2023-08

# Development of an interactive mobile application for information sharing between sccult, member cooperatives (saccos), and other stakeholders

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NM-AIST

# DEVELOPMENT OF AN INTERACTIVE MOBILE APPLICATION FOR INFORMATION SHARING BETWEEN SCCULT, MEMBER COOPERATIVES (SACCOS), AND OTHER STAKEHOLDERS

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**A Project Report Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Embedded and Mobile Systems of the Nelson Mandela African Institution of Science and Technology**

**Arusha, Tanzania**

**August, 2023**

## ABSTRACT

The use of mobile devices and their affiliated software has brought about a very immense change in communication. From a different angle, marketing of goods and services for business entities has been made easier and better. However, it has been discovered that, to know about a specific entity one would need to have prior knowledge about it. This makes it hard for unknown entities to become reached by potential buyers. This is the case for SACCOS and SCCULT in Tanzania. The two become invisible to the consumer community due to their infamous nature, making their marketing difficult and hence, stunting their growth. Savings and Credit Cooperative Unions (SACCOS) are financial groups that provide their members with different financial services, including loans, savings, and investments. By lending capital to Small and Medium Enterprises, SACCOS have been a source of close to 94.7% employments of their members. It as well contributes up to 40% of the national Gross Domestic Product (GDP). However, only less than 10% of the national population is beneficiary of the services offered by SACCOS in Tanzania. The purpose of this study was to bring to attention that most individuals do not engage with SACCOS and enjoy their easy and smooth services because they lack information. The study proved that with enough information and engagement of the SACCOS to society, many individuals could join SACCOS and enjoy their benefits. A mixed research method was used to gather information on the society's awareness of SACCOS, their knowledge, and usage of social media, and whether they have ever encountered news about SACCOS in their social media exploration. It was discovered that more than 70% of individuals have poor or no knowledge at all about SACCOS. The study discovered that, due to a large number of content contexts in social media, SACCOS are not easily found in such a pool of information. This project resulted in the development of an interactive mobile application for information sharing between the Savings and Credit Cooperatives Union League of Tanzania (SCCULT), their member cooperatives (SACCOS), and other stakeholders including the Tanzanian society mass. This is a mobile application dedicated to sharing news with society in a broader and more relevant way. Allowing individuals to have ease of access to SACCOS's basic information enough to help them build interest in joining them.

## DECLARATION

I, Tusekile Juma Mwasambili, declare to the Senate of the Nelson Mandela African Institution of Science and Technology that this project report is my original work and that it has neither been submitted nor concurrently submitted for a degree award in any other institution.

| Tusekile Juma Mwasambili | | |
|---|---|---|
| **Name of Candidate** | **Signature** | **Date** |

The above declaration is confirmed by:

| Dr. Elizabeth Mkoba | | |
|---|---|---|
| **Name of Supervisor 1** | **Signature** | **Date** |

| Dr-Ing. Andreas Solsbach | Andreas Solsbach | 08.07.2023 |
|---|---|---|
| **Name of Supervisor 2** | **Signature** | **Date** |

## COPYRIGHT

## CERTIFICATION

The undersigned certify that they have read and, with this recommendation for acceptance by the Nelson Mandela African Institution of Science and Technology, a project report titled ***"Development of an Interactive Mobile Application for Information Sharing between SCCULT, Member Cooperatives (SACCOS) and other Stakeholders"*** in partial fulfilment of the requirements for the degree of Master of Science in Embedded and Mobile Systems of the Nelson Mandela African Institution of Science and Technology.

| Dr. Elizabeth Mkoba | | |
|---|---|---|
| **Name of Supervisor 1** | **Signature** | **Date** |
| Dr-Ing. Andreas Solsbach | Andreas Solsbach | 08.07.2023 |
| **Name of Supervisor 2** | **Signature** | **Date** |

## ACKNOWLEDGMENTS

To God, for life, knowledge, health, and opportunities that rose in one area and the others. I believe it was all by his grace and I am forever grateful to him. For having risen mine and many other brilliant minds to be part of my journey.

To my family for their endless support and encouragement to keep on carrying on. To always help me find solutions to minor life issues to ensure my comfort. For their love and kindness that always fostered my stable mental health and focus on schools and academic activities.

To my academic supervisors, Dr. Elizabeth Mkoba and Dr-Ing. Andreas Solsbach, and my host supervisor Mr. Hassani Mnyone for their contribution to the work done. For taking the time to look at and correct my work and for having agreed to wholeheartedly work with me, train and groom me in academia and industry. I am very grateful!

To CENIT@EA, DAAD, SCCULT, and DSIK for hosting me and providing me with education and mentorship. For the financial support that fostered my Masters Education, internship, and project completion. For always covering my expenses and ensuring my well-being. I am very grateful!

To Mr. Erick Semindu and Mr. Justine Kemhe for all the technical support you provided me, thank you. Training, mentorship, and ad-hoc solutions to ever-rising technical problems of the project development. The hard parts of development were made easy by your wholehearted and selfless readiness to help find solutions to rising and persisting drawbacks.

To all my friends, and workers of the different institutions I have worked with during the term of scholarship and internship. For all the kindness and support whenever needed I am very grateful for that and so much more that is not mentioned. To all other individuals, not mentioned here but that touched me in one way or another leading to a successful thesis and project completion, I am grateful!

## DEDICATION

I dedicate this work to myself as a reminder of all the hard work put into making this work possible. I as well dedicate this work to all scholars looking forward to accomplishing their first-to-be-implemented projects but feel stranded and vague to giving up. This is to encourage them to not give up and not to lose hope, they can reach their goals. And lastly to all girl developers who do not know where to start or have not enough confidence in themselves. To signify that they can do it!

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## LIST OF ABBREVIATIONS

| | |
|---|---|
| API | Application Programming Interface |
| ASD | Adaptive Software Development |
| BOT | Bank of Tanzania |
| CENIT@EA | Centre of Excellence for ICT in East Africa |
| DAAD | Deutscher Akademischer Austauschdienst |
| DBMS | Database Management System |
| DSIK | Deutsche Sparkassenstiftung für internationale Kooperation |
| ERD | Entity Relationship Diagram |
| GB | Gigabyte |
| GDP | Gross Domestic Product |
| GUI | Graphical User Interface |
| IDE | Integrated Development Environment |
| IEEE | Institute of Electrical and Electronics Engineers |
| Ios | iPhone Operating System |
| OS | Operating System |
| RAM | Random Access Memory |
| SACCOS | Savings and Credit Cooperative Society |
| SCCULT | Savings and Credit Cooperative Union League of Tanzania |
| SQL | Structured Query Language |
| TCDC | Tanzania Cooperative Development Commission |
| TFC | Tanzania Federal for Cooperatives |

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background of the Problem

Savings and Credit Cooperative Societies (SACCOS) are cooperative financial organizations owned and operated by and for their members (Tumwine *et al.*, 2015). This, therefore means that the SACCOS is owned by not an individual or a specific organization, but rather all the members of the Cooperative. Such Cooperatives are dedicated to giving financial services to their members. Historically, SACCOS were officiated by the government of Tanzania in the 1980s (Magali, 2013). The number of SACCOS in Tanzania changes since new ones are formed and others demise now and then. The SACCOS operations are not different from commercial banks. The only difference lies in the management and their modes of operation. They gain enormous popularity due to the ease of service provision and reachability in comparison with commercial banks. The SACCOS provide financial services, especially credit with favorable conditions to accommodate all individuals especially those with limited collateral. This is done to perpetuate poverty reduction and eradication efforts by nations and the world at large (Mwai, 2017). Such cooperatives have played big roles in the economic growth of farmers, small business owners or entrepreneurs, and other society members most prominently from rural areas. Different services are offered by such cooperatives in the process of ensuring economic growth goals of such individuals are attained. The services offered are such as savings services, credit, education to their members on usage of the loans (Mwakajumilo, 2011) provided to them, and additionally investments (Qin & Ndiege, 2013). As important as SACCOS are, they face growth challenges due to a small number of customers on one hand, with poor management and corruption on the other hand. The problem is mostly caused by a lack of enough information on the SACCOS and their services to individuals. The existence of such challenges leads to the undergrowth and demise of most of the SACCOS.

The Savings and Credit Cooperative Union League of Tanzania (1992) Limited (SCCULT (1992) Limited) is a Union that brings together all registered SACCOS in Tanzania (Maghimbi, 2010). This league aims to have all of the SACCOS under one umbrella, where they can be addressed as one, have representation, a common say, and regulation. It was founded in the year 1992 as the name suggests, but ceased to exist a few years after. The Union came into existence once again in 2018 and has strived to serve its best to present. Figure 1 summarized

the SCCULT organization structure. The SCCULT was formed and is managed by SACCOS themselves, making them the top of the organization structure as the general meeting (Fernando *et al.*, 2019).

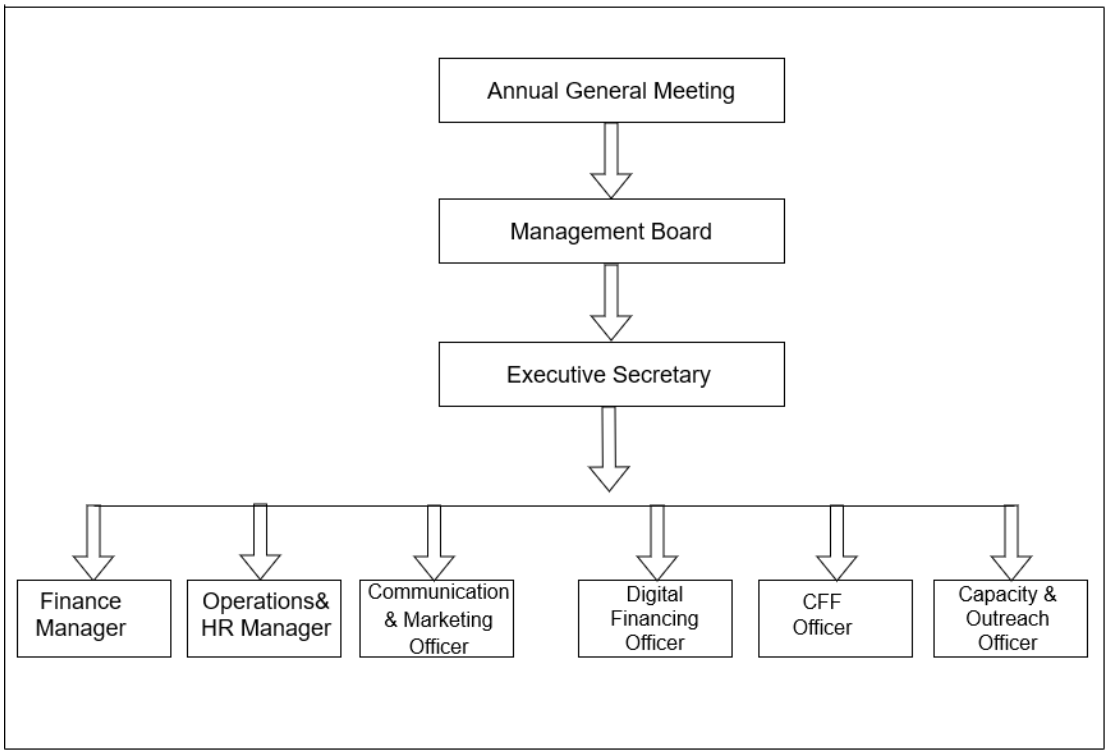



**Figure 1: The SCCULT organizational structure**

The league provides different services to SACCOS to help them form and ensure their growth. The SCCULT offers services such as capacity building, capital enhancement, advocacy, ICT, and legal services to mention a few. Moreover, support is provided in terms of consultation for SACCOS that stumble on different matters when starting or running services on their ends. By default, having been formed by SACCOS themselves, every registered SACCOS has the right to be a member of SCCULT. According to SCCULT, there are more than 3000 registered SACCOS in Tanzania. However, to present only 140 SACCOS are active members of SCCULT. Among the reasons for such a small number of members is the lack of information about the existence and services offered by the league. The union, therefore, strives to seek members by advertising the different services, products, and operations they conduct. Moreover, as an advocate and representative of all member cooperatives, the union strives to help its members grow and reach the maximum of their potential. Creating social awareness to current and potential customers of both the league and the member cooperatives may be one of the key activities to be done to help in the growth of both entities. Figure 2 shows the activities of SCCULT as the umbrella organization for SACCOS in Tanzania.

