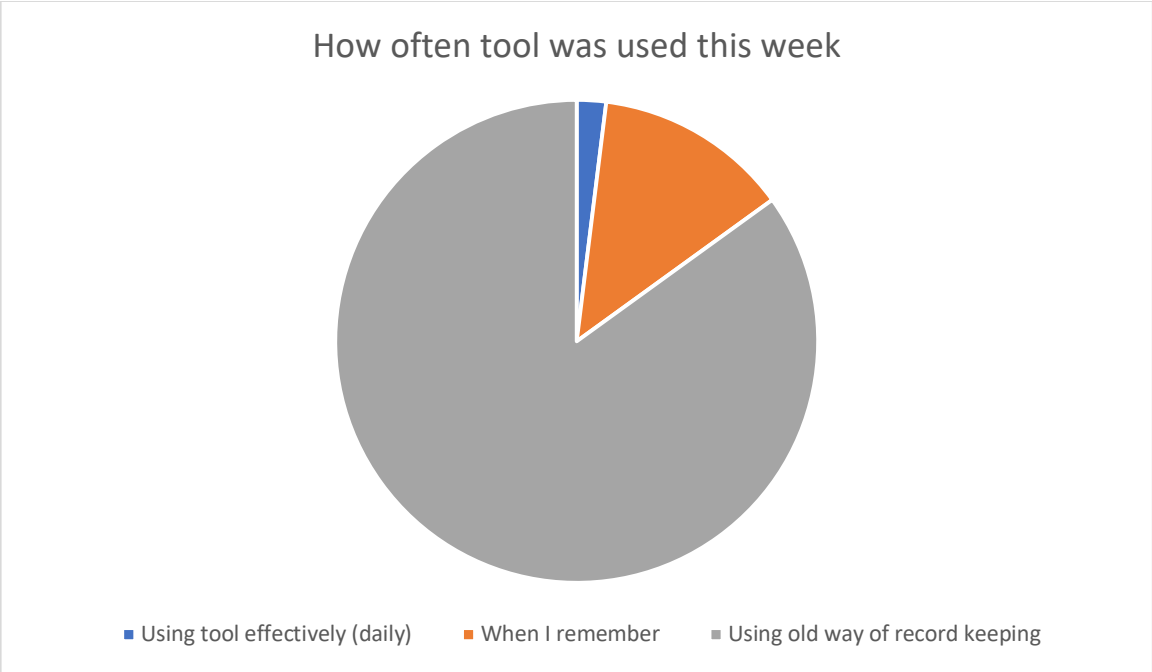

Figure 11 : How often the tool was used

This information was useful to note because, a high frequency of use would provide more accurate results in the financial projections which would in turn affect decisions of backs in giving credit. Thus, there was a need to encourage the data subjects to be diligent in inputting data. The focus of week one was to ensure the tool was in use.

4.3.2 Week 2 check-in

The main focus of week two was to ensure that data being put it the business tracker was accurate and to see to challenges faced by data subjects addressed. The percentage of use this week increased from 2% to 57%. The leap can be attributed to a lot of encouragement and an incentive (reward system) for the participants who interacted with the tool the most every week. Even though this figure increased, it was not quite what was expected yet.

4.3.3 Week 3 check-in

After increasing user engagement to over 80% in week three, the focus shifted to satisfaction and contentment of the tool. Its effectiveness, changes that could be suggested

among other issues were sort and addressed. Figure 12 captures the usefulness of the software.