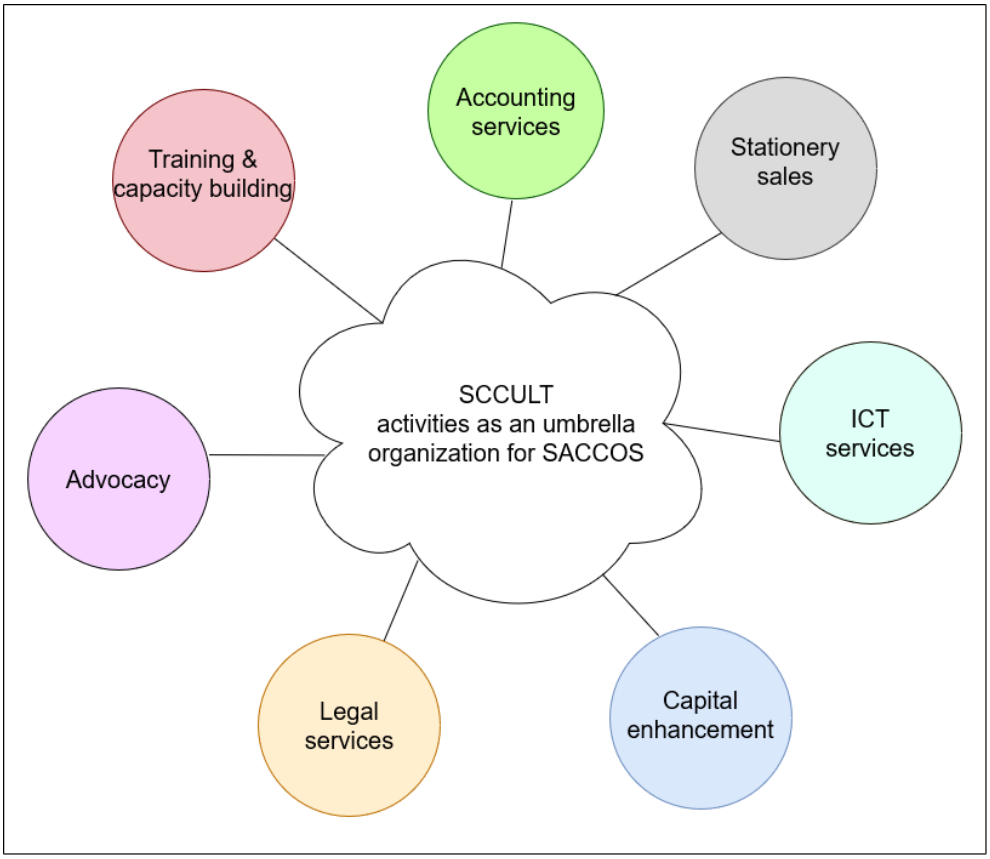



**Figure 2: The SCCULT activities as an umbrella organization**

Stakeholders are individuals and groups of individuals that are affected by the presence, products, and services offered by a certain organization, company, business, or other individuals (Bruce & Shelley, 2010). For business perpetuation and sustainability, stakeholders are a very important entity. This is because stakeholders are the customers, investors, wholesalers, approving authorities, and governments around these entities. In that case, pleasing and impressing the stakeholders is an important aspect of a business. Stakeholders' engagement serves great importance for innovation purposes, improves customer satisfaction, fosters decision-making, improves interaction, and lastly ensures business growth (Mathur *et al.*, 2008). This, therefore, makes stakeholder engagement a necessity for the prosperity of the company. In the bigger picture, some literature works have gone as far as stating that stakeholder engagement is a responsibility of the organization for its survival. Even though, further studies counterattack this say and prove that stakeholder engagement is rather a morally neutral activity and hence should not be directly related to organization responsibilities (Greenwood, 2007). Different types of stakeholders exist in business, they range from regulator, controller, partner, passive, dependent, and non-stakeholder (Mainardes *et al.*, 2012). Several stakeholders exist as far as SACCOS and SCCULT are concerned. SCCULT and

SACCOS work under the Bank of Tanzania (BOT) as their chief regulator. The BOT has its power delegated from the Ministry of Agriculture and they work with Tanzania Corporative Development Commission (TCDC). The operations carried out by SCCULT and SACCOS are guided by the Microfinance Act and its regulations of 2019 (Tanzania, 2018) and the Cooperatives Societies Act of 2013 (TCDC, 2013). Alongside those are the different partners, sponsors, and regulatory authorities who provide support financially, materially, knowledge, and capacity building to mention a few. All these entities need to be involved, consulted, applied, and included in different activities, anticipated products or services, and in different decisions to be made.

Different organizations around the world, including SACCOS and SCCULT, are making use of different kinds of technologies to run some or all aspects of their businesses. These range from procurement, administration, marketing, and information sharing to mention a few. This is fostered by the incredible advancements in the usage of ICT in the world with which great concepts such as automation, improved communication, and interactions have risen. Within the communication concept, mobility has been added to a great extent by the usage of mobile phones. A very big number of individuals are using at least one of the many existing mobile devices in the world now. According to Statista (2022), the number of registered mobile phones worldwide has increased from 14.22 billion in 2020 to 15.96 billion in 2022. It is also projected that the number will reach 18.22 billion by 2055 (Statista, 2022). This purge in the penetration of handheld devices brings about great mobility and a sense of self-servicing to users. These devices are used hand in hand with mobile applications for many if not all kinds of functions in different aspects of life (Wac *et al.,* 2011), from communication, fun and games, consultancy, and financial transactions and so on (Islam *et al.*, 2010). On top of it all, significant usage of mobile applications is observed in marketing and business growth (Adam & Alhassan, 2021). Social media applications are the kind of applications that bring people together from around the globe for communication purposes and exchange of information. It has become a very big niche for marketing and customer targeting (Saravanakumar & SuganthaLakshmi, 2012). Providing users with services and updates as close as to their hand-held devices has become one of the easiest ways of reaching out to customers for engagement. This in association with several other integration methods makes it an even better mechanism for reaching out to such potential stakeholders for expansion purposes of the audience and market. Figure 3 is a representation of how one individual is capable of reaching multiple other individuals through their mobile device.

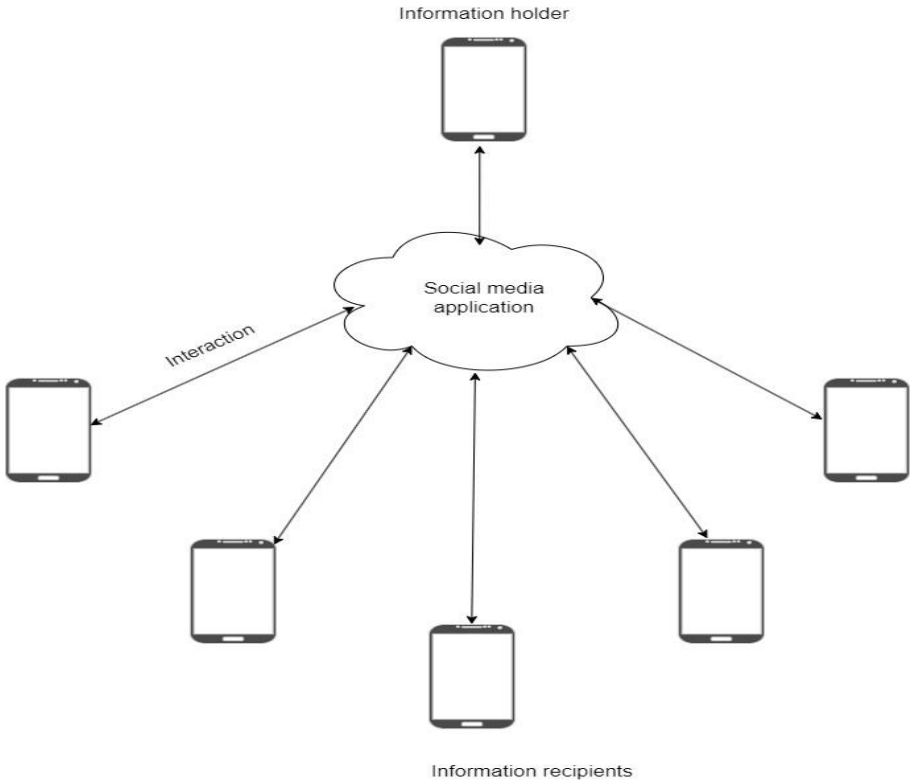



**Figure 3: Social media application news dissemination/ sharing scheme**

This study aimed to assess the need for a centralized digital platform (mobile application) where both SACCOS and SCCULT can interact with each other and their current and potential stakeholders. The digital platform was developed to enable SACCOS and SCCULT to advertise their different products and services, and interact with different users of the platform to gain more stakeholders and customers and have potential growth.

## 1.2 Statement of the Problem

Being the umbrella organization of all SACCOS in Tanzania, SCCULT engages with individual SACCOS and other stakeholders. Engagement with SACCOS is for awareness creation, customer acquisition, and service provision. On the other hand, this engagement is also done for the provision of aid and decision-making. The same applies to SACCOS, where engagement with the society at large is required for customer acquisition. On the other hand, meeting with other stakeholders is for investment, skills development as well as materials sharing and customer retention. On top of that, regulatory and controlling bodies are involved to ensure protocols and directives observation. All the above engagement activities are summarized in Fig. 4.

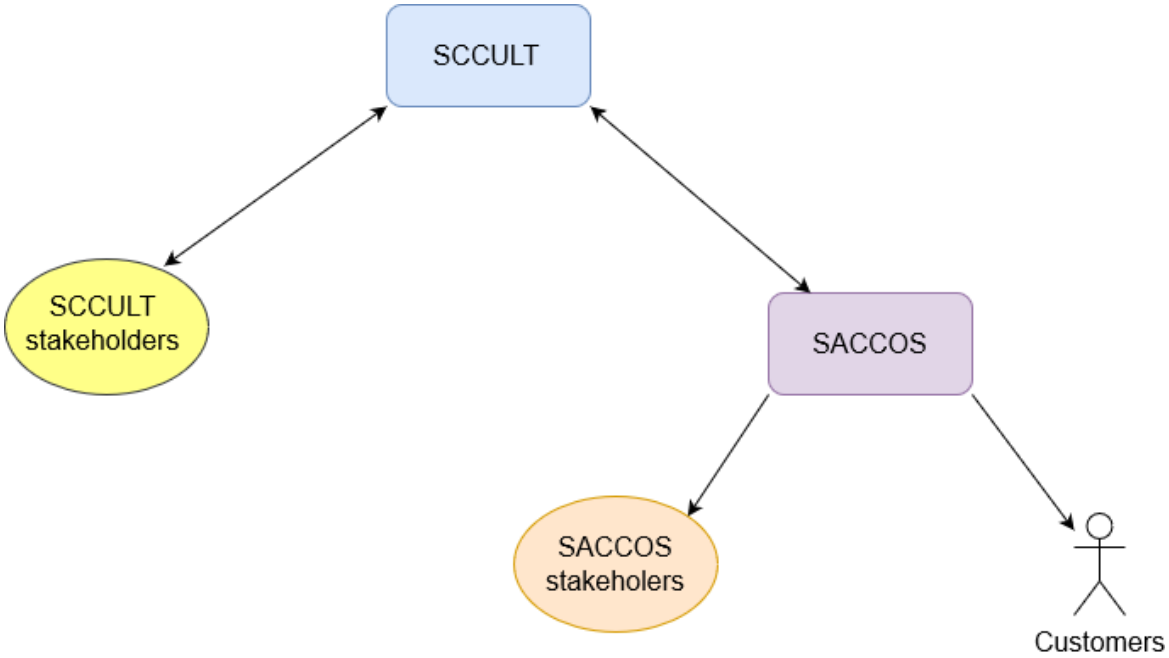



**Figure 4: The SCCULT and SACCOS engagement channels**

To present, engagement between SCCULT and its members SACCOS, together with SACCOS with its members is manual and for some SACCOS there is none altogether for others. It involves using bulk SMS, printed posters, announcement in meetings, letters, and emails for some organizations, phone calls, and physical meetings. All these methods are very useful for customer retention, but they do not work effectively for new customer acquisition.

Social media is another way used by the named entities to market their goods and services. This is a solution to the traditional means of marketing, and it places the entities at a better chance of appearing to the consumers. However, these social media platforms are too general. Individuals view information with different contexts and natures at the same time. Centralization of contents of the same context to help users learn in detail about one type of organization in details has not yet been employed. Even with such platforms, SACCOS and SCCULT therefore, still lacks the appropriate engagement from users. Therefore, the problem of SACCOS unpopularity remains in society.

## 1.3 Rationale of the Project

The service-providing industry has proven enormous growth for several decades now. Such growth is the evidence of the need for such an industry in the globe today (Lituchy & Rail, 2000). Globalization on the other hand provides a wider range of markets and coverage for such services. It proves, therefore, essential to put focus on such an industry. The goal of the

United Nations Sustainable Development Goals is to touch every aspect of the world that need correction for a sustainable life all around the Globe. Among them is the achievement of a higher level of diversification, technological upgrading, and innovation including a focus on high-value-added and labor-intensive sectors. Where, upon engagement of the usage of mobile applications, both inclusion of technology upgrades will be done and there is an anticipated economic boost due to the increase in the number of members.

Moreover, engaging in the technology fashion and adapting to the different changes brought by it is no longer a luxury for companies, but rather a necessity for survival (Kumar & Gupta, 2019). Individuals have changed their module operandi in the way they shop, seek services and attain their needs. Sectors and industries that offer such services need to evolve alongside the technology. This is no exception for SCCULT and SACCOS. The use of technology facilitates instant and fast communication between employees, customers, and other stakeholder. On the other hand, paves the way for better customer service and ensures customer satisfaction (Levi-Bliech *et al.*, 2018). The involvement of ICT and specifically mobile application brings about centralization of all the SACCOS and their related services. Lastly, engaging in technology is a competitive advantage, to stay on the trends of globalization.

## 1.4 Objectives of the Project

### 1.4.1 General Objective

To develop an interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS), and other stakeholders in Tanzania.

### 1.4.2 Specific Objectives

The study aimed to achieve the following specific objectives:

(i) To identify requirements for an interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS), and other stakeholders.

(ii) To develop an interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS), and other stakeholders.

(iii) To validate the developed mobile application.

## 1.5 Research Questions

The study intended to answer the following questions:

(i) What are the requirements for an interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS), and other stakeholders?

(ii) How to develop an interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS), and other stakeholders?

(iii) How to validate the developed interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS), and other stakeholders?

## 1.6 Significance of the Project

The project has led to the development of a mobile application specifically to add automation to some business processes done by SCCULT and SACCOS. The automated processes include the registration to attend events prepared by SCCULT, SACCOS profile building for visitors' knowledge building, and advertisement of different activities carried out by SCCULT and SACCOS. Secondly, it has added visibility to the activities, operations, products, and services they offer. It provides equal opportunities for all SACCOS to be known to their potential customers and stakeholders. Now the community and stakeholders are capable of viewing details of a specific SACCOS and seeing how their needs can be met by them.

Furthermore, the application ensures better communication between SCCULT, SACCOS, and their stakeholders. Having a centralized place where individuals can reach all the news, information, and answers to their questions has made communication better. This could as well help in the development and strengthening of the relationship between the related sides.

The engagement of individuals in different activities, be it physical, virtual, online, or offline is dependent on the users' knowledge and interest. This platform is useful as a knowledge-building space for society to understand what is being addressed. It can as well be used to influence the engagement of the stakeholders in the activities and services. Lastly, users who miss the opportunities to attend the events can always be able to access reports and photos of the event from the application. They can as well lay down their suggestions and comments in a place they can be accessed even after a long time of staying on the platform.

The interactive mobile application is self-service based, where, users have options of what they want to view. They may as well be free to register for events, cancel their registrations, and add or remove comments. Generally, the user has total control over their movements in the app without assistance from the organization. However, a space is provided for users to reach the application handler in case of needed assistance howsoever. To SCCULT, the application helps in the organization of users, events, and reports

## 1.7 Delineation of the Project

The developed mobile application is for bringing to attention information that SCCULT and SACCOS chose to share with their stakeholders and society. Information that can be viewed by users is basic and those of choice by the organization itself. The mobile application will not seek further information howsoever in violation of the privacy of or limitations provided by the organization and users in general. The basic information acquired is such as the location of the SACCOS/ SCCULT, they're about information, social media accounts handle, full names, region of existence, and events media they chose to share. Some of such information must be provided at the beginning of the profile setup. This information will be viewed by other users of the platform.

Consideration is put on information that all SACCOS and SCCULT can provide, this is to bring a sense of balance and having no one SACCOS with better or more information than the other. Lastly, a search engine is put in place for viewing SACCOS, especially those which cannot easily be seen in the news and feeds segment due to less sharing tendency.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Related Works

Interactive mobile applications are the type of applications that allows interactivity between a user and the device (Gao *et al.,* 2009). A slight difference between mobile applications and interactive mobile applications is shown by the bringing of reality to many of the applications and gives a better sense of engagement with the user to the entity represented by the application. This means that, a user becomes more than just a spectator of the information and different activities done by the application: but rather a contributor to the information put and influence the application's behavior. The following related works show interactivity with the applications that have been employed in different sectors such as education, social, and health, and try to relate it with how it will be used to bring interactivity in the SACCOS sector.

### 2.1.1 Cross Savings and Credit Cooperative Societies Information Sharing and Collaboration Environment: Ucredit Mobile Application

The SACCOS collaboration and information sharing pave a good way to further better competition among SACCOS and better value creation. The Ucredit is a mobile application developed in Kenya with the sole aim of bringing together all SACCOS in Nairobi County (Mukenya, 2019). The members of SACCOS are provided with the privilege to create a profile and fill it with information about their loans and credit services using a website. This information is then reached by all customers within these SACCOS. This information is being used by these members as a comparison point of services offered among SACCOS. These members can then decide to move and seek better services in other SACCOS or stay. This information is as well used by investors to make informed decisions on the kinds of investments they want to do in the SACCOS of their choice. In this application, members other than SACCOS (SACCOS customers) need to be registered under a certain SACCOS, meaning members outside of SACCOS are not provided with opportunities to join such an application. The information provided is read-only to all customers and investors. At the same time, SACCOS are allowed to update their information from time to time, in case there are changes in policies or there are additional services.

### 2.1.2 Acquiring Knowledge Through Mobile Applications

Education provision is expanding from limited physical classes to mobile and electronic learning (m-learning and e-learning respectively). Different applications are being created to foster education provision to their user (Ebrahim *et al.,* 2015). A good example of interactivity brought into the education sector through mobile applications is depicted by the interactive mobile applications to support the teaching of reading and writing of the Spanish language for children in primary education. It shows how interactivity makes learning more fun for students. From the application, children are capable of learning from different supporting characters which makes the learning process more fun. The users are also able to track their progress and create mimicking avatars of their choice to help them learn (Hernández-Campos *et al.,* 2020). With all the positivity, the application had limitations. It was not flexible to fit users' preferences, the communication was one-way, and the classes' data are predefined. All qualities to make an app poor in terms of interactivity.

### 2.1.3 Interactive Mobile Application for Maternal, Neonatal and Infant Care Support for Tanzania

Apart from education, the use of interactive mobile applications has proven to be of great help in the facilitation of the provision of health services information to users. (Mramba & Kaijage, 2018) pioneered the interactive mobile application for maternal, neonatal, and infant care support in Tanzania. The application was created to contribute to the promotion of reduction of maternal and infant death in the world by ensuring constant communications with medical personnel and discussion forums. The application as well brings news and updates to pregnant and lactating mothers by behaving as an information-sharing platform for such. To top it all, it locates the closest health center to the user. Such an application behaves as a guarantee of essential information outreach and immediate availability of health services to this group of individuals. The application uses Swahili language which makes the application usable for local users but difficult to expand beyond the borders of the local area of the application's originality.

### 2.1.4 Ihanda: A Mobile Application for Disaster Preparedness

It has been observed that there is a heavy purge in the usage of mobile applications and mobile devices in general in times of crisis. Communication among citizens and communication between residents and their authorities (Tan *et al.,* 2017). The use of information-disseminating

applications makes news fast and easily available to all individuals at once. A mobile application named iHanda (Fernando *et al.*, 2019) is designed to be used in the Philippines, with the translation 'I am ready'. The app was developed to inform residents of Manila in the Philippines about general threats that require precautionary measures. The second task of the app is to provide announcements in case of emergencies and calls for quick actions to be taken. Lastly, the application shows information about the nearest government facilities, evacuation centers, and contacts for rescue help. Finalizing the application goes as far as notifying users using SMS in case, they have missed the information on the application. However, the application is limited to use in only one region (Manila) as well as the Android platform. Users of iOS cannot access such a platform.

### 2.1.5 Design and Development of a Mobile Application for Accessible Beach Tourism Information for People with Disabilities

Interactive mobile applications are as well greatly used in tourism recently. Tourists use these mobile applications to seek information about different tourist destinations for proper planning of trips and decision-making (Wörndl & Herzog, 2020). Different applications exist, that let the users view details of hospitality and other services, the expected tours and transportation. Mayordomo-Martínez *et al.* (2019) introduced a mobile application that is developed to provide real-time information about the availability of tourism resources to accommodate individuals with disabilities. It gives information such as the availability of bathing assistance tools, accessibility of the beach, parking lots, availability of assistive facilities, and so on. The app allows data from users as a means to populate data about their experience in certain beach visitations. However, the app is limited in terms of not being developed to be used by all individuals with disabilities. Some individuals with disabilities will require assistance to acquire such information.

### 2.1.6 Design for Empowerment: Empowering Sri Lankan Farmers Through Mobile-Based Information System

There is a great lack of accurate and timely information among the different farmers' communities in Sri Lanka. The lack of such an important facility leads to poor decision makings which in the end affects negatively production and related activities in such communities (De-Silva *et al.*, 2013). Naturally, farmers have been making decisions based on their experiences and instincts. However, with different circumstances, the decisions made are not always

compatible with the changing trends and environments. The development of a mobile application (Ginige *et al.,* 2020) to foster the timely dissemination of important information to the farmers, has helped in the acquisition of information instantly, with increased efficiency in decision-making. The efficiency of the application was assessed by measuring farmers' decisions makings, self-control, and motivation. An empowering model is developed as a helping foundation for the mobile-based information system. The system applies to numerous countries in the world including Australia, and some African and Asian countries.