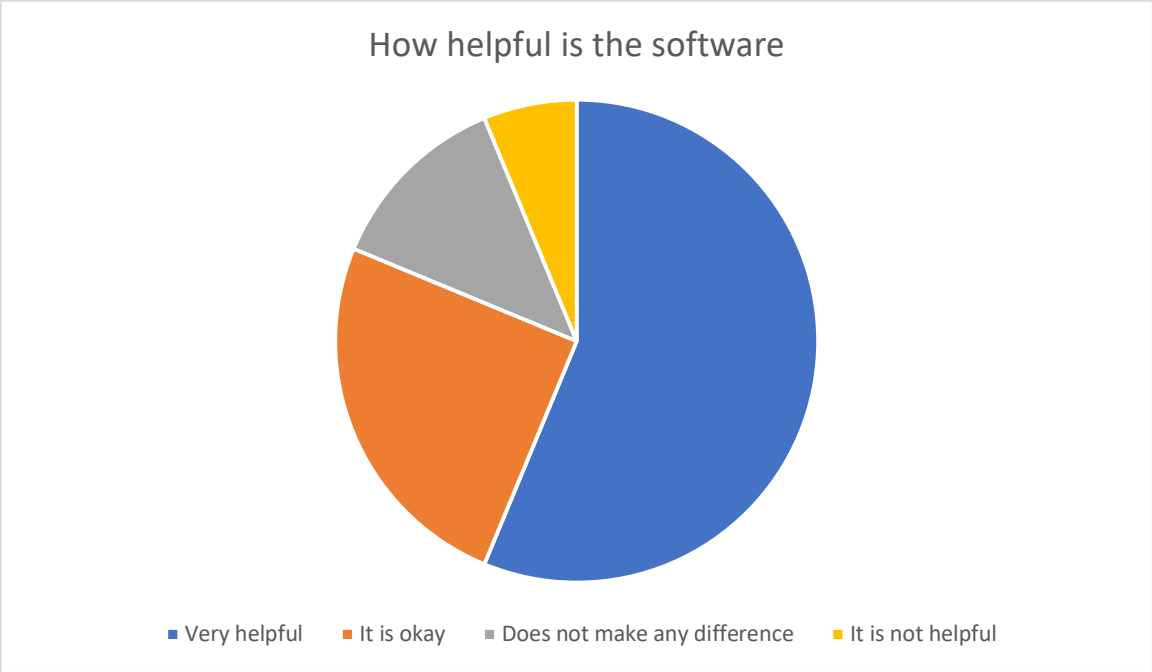

Figure 12 : Usefulness of the tool

At this point, all participants were familiar with the software. From figure 12, it is observed that a higher percentage found it useful when asked *"why?"*, these were some of their responses-

i. "It is very simple to use"

ii. "I see what my mechanics make daily"

iii. "All my businesses are here, workers do not have to call me every day to tell me"

iv. "I am beginning to like it more than writing down responses"

v. "I like seeing the sum I make daily increase"

The most popular response being, a liking of its simplicity. This week however, it was observed that, while the informal sector found the tool mainly helpful, the two SMEs opted for more functionalities as they performed more duties. This insight led to the realization

that, the needs of these two groups of people were different. Questions that arose included, how can this tool remain simple enough for the informal sector but sophisticated enough for the SMEs to gain its optimum use.

4.3.4 Week 4 check-in

This week and the weeks that followed focused on listening to insights, feedback, questions and attending to the needs of data subjects efficiently. It seemed the tool had become popular among them. Some of the population, mentioned wanting to recommend the tool to others.

Unfortunately, in this very same week, as numbers and engagement seemed to move in a positive direction, the country was hit with an unfortunate plague that tempered with work in this space. A full insight on the effect of the COVID-19 pandemic on the research is highlighted in chapter 5 of this paper. As engagement slowed down this week, subsequent check-ins become daily routine calls. Half of the data population found themselves home as a result and the remaining half had businesses slowed down and income plummeted.

4.4 Impact of Use on the Sample Population

Even though, the frame to test the effectiveness of the tool rested heavily on how well it was integrated into the businesses of the data subjects. They seem to be sure of its positive impact on their record keeping. Below show details of some questions asked to the remaining sample population after the test period.

1. Are you confident enough to apply for a loan now?

This was targeted at those who had never applied for loans since they believed they would not get it. They reported after using this tool after a short while that, they have discovered a new confidence in walking to a bank. They felt they knew their businesses better now. They felt more connected to it and were thus, more willing to seek financial help for it. In figure 13 below, it is observed that over 80% felt positive.

Figure 13 : Apply for a loan in the future.

2. Has this improved your record-keeping?

Record keeping being the main function that was being tested. It was imperative to know from the data subjects how they perceived the tool in helping them achieve this aim. This question also found out if the subjects who still used the manual book-keeping method will continue to do so after interacting with this tool.

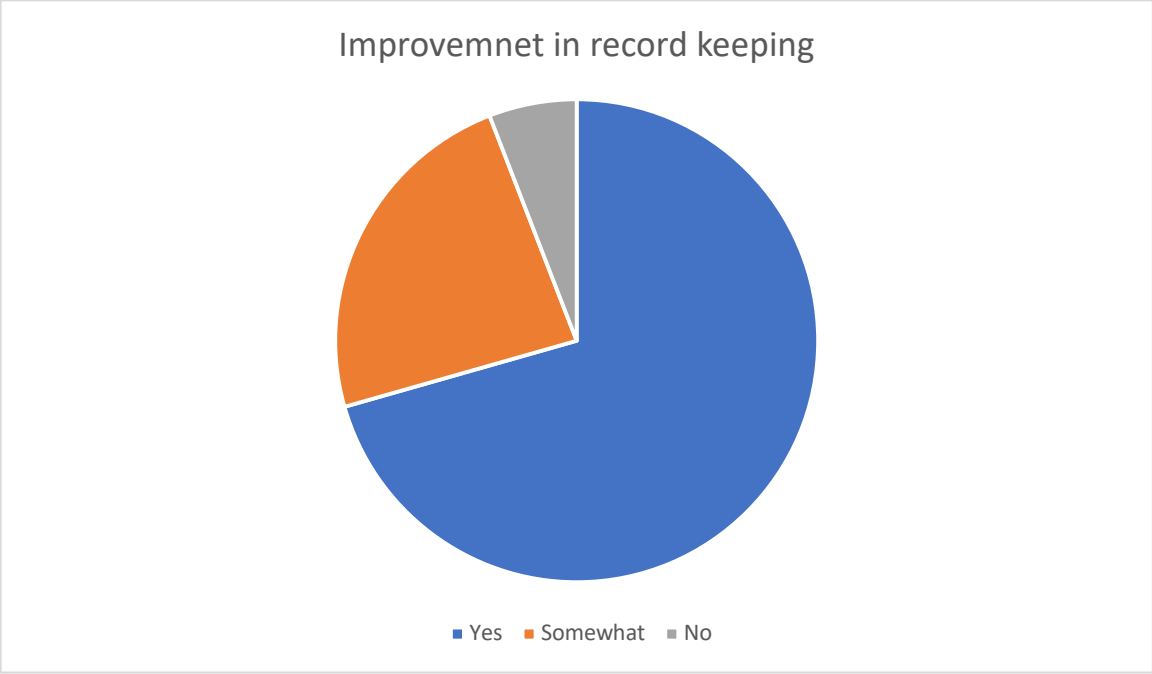

Figure 14 : Improvement in record keeping.

3. Would you stop using this tool after this research?

Even though the main objective of this paper was to improve record-keeping aiding credit acquisition, knowing whether participants will continue to use the tool even outside this research shows they might have obtained other benefits from it. When the percentage of participants feeling optimistic about using this tool was asked why, they repeated that, even if they were not going to apply for a loan, it has improved their record-keeping, helped them connect with workers and simplified their work.