## 2.2 Identified Technical Gap

**Table 1: Summary of related works**

| Name | Purpose | Strengths | Limitations |
|---|---|---|---|
| Cross SACCO information sharing and collaboration environment: Ucredit mobile application (Mukenya, 2019) | To bring together all SACCOS in the Nairobi County for the purpose of creating information pool about their SACCOS. This information is to be reached by their current customers and investors. | (i) Customers and investors are informed enough to enable them to make informed decision.<br>(ii) Member registration is approved by the admin before being granted access.<br>(iii) Outdated profiles are considered inactive and hence are eliminated to reduce traffic. | (i) The application does not allow for non-SACCOS members to join the application.<br>(ii) There is no interactivity between SACCOS and their members.<br>(iii) Information is updated only when there is new and major changes. |
| Interactive Mobile Applications to Support the Teaching of Reading and Writing Spanish for Children in Primary Education (Hernández-Campos *et al.,* 2020) | To teach primary students the basics of writing and reading Spanish. | Children do enjoy using the application due to the availability of supportive characters, avatars, and voice assistants. | (i) No flexibility and limited customization<br>(ii) No two-way communication<br>(iii) Classes are predefined<br>(iv) Specific for only one language. |

| Name | Purpose | Strengths | Limitation |
|---|---|---|---|
| Design of an Interactive Mobile Application for Maternal, Neonatal, and Infant Care Support for Tanzania (Mramba & Kaijage, 2018) | An application to help bring health-related information and awareness to pregnant women, lactating mothers with their infants. | (i) Information reaches the intended through the information portal, there is interaction through discussion forums and live chats.<br>(ii) Users are also able to locate the closest health care from their location. | (i) Language barrier, where Kiswahili is the main language.<br>(ii) Developed considering the local environment making scalability hard. |
| Design and development of a mobile app for accessible beach tourism information for people with disabilities (Mayordomo-Martínez *et al.*, 2019) | The application provides real-time information about the availability of beaches around Spain that have facilities to support the accommodation of individuals with different disabilities. | The application provides information about all supportive facilities available, to help users understand if they will find the support they need. It collects data from users of the beach and beach owners. | The application does not have special features to assist all disabled individuals to work directly with the application. Some disabled individuals might require assistance. |
| iHanda: A mobile application for disaster preparedness (Fernando *et al.*, 2019) | A mobile application to update users on changes observed in the environment, update them on potential disasters and locate the nearest rescue or evacuation facility. | For users who fail to access the news in time, they receive an SMS to notify them of the potential dangers. | The application has a small coverage of only one town for one. Second, the application is developed to be used by only the Android platform. |
| Design for Empowerment: Empowering Sri Lankan Farmers through Mobile-based Information System (Ginige *et al.*, 2020) | A mobile application and empowering framework for timely agricultural information dissemination | Timely acquisition of information has fostered better and more informed decision-making amongst farming societies. | There was no way to measure the competence of farmers a factor that could contribution to poor harvests and poverty cycle continuation |

All the above-related works summarized in Table 1, have proven that interactivity with the applications provides users with a bigger room to pour out their thoughts and ideas with improved chances of enjoying usage of the application. From the above studies, different strengths are adopted, these are such as the timely acquisition of news, constant provision of key information, use of maps to locate nearby entities, and interactivity capabilities which give users a wider room to learn. However, limited observation is made on content auditing and user profile creation. Due to the two weaknesses, individuals tend to post all sorts of content including unethical, false, and displeasing content. This makes several individuals less interested in social media and their content. Furthermore, fraud and impersonation due to lack of profile creation limitation leads to damaged reputation of entities and distress in the society incase endangering false new erupts.

# CHAPTER THREE

# MATERIALS AND METHODS

## 3.1 Project Case Study

The project was carried out at the Savings and Credit Cooperative Union League of Tanzania (SCCULT) in Dar-es-Salaam, Tanzania. The case study is relevant because SCCULT is the top overseer of all the SACCOS in Tanzania. Secondly, Dar-es-Salaam being a big and active city is leading with the highest number of SACCOS in Tanzania. Therefore, getting a required sample size is easier than in most regions. Finally, Dar-es-Salaam is as well equipped with the most necessary resources and facilities that facilitated this project activity. Within Dar-es-Salaam, and with the proper usage of the channels of SCCULT getting interacted with the user of the application was made easy.

The application was created with the sole aim of reaching all potential stakeholders of the member SACCOS including the Tanzanian mass, investors, and partners. With not less than 3000 SACCOS all over Tanzania with not less than 1000 members from each SACCOS, the application can generally reach up to one-tenth of the Tanzanian population. The aim is to increase the number of SACCOS customers to half the Tanzanian population, in any one of the many existing SACCOS. Such individuals can easily be reached and attracted by viewing the different activities, services, and products displayed by the SACCOS and SCCULT together with interaction with the makers of such content.

## 3.2 Research Methods

The interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS), and other stakeholders employed four methods of data collection, namely, interview, document analysis, focus group discussions, and questionnaire. The first three ways i.e., interview, documents analysis, and focus group discussions fall under the qualitative research method, while the other data collection instrument i.e., questionnaire falls into the second method which is the quantitative research method.

## 3.3 Target Population

The SCCULT being the main user of the Application, is the first target. The SCCULT used the application to create awareness about the different services they offer. However, SACCOS all

over Tanzania are another potential targeted group. The application was built to reach all potential customers and stakeholders of the member SACCOS making them the third target. The application brings forth news about SACCOS to their customers and stakeholders. There exist many customers, partners, investors, and other shareholders who are potential for the growth of the named entities. Such individuals can easily be reached and attracted by views of the different activities, services, and products displayed by the SACCOS and SCCULT.

## 3.4 Sampling Techniques and Sample Size

### 3.4.1 Sample Size

The sample used in this project was 185 individuals in total who were clustered into three groups. This process involved individuals of different backgrounds. The first individual group was of workers of SCCULT and a few of their closest stakeholders. The second was those with deep knowledge and passion about SACCOS since they work for them (workers in SACCOS) the last group was the random individuals with no guarantee of whether they know SCCULT and SACCOS. This division helped in getting a genuine understanding of the need of the targeted groups and getting ideas of what was the best solution.

The SCCULT and their closest stakeholders offered ten participants. The whole population was actively involved in the study. A few SACCOS were selected for sampling to conduct the study. Five SACCOS were visited and five members from each SACCOS were sampled to participate in the study. Lastly, random individuals were approached to complete the study. For this case, 150 individuals were studied to acquire input for the study and proposed solution.

### 3.4.2 Sampling Technique

The probability sampling method was applied in the data collection for the project at hand. Any individual with whom it was possible to interact with became a potential respondent to the questionnaire and data collection process. This implies that simple random sampling was employed by default. Whereby all individuals had equal chances of being approached and involved in the study. However, cluster sampling was also involved in some instances. In areas where there were groups of people engaging in certain activities and that could be approached for discussions a great number of individuals were approached at once. Exemplified by a group of small business owners conducting business activities in marketplaces.

## 3.5 Data Collection Methods

Both primary and secondary data were attained from users and existing systems. Stated here, are the methods stated above only in better categorization in their state as primary or secondary data.

### 3.5.1 Secondary Data Collection Methods

The secondary data are obtained from previously existing data. From this perspective, a document review was conducted to study the existing systems, on the one hand. The second secondary data source was the documentation of different topics concerning SCCULT and SACCOS that helped in understanding and justifying the study.

### 3.5.2 Primary Data Collection Methods

This describes the fresh sources of data originally from the field. Whereby, for this case, the data were acquired from SCCULT and their member SACCOS and different users through the focus group discussions. While the data from member SACCOS and other users were obtained through questionnaires and interviews.

## 3.6 Data Analysis

Thematic analysis is the method fitting with qualitative data analysis (Clarke *et al.,* 2015). Qualitative data obtained from the focus group discussions and document analysis were analyzed using the thematic analysis method. From the analysis patterns were identified which depicted the users' needs of the proposed systems. From the identified patterns requirements of the system emerged. Emphasis was put on some matters which made them key requirements of the system needed, while the rest are placed as other needed requirements by the users.

The SPSS is a strong data analysis tool for quantitative data. It was used to facilitate the generation of statistics and visualization of data from the quantitative data that was collected through a questionnaire.

## 3.7 System Development Approach

The development of a system (in this case a mobile application) is a process that encompasses several activities to be done in the lifetime of the named system. For the case of the Interactive

Mobile Application for SCCULT and Member Cooperatives, the Agile software development methodology was adopted, specifically the Adaptive Software Development (ASD) method.

The choice of approach is based on the nature of the project and its general environment. The customer was specific on their end goal but had a rough idea of the specific requirement for their system. The system required several adjustments throughout the lifecycle. There was the direct involvement of the customer which emphasized teams work, meanwhile, it also opens doors to frequent changes and hence ensured flexibility. Finally, since the Savings and credit association is a new environment, some learning was part of the project activities to bring about reality to the project.

### 3.7.1 Adaptive Software Development

Adaptive Software Development is made up of three steps or phases that describe the general process encountered to complete a project. The three phases are summarized in Fig. 5. Thereafter, they are described hereunder.

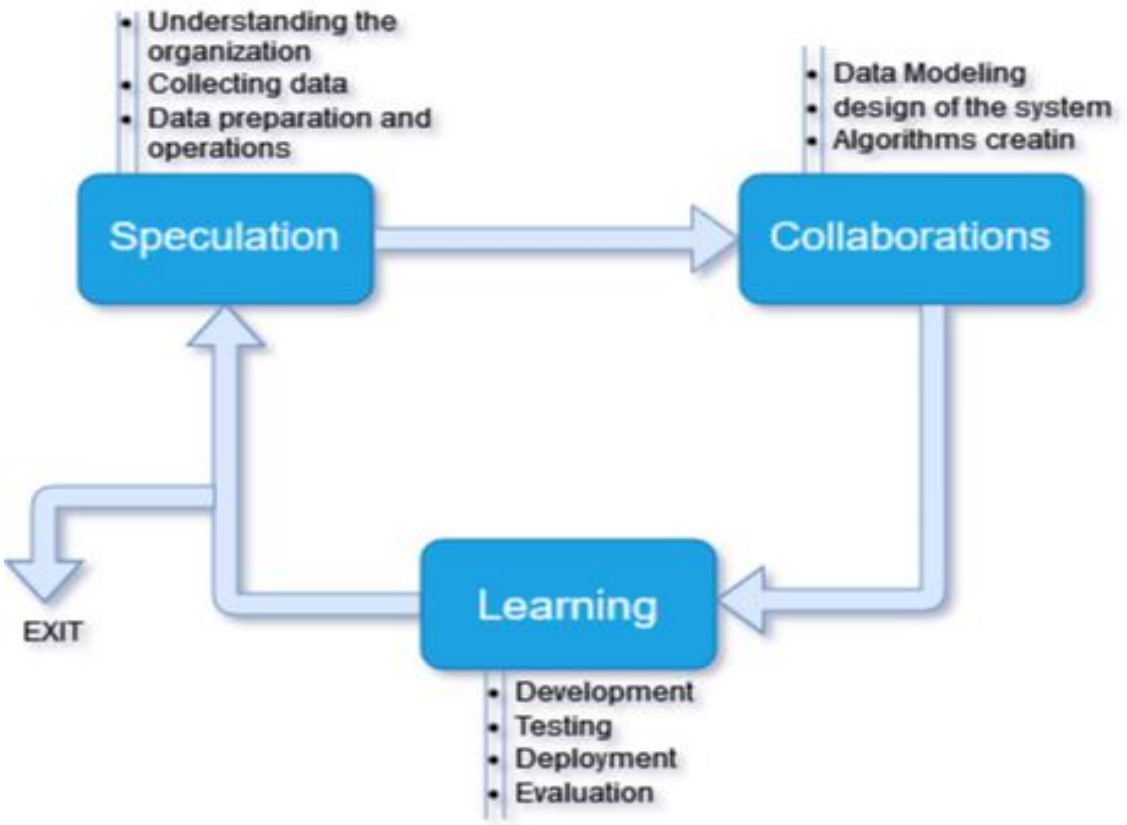



**Figure 5: Steps of the adaptive software development method**

### (i) Speculation

This is the initial stage under which investigation was carried out in SCCULT to figure out the problem. This was the perfect way of getting the basis of the project and the justification. Data was collected and proper preparations and operation mechanisms were planned.