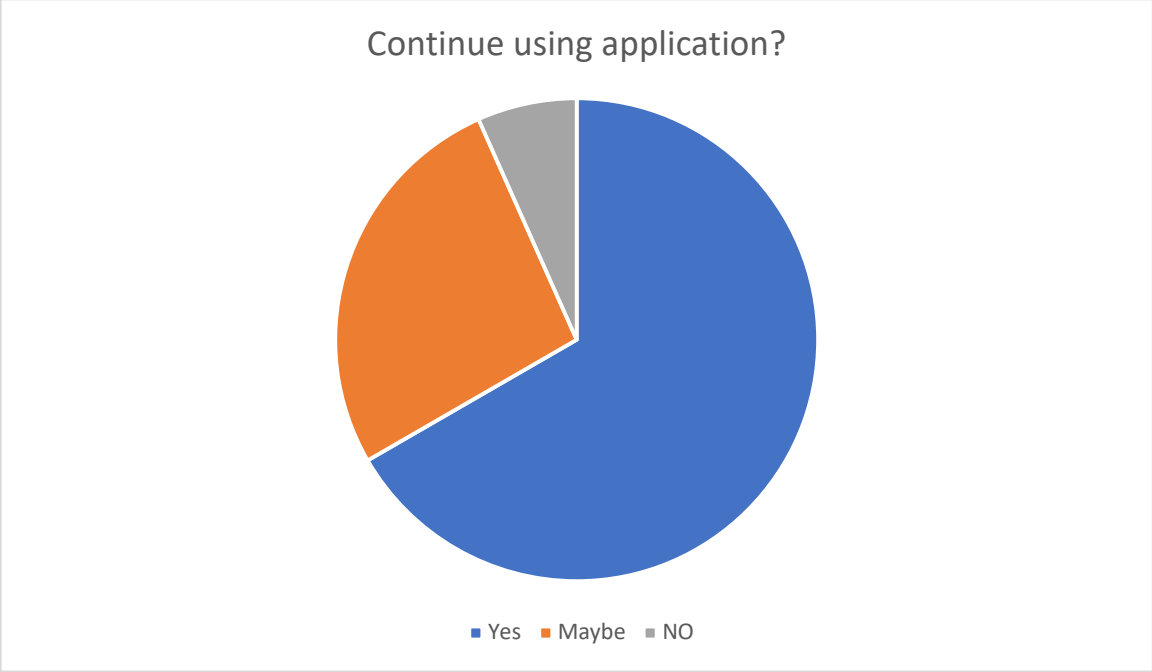

Figure 15 : Continuous use of the application

Over the 4 weeks, there was a growth in both the use and satisfaction of the tool among participants. Most importantly, the majority attested to this helping to improve their business processes, especially with regards to record-keeping. However, this project is not one-sided, therefore it is imperative to know the take of the financial sector concerning its effectiveness as well.

4.5 Impact on Decisions of the Financial Sector

As mentioned in chapter 3, two financial institutions were involved in the project. Both banks took part in focus group discussions. One before the introduction of the application and one after. This is a summary of the take of banks after the tool. The data received from two participants were sent to banks and a review on the business was done in preparation for a loan application simulation. This simulation was done before the application was introduced.

4.5.1 Banks Decision before Business Tracker

Before the software was developed, the banks accessed the credit-worthiness of 2 of the data subjects who had never applied for loans but were considering it. It took them through a simulation of the loan application process after which a focus group discussion was held. Questions asked both before and after the use of the tool are found in the appendix of this paper.

Focus group discussions held before the application was introduced, revealed that, the financial sector pays attention to – individuals who can demonstrate an ability to pay back. This takes into account their risk structure; the consistency of their income and the kind of the business being operated (it should not be one harmful to the general public). This is what both banks had to say regarding the financial states of the two data subjects.

Table 4 : Response to Credit Worthiness before Application

Theme	Ecobank	Fidelity
The financial status of data subjects presently	Both have good earnings but no structure. Collateral is non-existent and cash flow analysis cannot be done	It is difficult to ascertain the validity of the information. Income is too irregular to determine whether they would be good candidates for a loan

The main hurdle in attaining credit	The main hurdle is organization and documentation.	No structure around their financial management
Proposed solution	Auditors to check earnings, proper documentation	Some structure – manually or digitalized
Stage in the application process they can be considered for	They would not make it past the preliminary interview	They cannot be considered for financial analysis.

From table 4, a few insights were gotten –

i. Both institutions were concerned about the lack of documentation and structure of the data subjects. Documentation is essential for financial analysis, but this was hindered by a lack of it.

ii. The data subjects could not make it past the primary stages of the loan application process due to the major hurdles of lack of structure.

iii. Another challenge was the inconsistency of income in this sector. Also, distinguishing between the personal and the business income in this sector is difficult. Banks therefore may find it hard to ascertain profit generation patterns for repayment.

4.5.2 Banks Decisions after Business Tracker

After the 4 weeks of using the application to track business processes, the banks were contacted for another focus group discussion. This time, the insights and information collected over the period were presented for their consideration. Table 5 details the insights from the discussion.

Table 5 : Response to Credit Worthiness after Application

Theme	Fidelity	Ecobank

Financial standing	Easier to find a pattern in income	Structured documentation makes it easier for analysis
What improved	Documentation and structure	Financial management and daily tracking of cash flow statements
Stage considered in the application process	Financial analysis. They would progress in the process but success in credit acquisition is not guaranteed	The tool helps in making informed projections and predictions of income. This will make them eligible for analysis.

From table 5, the following insights can be gotten –

i. Banks believe the structure and documentation improve the chances of credit acquisition to an extent, however, they cannot guarantee anything.

ii. Cash-flow analysis and predictions can be made which are instrumental in the process for determining payback abilities.

iii. This can push the process a step further however, decisions cannot be made using the tool for a short period. It would take about a year for true results on the simulation.

Chapter 5: Conclusion

The main objective of this paper again was to –

i. Understanding other factors that contribute to obtaining finance for debt and equity.

ii. Using the knowledge obtained above to develop an ERP model that would potentially solve the documentation problem and grant finance to SMEs and the informal sector and observe its impact.

Thus, it was essential to include both the financial sector and the informal sector in the process. To address the first objective, focus group discussions backing secondary research revealed that obtaining financial equity is heavily reliant on many factors notable among them being documentation, structure and ability to pay back in time.

The tool developed focused on structure and documentation as these were the main issues faced by the sector. It was revealed that the tool improved the credibility of data subjects and increased their chances of obtaining credit. Even though, this was confirmed by both financial institutions, they both agreed that other factors come into play in the process and no *certain decision* can be taken within the given time frame and circumstances.

5.1 Recommendations

The financial sector seems to have a similar set of requirements for all sectors of the economy. The baseline of requirements seems to be a bit harsh on the informal sector. Making the requirements unique to this sector would increase equity and may improve their chances of obtaining credit.

Again, the financial sector in trying to increase financial inclusion can set reserves aside yearly for the informal sector knowing its role in the economy. This would increase the ability of the sector in executing its role as the backbone of the economy. Financial services including microfinance and macro-finance institutions can tailor products and services to suit this sector, as opposed to employing a one-size-fits-all approach to their

products. Abs bank has progressed in this regard by partnering with MTN to provide quick loans to the informal sector. They are pioneers in this industry and there is room for many more financial institutions. What they focused on was the removal of collaterals and ease of processes for small, easy and fast loans. They have also been able to reduce their defaults through an incentive system [31]. Other financial institutions can follow suit especially Non-Bank Financial Institutions by partnering with telecommunications networks to create an easy pay back system instead of using the traditional banking approach. In addition, the Bank of Ghana can be included in the process by easing the requirement for obtaining a license to operate a savings and loans institution, the economy needs it. Appendix D contains the licensing requirement as of 2018.

The informal sector on the other hand, can seek digitized ways to obtain credit. A contribution from the financial sector was that, their earning be kept with some form of organized service including mobile money or banks. Keeping money in banks would enable them to make projections and ascertain income patterns.

Finally, financial literacy programs are essential as a gap in financial literacy was observed in the sector.

5.2 Limitations

There were a few setbacks in executing the project. The first and main hurdle being the time constraint. The financial sector believed to measure the effectiveness of the application, it was essential for it to be used for at least a year. Thus, the limited time allocated for the project might have not allowed the financial institutions to make the most informed decisions or give true insights. Global happenings also negatively affected this project. The COVID-19 pandemic led to half of the data subjects stepping down from the research as they were out of work for a period. This may have altered the data received in the study.

However, these limitations might just have some benefits for this sector even in the period of the current pandemic. Speaking to a correspondent from the Bank of Ghana, Mr. Ismail Adam, it was found that the banking sector, in this time, is putting the measure in place not only to cushion the fall of the economy but to find ways to bring it back to life after an expected economic recession. The report detailed the Government's intervention through the central bank and response from Financial Service Providers in the country.

With regards to the Central Bank's response, the following have been put in place –

- The Primary Reserve Requirement has been revised downwards from 10 % to 8% percent to provide more liquidity to banks to support critical sectors of the economy including SMEs.
- The Capital Conservation Buffer (CCB) for banks of 3.0 % is reduced to 1.5 %. 50 % of the CCB has been released as capital for banks to continuously provide financial support to the critical sectors of the economy including SMEs. This effectively reduces the Capital Adequacy Requirement from 13% to 11.5%.
- The Bank of Ghana has revised downwards the loan provisioning requirement for the "OLEM" (Other Loans Exceptionally Mentioned i.e. loans past due by 30 days but below 90 days past due) category from 10% to 5% to provide relief to banks in respect of performing loans that many show signs of deterioration due to the COVID-19 pandemic.
- For microfinance institutions, loan repayments that are past due for Microfinance Institutions for up to 30 days shall be considered as "Current" as against the existing norm of 1 day past due policy.

The following measures are also being taken by the Financial Service Providers –

- The Ghana Association Bankers (GAB) has reduced lending rates across all sectors of the economy by 200 basis points.