### (ii) Collaboration

It is the stage that involved deep association with the individuals working at SCCULT and teams. The aim was to understand the modules from their perspective. Since the software was developed to solve issues faced by them, and since the entire process circulates getting to satisfy them, then the entire design was to be based on their suggestions.

### (iii) Learning

It is the final stage in the ASD approach under which, the project was implemented, tested, and deployed for use. This stage involved the evaluation of the developed product intending to learn from mistakes and evolve the system to its perfection and expected outcomes.

The interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS), and other stakeholders, was initially thought to be working in two platforms. The admin was to use a web application to monitor the entire application while other users would be using the application on a mobile platform to interact with it differently. However, during the design phase, it was decided that all the users can use the same application in one platform (mobile phone) to each do their activities. This, therefore, led to the application having three different anchor points upon login. The admin is presented with a panel where they can easily access all the entities they are obligated to manage and monitor in the application. The normal user is presented with an interface where they can interact with the application and its contents. However, they have a difference that limits the activities they perform in the application. On top of that, their profile looks different because they do not need to provide business information about themselves like SACCOS or other stakeholders. Lastly, the SACCOS have access to the app with full privileges and access to business information updating for profile build-up.

Technically, how the user types are distinguished is dependent on how their profile is created. Normal user has their user type decided when they register through the application. When the

user type is assigned as “User” in the database, their privileges and functionalities are limited to those of the user. The other users (SACCOS & stakeholders) have their profiles created by the administrator. This means that they are assigned a user type as SACCOS in the database and they are provided with all the privileges of a SACCOS from there. This means that a SACCOS/Stakeholder will only be provided access to the app using the main account through the administrator. This helps in the reduction of fraud and false content creation. However, even if the SACCOS or Stakeholder has their main account run by a single individual in the company, other users can have their ordinary accounts as normal users to enjoy the services provided by the application.

## 3.8 System Requirements

From the survey carried out in the project phase, potential users’ ideas on how the system should appear, work and respond were gathered. Such ideas were the basis for the formulation of the system requirements. The functional and non-functional requirements were derived from such information, engineered, and approved by the users for design. The system requirements and other technical requirements were then decided based on the approved functional and non-functional requirements.

## 3.9 System Design

### 3.9.1 Conceptual Design of the Developed System

This platform has three types of users, admin, and SACCOS/stakeholders. These users are differentiated by the roles they perform in the systems and the limitations to the activities they can conduct within the mobile application. An administrator will be able to create a new SACCOS or stakeholder account and manage them, create events and manage them, and manage posts, comments, and normal users. The system has only one administrator whose login credentials are constant. The SACCOS and stakeholder on the other hand will receive their login credentials from the administrator, these users will have to update their account details and login details on first login. These accounts which are created by the administrator will be provided with different privileges which will equip them with posting capabilities and more information on their profile. These accounts will as well be able to register for events. The last type of user is the normal user. These individuals will create their accounts at the account at the register page. They will decide on their login credential and will have to provide extra information about themselves on the first login. These accounts will have limited

information on their profiles with limited capabilities compared to SACCOS and stakeholder accounts. Figure 6 shows a summary of all the activities and actors of the system.

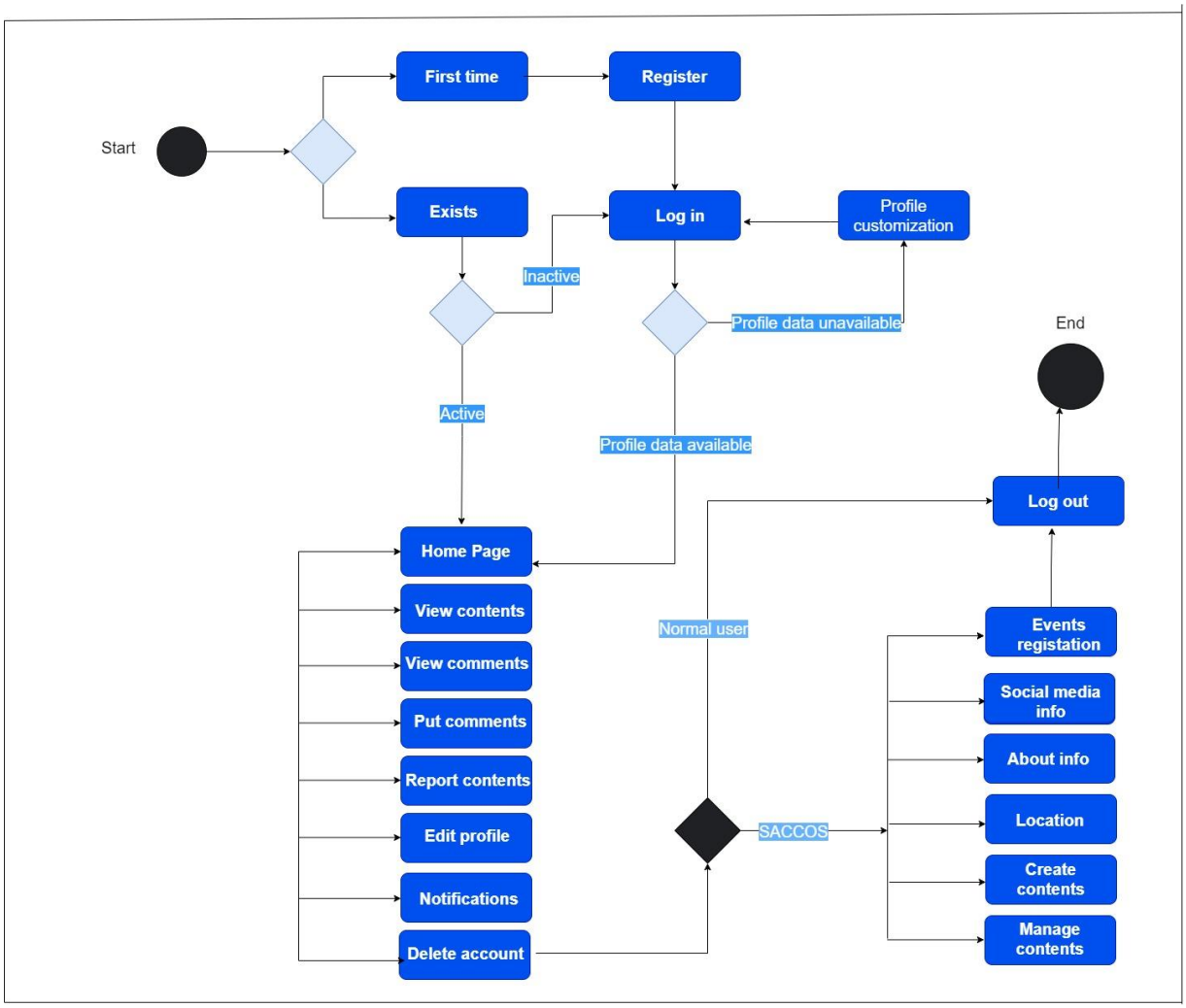



**Figure 6: Activity diagram**

### 3.9.2 Context Diagram

The context diagram depicts the general overview of the interaction of the key system entities and the system. All three users of the system have both input and output interaction with the system. Due to their limitation, each one has a set of different data they can input into the system. However, all users have access to viewing at least 80% of the data in the system. This is due to the nature and purpose of the application, which is, the dissemination of the information about SACCOS and Stakeholders to the mass audience. Figure 7 shows the context diagram for the interactive mobile application for information sharing between SCCULT, its member cooperatives, and other stakeholders.

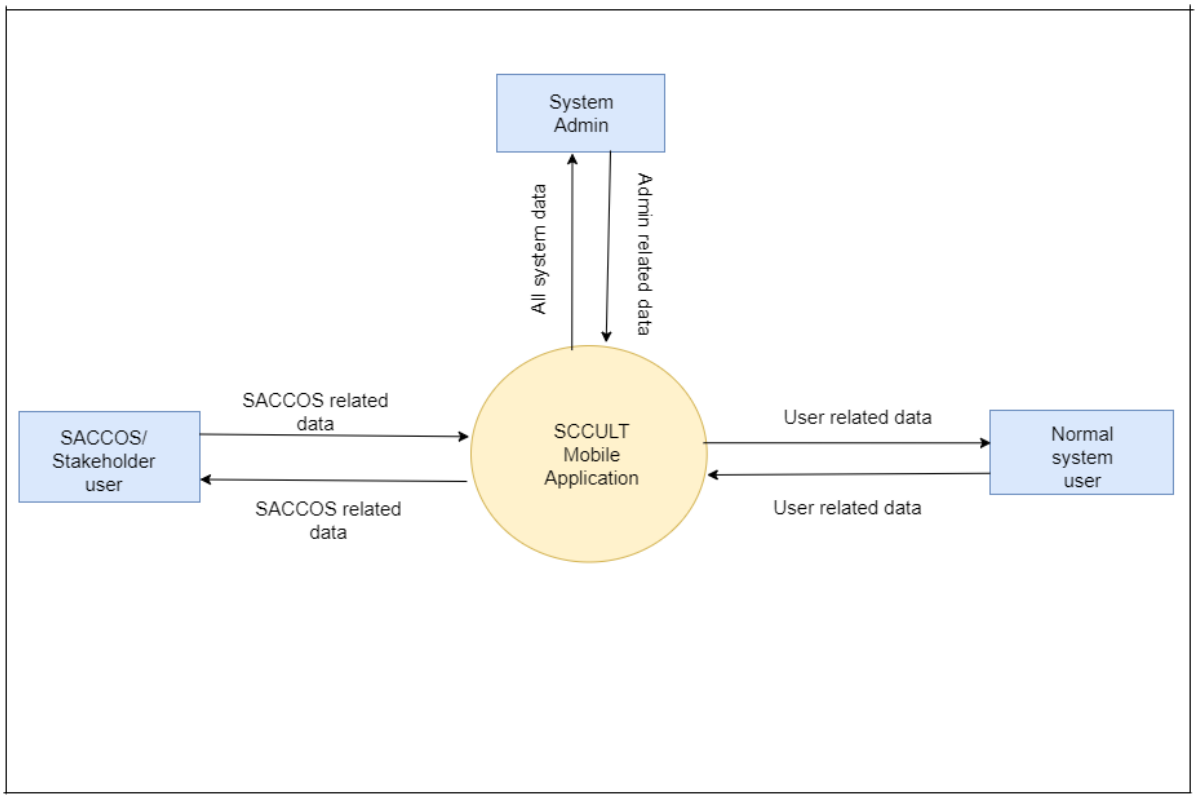



**Figure 7: Context diagram**

### 3.9.3 Data Flow Diagram

The data flow diagram was created for the main purpose of highlighting the flow of data between external entities, different key processes, and their related storage units. Only three external entities are described, these are, the administrator, SACCOS/stakeholder, and the normal system users. The few illustrated processes are account creation, profile customization, posters, comments, social accounts, events, event registration, and lastly, careers. All the processes lead to a data repository which is a table on a database. Moreover, all the entities have different roles to play in the insertion and retrieval of data based on their privileges. The most dominant is the administrator entity which has access to most of the data for control purposes. Figure 8 illustrates the data flow diagram level 2.