- Absa Bank has offered a repayment moratorium of up to six months to all its personal and business customers who have been affected by COVID-19.
- Republic Bank Ghana Limited has placed a six-month moratorium on the repayment of loans it granted to customers, in a bid to help its clients cope with the devastating impact of the Coronavirus disease (COVID-19) on businesses and economies.

"Whilst the above are initiatives of financial service providers on their own volition, there are legislative proposals for payment moratoriums which are under consideration by the Bank of Ghana with a policy objective of easing the financial burden on loan customers affected by the pandemic", says Mr. Adam, head of Banking Supervision Department of Bank of Ghana.

In essence, both the Central Bank, Legislative bodies and Financial Institutions are working hand in hand to ease the burden and impact of COVID-A9 on the economy by protecting the Informal Sector and SMEs. Hence, even though this pandemic posed many challenges, it creates an opportunity for the sector to get back on its feet with the ease in requirements and legislation provided above.

5.3 Future Work

Even though the results of the study may have proven positive, the data subjects had a lot to say about how the work can be improved.

i. Functionalities in the ERP to cover all possible aspects of the business would be essential to capture all components of the business.

ii. Financial projections and predictions of income can be done digitally in the ERP instead of leaving this analysis to the banks. This would make the work of the financial institutions easier and improve the time spent deciding on loan acquisition.

iii. Alternatively, a system that can be directly linked to a mobile money wallet or other financial applications that can track all business activities related to money inflow and outflow would prove instrumental in integrating and improving already existing systems. This would also make the loan application frictionless for SMEs especially.

iv. Financial literacy educational features on the ERP would be a great resource.

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[5] Full Bio Follow Linkedin Follow Twitter Kimberly Amadeo has 20 years of experience in economic analysis and business strategy She writes about the U. S. Economy for The Balance Read The Balance's editorial policies Kimberly Amadeo. Four Critical Components of America's Economic Growth. *The Balance*. Retrieved April 7, 2020 from https://www.thebalance.com/components-of-gdp-explanation-formula-and-chart-3306015

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Appendices

Appendix A: Focus Group discussion questions

Initial Discussions with Financial Sector - before software use

- What are the requirements you look at for financial credit specifically to SMEs?
- Are requirements for multinationals and the private sector the same as that of SMEs?
- What measures has your organization put in place to create financial inclusion in the informal sector and among SMEs in Ghana
- What is the biggest challenge when it comes to granting credit to this sector?
- How do you think these can be improved?
- Do you have reports on loans granted to this sector from previous years? Can I access them?
- What have been the challenges encountered for those that were able to obtain credit?

Latter Discussions with Financial Sector - after software use

- How does this relieve some prior challenges?
- What has changed about the two data subjects before having the record-keeping tool?
- What stage of the application process would they be considered for now?
- What improvements would you suggest be made to the tool?
- What are the perks and downsides of using this?
- Any ideas for further promoting financial inclusion from this experiment?

Appendix B: Focus Group discussion questions

Initial Discussions with Informal Sector - before software use

- Do you know of business tracking software?
- Why haven't you used any business tracking software?
- What would you like to see if such a software was created?
- Have you tried asking for a loan to help your business?
- Why? Why not
- What was the response?
- Does your business need support financially? Why?
- What do you believe would be helpful to you in your loan application process?
- Why do you believe this would be helpful?

Latter Discussion questions - after software use

- Are you having challenges adapting to the use of the software?
- How is/ has this software improved your processes? In what way? / why not?
- Are you more confident to apply for credit now? Why/ Why not?
- Would you like to continue using the software after this exercise? Why? Why not?
- Are some of the major challenges you faced earlier relieved now?
- How would you integrate this into your work moving forward?

Appendix C: Bank Loan Application Document Requirement (For Fidelity Bank)

MOST IMPORTANT DOCUMENT

FIDELITY BANK

Dear Customer, please read and sign to confirm that all relevant information has been provided to you.

Dear Customer,

Thank you for your application to avail the "Personal loan" facility of Fidelity Bank.

Please read the following and sign your acceptance of same.