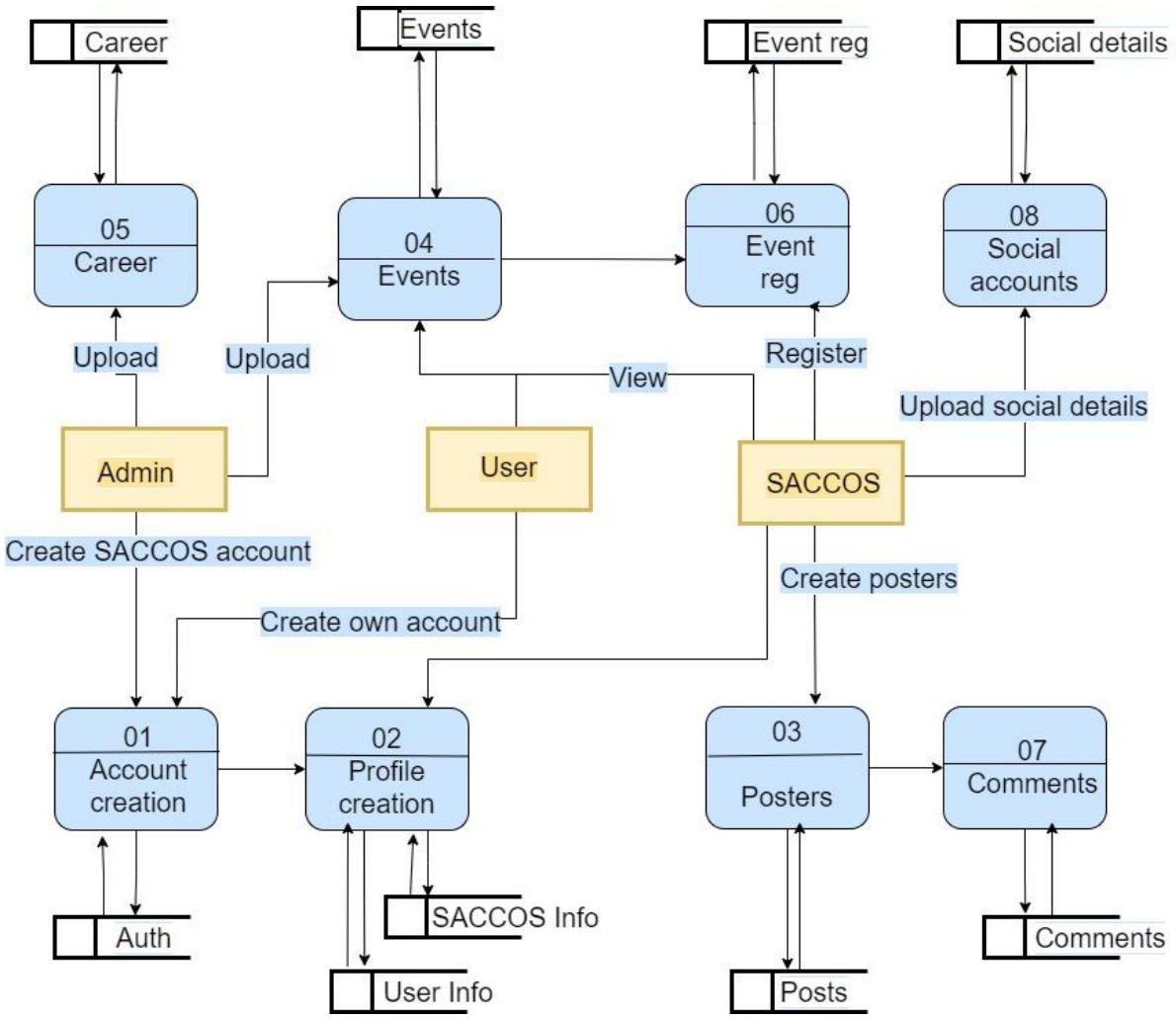



**Figure 8: Data flow diagram level 2**

### 3.9.4 Database Design

The interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS) and other stakeholders was implemented with a MySQL database. The database was chosen due its high efficiency in managing relationships between entities in the database. The database is made with a total of 11 tables that store different information as shown in the entity relationship diagram in Fig. 9. The PhP language was used in the connection and management of the database to the application through Application Programming Interface (API).

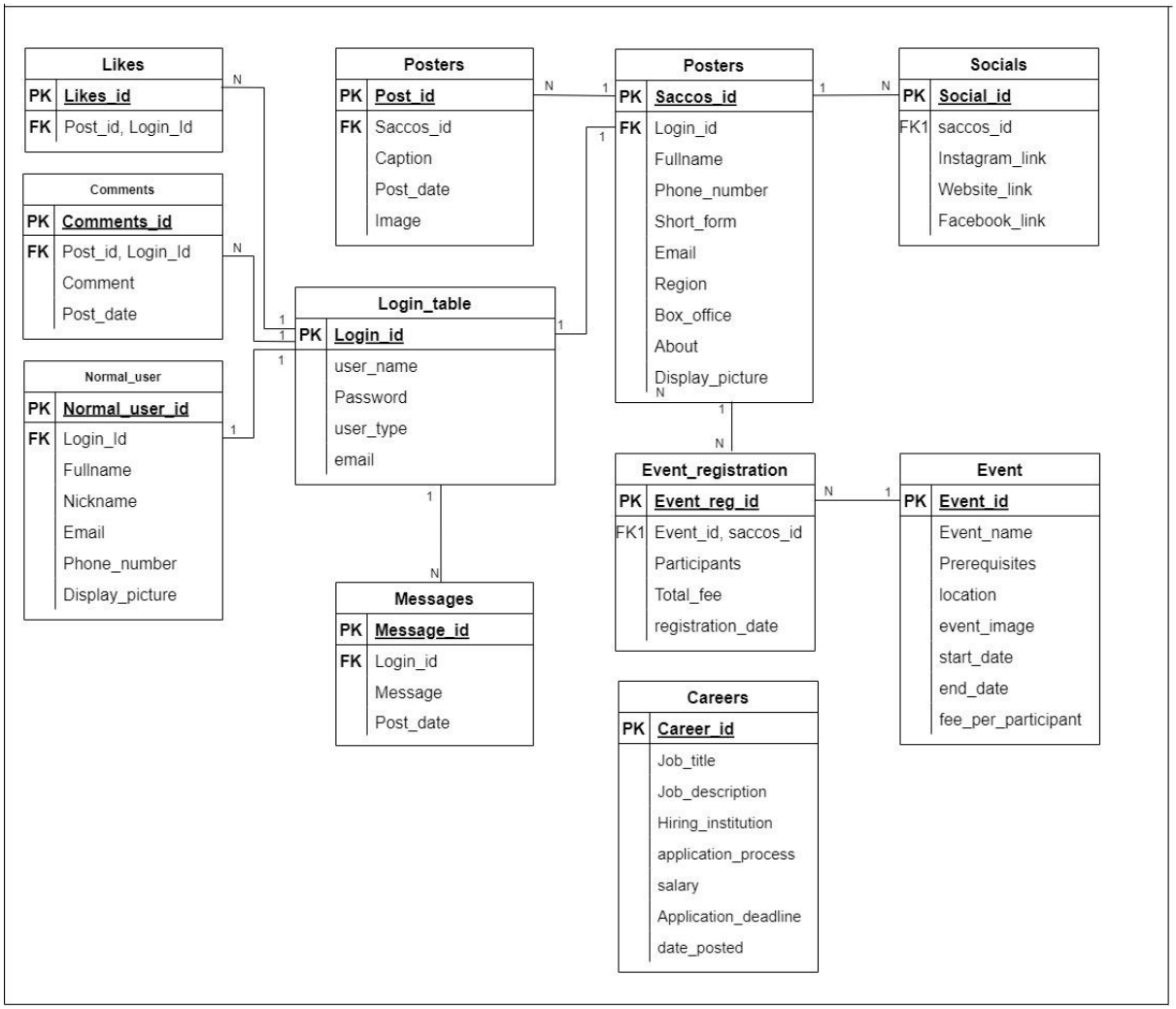



**Figure 9: Database entity relationship diagram**

### 3.9.5 Use Case Diagram

Figure 10 is the use case diagram. The diagram shows the interaction of the users with the system. Different users have different activities to do in the system, as well as their limitations. The SACCOS/stakeholder shares some activities with the User. Whereas, the activity labeled with green can only be conducted by the normal user. The activities labeled in red can only be conducted by the SACCOS/stakeholders, while the activities labeled in black are shared by both. Meanwhile, the administrator does not share their activities with any other user, except for the login activity which is shared by all the system users.

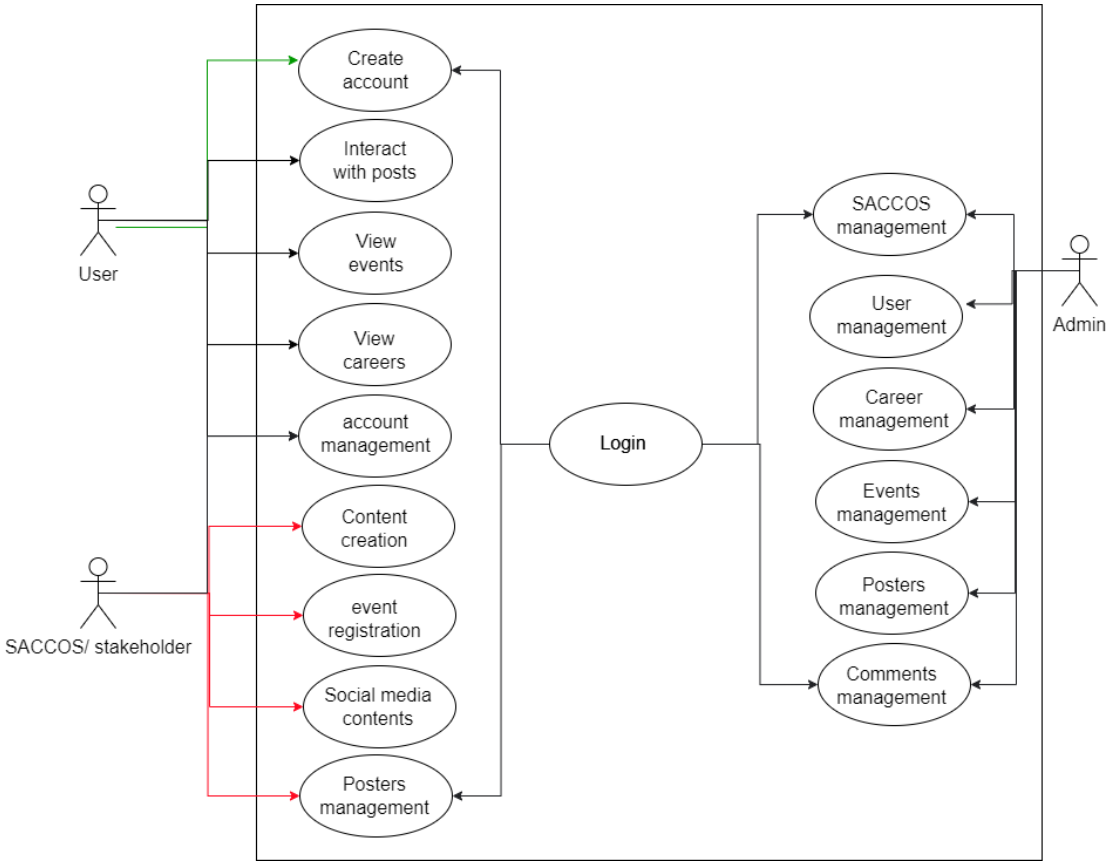



**Figure 10: System use case diagram**

## 3.10 System Development

Like any other software application, the interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS) and other stakeholders has certain requirements for proper functioning. This involves both hardware and software requirements. This subsection as well stipulates the different hardware and software requirements as used for the development phase. The following are the hardware and software requirements for the development and deployment of the mobile application of the subject.

### 3.10.1 Hardware Requirements

#### (i) Computer

A computer was required for development, for this case a laptop computer was used for easy mobility. The computer used was a laptop possessing a storage capacity of 1 Terabyte to foster data storage. On top of that, the computer was equipped with 8 gigabytes of memory (RAM). Such capacities allowed the proper installation of all the software required for the development of the mobile application and the smooth operation of all conducted activities.

**(ii) Android-based mobile phone**

A mobile phone with an Android-based operating system (OS) was required for system testing purposes. During development, the mobile application was tested at every stage to oversee its behavior and responses to different inputs and actions. Of current, the application is developed to work with the Android OS alone, but later on, it will be extended to work with other Operating Systems as well beginning with iOS and Windows in the future. In cases where the physical mobile device was not available; an emulator was installed to perform the same task.

### 3.10.2 Software Requirements

The following is a set of software that needed to be available for the development of the mobile application.

**(i) Android Studio**

It is an integrated development environment (IDE) specifically used for the development of mobile software/application programs. Standing alone, the IDE makes applications using the Java programming language. However, it is customizable to work with different frameworks using different languages. It can be done through the installation of related plugins to support the desired frameworks. The different frameworks are such as Flutter, Xamarin, Ionic, Kotlin, and React Native to mention a few. This project was made using the flutter framework which employs the dart language.

**(ii) Flutter framework**

Is among the frameworks compatible with Android Studio. The framework was selected because it works with a programming language called Dart which is very easy to learn and is not too far different from the C language. The language works with ordinary English terms, which makes it even easier to work with. The flutter framework is famous for its beautiful features which make very beautiful and eye-catching applications. It is a new framework but has means and is open to integration with a lot of other applications and plugins to ensure a successful implementation of the mobile application. The flutter framework is equipped with a lot of plugins that can be installed and customized to perform a certain task instead of developing every little feature from scratch. On top of it all, the framework develops both Android-based applications as well as iOS-based applications.

### (iii) The XAMPP

It is a database server that works with software including phpMyAdmin to handle PhP-related queries. The XAMPP supports both graphical user interface (GUI) and command line-based implementation of the database. It is also capable of producing an ERD representation of the database after completion. This server was selected to be used because it works well with MySQL Database Management System (DBMS) which is the DBMS used for the development of the mobile application at hand.

### (iv) MySQL

MySQL database management system is the DBMS created, implemented, and managed by the ORACLE Cooperation. It is a DBMS that works together with both mobile and web applications serving as a way to link the server and client sides of the database. It is a DBMS light, compatible, and compiles in all devices and platforms including web and mobile OSs. It is the means used to manage data sent and acquired from the database to the application and the opposite. The DBMS as well is free to download and use which alleviates developers and owners of the application of the licensing costs and other implications. Lastly, MySQL DBMS is a perfect choice for relational databases, unlike Firebase (Which is recommended for Android applications) which is no SQL DBMS.

### (v) Open Street Maps

It is a plugin in Flutter which enables the application to work with maps. With this plugin, the application is given capabilities to work with the maps in the application as much as the application has been given capabilities to do so. It is an open-source maps feature that was also selected to alleviate users of all the limitations brought about by the licenses. In the application, the maps provided by the named plugin are used to map the SACCOS for easy accessibility by users who wish to visit physically. However, the usage of the maps will keep on expanding as users keep on using the application and discover more upgrades to be made to the application.

### (vi) Application Programming Interface

These are the mechanisms used to provide means for more than one application to interact with one another. In the interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS), and other stakeholders APIs were used to connect the

MySQL database and the mobile application. This enabled the application to send and receive data to and from the database. With such data different activities are carried out in the application. Some APIs were made because the MySQL database has several related management files each performing a different activity. Therefore, different APIs were made to do different CRUD activities on one or more of the pages in the application.

**(vii) Domain name**

The mobile application had to be hosted for it to function properly and bring out the proper outcomes during the backend development. Therefore, the application had to have a domain name for it to be accessible on the web. On top of that, the domain name becomes a part of the API which is then used to work with connection between the application and the database.

# CHAPTER FOUR

# RESULTS AND DISCUSSION

## 4.1 Results

Deducing from the data collection methods mentioned in chapter three, in total three ways were used in data collection, focused group discussion for the members of SCCULT. The method was selected due to the small number of members in the office. Interviews were conducted with a few SACCOS; this was done as preliminary studies to justify the carry out of the research and determination of the problem. Thereafter, two surveys were conducted, first to determine requirements and second to validate the developed system.

### 4.1.1 Results from the Focus Group Discussions Held at SCCULT

Several series of focus group discussions were held at SCCULT involving the employees of the named organization. The first focus group discussion was conducted to assess the problems faced by employees in the organization that would require technological solutions involving the adaptation of the usage of mobile applications. The focus group discussion resulted in the formulation of the problem statement in chapter one above. From such discussions, the problems were identified, and their root causes were identified to foster the decision on the proper solution to be adopted.

Further focus group discussions were carried out to identify the requirements of the system to be developed that can satisfy the needs of the organization. The founded requirements were used as grounds for further requirements gathering in the different SACCOS visits and interviews. Moreover, other focus group discussions were conducted to approve the gathered requirements, approve the designs made from the requirements gathered and other adjustments to the requirements and designs. Furthermore, focus group discussions were conducted to oversee the system functionalities at the end of development and pose suggestions on the different amendments to be made for the relevance and perfection of the system.

### 4.1.2 Results from the Interview to Assess the Essence of Having a Dedicated Mobile Application for SACCOS and Their Affiliated Stakeholders

#### (i) Interview results summary

An interview was conducted at the very beginning of the project using an interview guide from (Appendix 1). The aim was to assess the current module operandi for marketing and advertising the SACCOS products and services. Later on, to assess the essence of having a dedicated mobile application for information dissemination about SACCOS. The interviews were conducted with 5 employees from 5 different SACCOS (3 from Dar-es-salaam, 1 from Moshi, and 1 from Songea regions). A total of 5 employees interviewed from each SACCOS made a total of 25 respondents.

Different initial questions were asked to the respondents to get to know the respondent well, their work position, and how closely they are affected by the statistics of customers in their SACCOS. This was done to find out the relevance and authenticity of their responses. The rest of the questions were to get the respondents' opinions on the subject matter. Table 2 depicts the summary of the responses to some questions regarding the essence of the development of the mobile application for SACCOS and their affiliated stakeholders.

**Table 2: Summary of the interview carried out to assess the essence of having a dedicated mobile application for SACCOS**

| Q. No | Interview Question | Positive response frequency | Positive response Percentage |
|---|---|---|---|
| 01 | Does the SACCOS make use of any social media? | 20 | 80% |
| 02 | Is the use of social media so far effective in news dissemination to members and potential members? | 15 | 60% |
| 03 | Does social media help you easily reach to other SACCOS even those you do not know about? | 3 | 12% |
| 04 | Do you think there is an essence of having an interactive mobile application that will bring together all the SACCOS, their customers, and stakeholders for information sharing and outreach? | 25 | 100% |

The results from the interviews revealed that SACCOS that are found in urban areas such as Dar-es-salaam and Moshi urban are exposed to the use of technology and their related services. This includes the use of social media for advertisement and customer acquisition. On the other hand, SACCOS located in rural areas such as Songea were limited to the use of technology due to lack of knowledge and resources to do so. However, the SACCOS users of social media have proven that it has made the communication of different news about the SACCOS to the mass a lot easier. However, being found by new users is still a problem. A user needs to be prior informed about the SACCOS for them to be able to find them. Moreover, all the SACCOS thought it was important for the SACCOS to have a dedicated platform where they can easily be found by their current and potential customers without requisition of full knowledge of the SACCOS. The results are summarized in a graph shown in Fig. 11. The questions are as well indicated in Table 2.

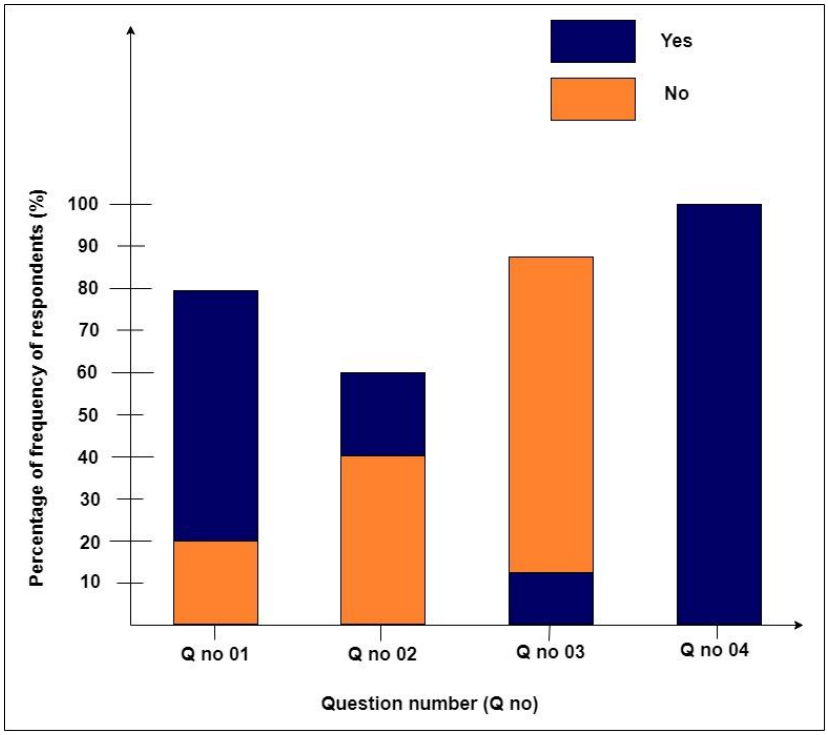



**Figure 11: Graph of percentage of frequency of respondents against specific question numbers on the interview**

### (ii) Other suggestions from the interview

Among the questions asked to the interviewees was what their suggestions on the different features were to be implemented to make the application more favorable for SACCOS recognition. This was to help gather more insights from the significant users of the application and key stakeholders of such an application. This was done to ensure the relevance of the

application and guarantee user satisfaction on top of the usability of the application. The following were the additional requirements acquired from the interview on top of the basic application requirements gathered from the focused group discussion with members of SCCULT. These results finalized the requirements collection phase. Table 3 lists down all the functional requirements, while Table 4 lists the system's non-functional requirements.