- Interest Rate: The interest rate has been explained to me. The interest rate is Base ±_____% per annum and is subject to change in line with changes to our Base Rate. Fidelity Bank's Base Rate is currently _____%
- Loan Processing Fee will be_____ % of limit. This will be deducted from the approved loan amount.
- Early Redemption Fee will be_____ % shall be paid on the outstanding balance at the time of redemption.
- Insurance: Credit Life Insurance Cover of _____ %,will be deducted from the approved loan amount.
- APR: _____ % Annualized Percentage Return
- No discount/free gift or any other commitment is given whatsoever which not documented in the Loan Agreement of Fidelity Bank or any of its authorized representatives
- Your monthly instalment will not exceed _____ % of your Net Monthly Salary.
- Mode of Repayment will be:
- (Account Holder) Monthly repayment debited to your Fidelity Bank Current Account by Standing Order. Any default of your loan repayment (on the due date), will attract the bank's penalty charge of _____ Of the monthly repayment amount.
- Salary-Backed (Non Account Holder)...Monthly repayments by postdated cheques
- Employee Scheme ... Payroll deductions at source
- **Where the first installment period (Period between loan disbursement date and first repayment date) is greater than 30 days, the customer will pay the interest accrued between the 30th day and the first installment date (broken period interest)**
- **Discretion of Bank: The approval and disbursement is at the sole discretion of Fidelity Bank and no commitment has been given regarding same.**

Acceptance signature of the applicant

Name:

Address:

Contact Tel No:

Siganture:

Date: D D M M Y Y Y Y

FSA/Bank Official (person who booked thee loan)

Name:

Description: ☐ FSA ☐ Other Bank Offical

Contact Tel No:

Siganture:

Date: D D M M Y Y Y Y

Appendix D – Licensing Requirement of Bank of Ghana for Savings and Loans Institutions

1. Restricting Eligibility to Licensed Corporate Bodies
   No person other than a body corporate incorporated in Ghana shall be eligible to apply for a licence to carry on the business of a savings and Loans/Finance House.
2. No person shall carry on the business of a savings and Loans/Finance House unless the Bank of Ghana licenses it.
3. Interview
   The Banking Supervision Department located in the Cedi House [Bank of Ghana Annex] shall first interview the applicant. The applicant may then make a payment of GH¢5,000.00 [Five thousand Ghana Cedis only] as non-refundable processing fee. A licensing fee of GH¢10,000.00 [Ten thousand Ghana Cedis] would be paid if the application is approved for the issuance of the licence.
4. Application for Licence
   Every application for a licence shall be made in writing to the Director, Banking Supervision Department Bank of Ghana, Accra, and shall be accompanied by:
   a. A certified true copy of the Regulations or other Instrument, relating to the proposed business, or by or under which any person proposing to carry on such business was established.
   b. [b] Names, addresses, occupations of persons who would hold significant shareholdings directly or indirectly in the proposed venture and the respective values of such holdings as also their corporate affiliations.
   c. Completed Personal Questionnaire on the particulars of five [5] directors and senior persons to be in charge of the management of the said business, including their background, financial position, business interests and particulars of other business concerns under their control or management.
   d. A feasibility report including a business plan and financial projections for the first five years and intended areas of specialisation, if any.
   e. Information on capital and sources of funds; and
   f. Such other particulars as the Central Bank may require.
5. Minimum Paid-Up Capital
   All saving and loans/finance houses applications require initial paid-up capital of GH¢15,000,000 (Fifteen million Ghana cedis).In the case of foreign ownership, not less than 60% of the required capitalisation shall be brought into Ghana in convertible currency
6. In Principle Approval
   The Central Bank may issue 'in-principle' approval to the applicant on such terms and conditions as it may consider necessary and appropriate if it is satisfied that:
   a. the applicant would carry on the business with integrity, prudence and the required professional competence; and
   b. the applicant has the initial paid-up capital required to hold a licence.

   The Central Bank may issue the final approval and licence to the applicant after satisfying itself that the conditions above and those set out in 7.0 below have been met.
7. Pre-Operating Conditions
   Approved institutions shall not commence business until they have obtained a final licence from Bank of Ghana. Such a certificate shall be issued only upon fulfilment of the following requirements and demonstration of readiness to commence business by the institution.
   a. Premises:
      i. Sufficiency of title deeds/lease agreements
      ii. Approvals by relevant authorities
      iii. Adequacy of business premises, staff operating area, ventilation, lighting, etc. and