**Table 3: Functional requirements**

| Functional requirement | Description |
|---|---|
| Register | A user shall be able to register on their own to use the application as a normal user. |
| Register SACCOS and Stakeholders | An admin shall be able to register SACCOS and provide them with login credentials with different privileges from normal user. |
| Login | Both users can log in into the system to interact with it. |
| Information update | On first login, a user shall be prompted to give further information for profile creation. |
| Post contents | Only accounts registered by the admin shall be capable of posting contents. |
| Interaction with contents | All users in the system shall be capable of interacting with the application by commenting and liking. |
| Events creation | An admin shall be able to create new events to be viewed by the users of the application. |
| Event registration | SACCOS and Stakeholders shall be able to register to attend events. |
| Update profile info | SACCOS and stakeholders shall be provided with room to update their profile information. |
| Update login credentials | All users are capable of changing their login credentials. |
| Use locations | SACCOS and Stakeholders shall be able to pin their location to be viewed by different visitors of their pages. Other users cannot pin their location for privacy purposes. |
| Social media visitation | SACCOS and Stakeholders shall be able to put their social media links for direct social media visitation by their profile visitors. The social media are Instagram, Facebook, and website. |
| Logout | All users shall be capable of logging out once they are done using the application. |

**Table 4: Non-functional requirements**

| Non-functional requirements | Description |
|---|---|
| Availability | The mobile application shall be hosted. Any user can access it at any time upon the internet connection. |
| Performance | The mobile application shall be fast in the provision of required responses based on the input. |
| Security | The system shall implement encryption for login information. On top of that, different users shall have different interfaces which limits their application usage. |
| Usability | The application shall be user-friendly and self-explanatory. It should easily be used by any individual with knowledge of smartphone usage. |

### 4.1.3 Results from The Survey Questionnaire

A questionnaire survey shown in (Appendix 2) was conducted on ordinary individuals outside the SACCOS industry. This included random individuals who are not employees or related to SACCOS, SCCULT, or other SACCOS stakeholders. It was aimed at finding out about individuals' understanding of SACCOS and assessing how the project to create the mobile application can be of assistance in spreading the word about the SACCOS, SCCULT, and their stakeholders. A total of 150 individuals were reached by the questionnaire, and different responses were given for different questions. The following are the responses acquired for four clustered question types. The clusters are assessment of individuals' awareness about SACCOS, individuals' awareness of social media, users' experience using social media, and lastly other contributions. A summary of the responses to the questions asked is elaborated as follows.

#### (i) Assessing individuals' awareness about SACCOS

The first phase was to assess the individuals' awareness of SACCOS. The aim was to assess their knowledge of SACCOS and their activities. From there, the candidates were assessed to see their membership status in SACCOS and later on to see their interest in joining SACCOS in case they get enough information. The aim was to see the extent to which SACCOS are known by their potential customers in the society. The following Table 5 shows the responses to three knowledge questions posed.

**Table 5: Summary of results of the questionnaire to assess individuals' awareness about SACCOS**

| Q.no | Question | YES | YES% | NO | NO% |
|---|---|---|---|---|---|
| 05 | Do you know anything about the savings and credit cooperatives societies in Tanzania? | 47 | 31.3 | 103 | 68.7 |
| 06 | Are you a member of any savings and credit cooperative society (SACCOS)? | 02 | 1.3 | 148 | 98.7 |
| 07 | Do you get enough information about the SACCOS such that it influences you to join or retain your membership? | 02 | 1.3 | 148 | 98.7 |

Three questions were asked in the first cluster of questions. They were about awareness of SACCOS, the membership status of the candidates, and how easily they reach information about SACCOS enough for them to be eager to join. Forty-seven (47) individuals out of 150 responded yes as to whether they know about SACCOS. Though some of them just had ideas of their existence since they just heard of them from childhood. This constituted to 31.3% of the entire candidate population. The rest, i.e., 103 responded NO which is a 68.7% of the population. Out of the 150 questioned respondents, only two were members of a SACCOS, while the rest (148 constituting to the 98.7%) were not members and claim to have not enough information to trigger them to join SACCOS. This concludes that very few people know the term SACCOS and even fewer people know what SACCOS really does. Figure 12 is a graph showing the results of Table 6 in pictorial form.

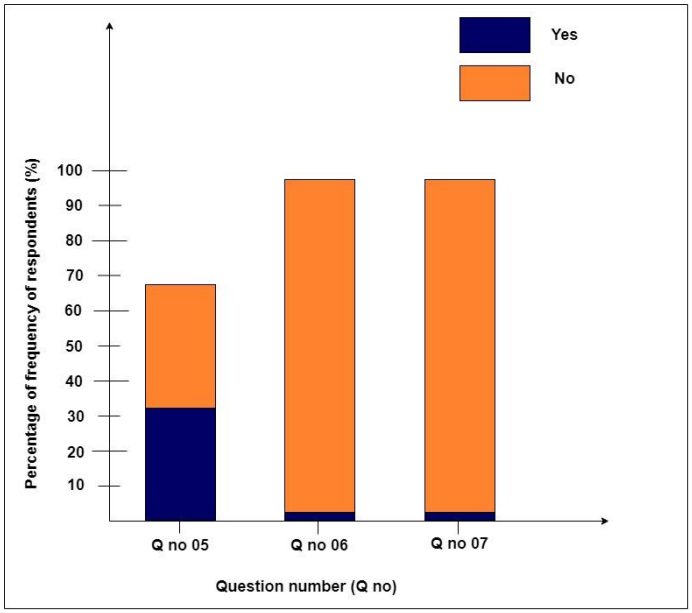



**Figure 12: Graph of percentage of frequency of respondents against specific question numbers (Questions about individuals' awareness about SACCOS)**

**(ii) Assessing individuals' awareness and usage of social media**

**Table 6: Summary of questionnaire results assessing the individuals' awareness and usage of social media**

| Q.no | Question | YES | YES% | NO | NO% |
|---|---|---|---|---|---|
| 08 | Do you have any idea of what social media is? | 100 | 67 | 50 | 33 |
| 09 | Do you ever use social media to seek information about products or services? | 85 | 57.7 | 65 | 43.3 |
| 10 | Have you ever encountered any information about SACCOS in your social media page? | 05 | 3.33 | 145 | 96.7 |

The second cluster of questions was to assess individuals' usage of social media and social networking sites. A total of 100 individuals agreed to be using social media, which constitutes of 67% of the population. The 33% left confirmed to not be using such sites due to reasons such as missing resources such as smartphones, and other personal reasons such as the hate of social interaction and irrelevance of the information found in social media. Out of the 100 users of social media, only 85 (57.7% of the entire population) agreed to be using social media to look for information about products and services. The main reason for such was easy access to the required information without the need for physical presence at the site of service provision. The remaining 43.3% denied the usage of social media to seek information, the reasons being fraud and false information on the sites. Meanwhile, only 3.33% equivalent to 05 respondents have agreed to have encountered news about SACCOS on the social media platform at least once. Figure 13 and Table 6 give a summary of the explanation above.

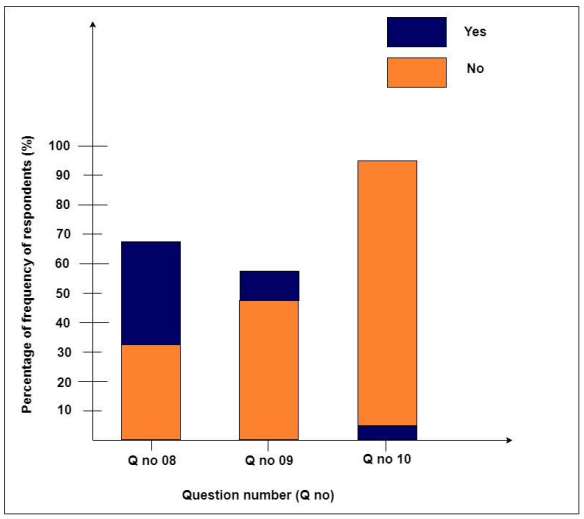



**Figure 13: Graph of percentage of frequency of respondents against specific question numbers (Questions about individuals' awareness and usage of social media)**

**(iii) Assessing individuals' experience in usage of social media**

**Table 7: Summary of questionnaire to assess user experience using social media**

| Q.no | Question | YES | YES% | NO | NO% |
|---|---|---|---|---|---|
| 11 | At all times the social media updates acquired and suggested are those of interest of the user. If it happens an individual has no idea about the existence of certain issues it becomes almost impossible for them to be exposed to such content. Do you think this sentence is valid? | 90 | 60 | 60 | 40 |
| 12 | Do you think there is an essence of separating news and updates from differing sectors in social media to influence engagement and ease of access to information on that specific sector? An example separating updates of entertainment from finances and academic sectors? | 125 | 84.4 | 25 | 16.6 |
| 13 | Do you think ease of access to information on a certain type of topic or content helps in the increase of engagement and participation in the different activities held in the named sector? | 125 | 84.4 | 25 | 16.6 |
| 14 | Do you think there is an essence of having a dedicated network about the SACCOS in Tanzania to bring closer to users' news about such SACCOS? | 120 | 80 | 30 | 20 |

As shown in Table 7, the third cluster of questions was to assess the experience of users when using social media concerning content generation and information acquisition. To answer the question of whether the content generation is centered on what an individual interacts a lot with whether if an individual does not know about a specific topic it becomes almost impossible for them to know about its contents from suggestions. Ninety (90) users which equal to 60% agreed to the claim. It is known that social media sites suggest content based on the trending searches and users' most-watched content. A person therefore has a predefined interaction with content and rarely suggested new themes of content. This limits users' exploration and discovery of other types of content especially the most uncommon, SACCOS included. One hundred twenty-five (125) respondents agreed that there is an essence of separating platforms based on content. This equals 84.4% of the population. Reasons stated were such as relevance and interests. Some individuals do not find social media interesting because the most trending news is of less importance to them. Having a separation of certain types of news from others will definitely trigger their engagement interests. One hundred twenty (120) respondents (80%) said

it’s important to separate SACCOS-related platforms from others to make the news easily reachable and more relevant. The result is illustrated in the Fig. 14 from questions in Table 8.

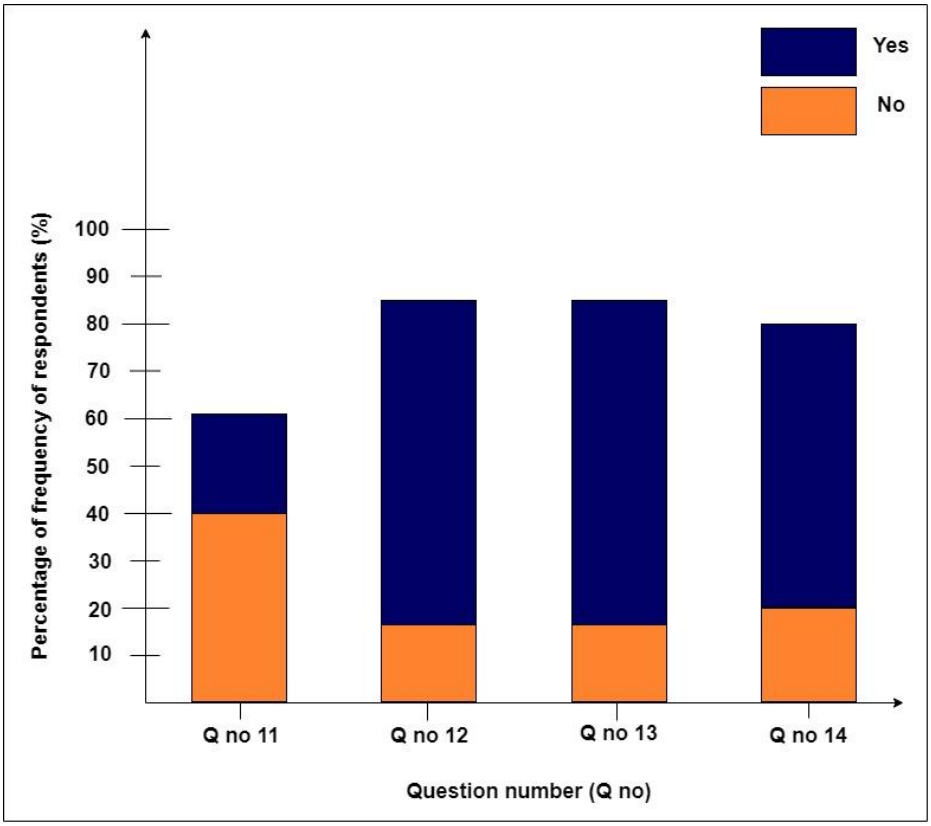



**Figure 14: Graph of percentage of frequency of respondents against specific question numbers (Questions about individuals' experience while using social media)**

### (iv) Other contributions from the survey

Two other questions were asked to the respondents in the quest to seek their opinions on the functionality of the proposed system and their experience in the social media application usage. The questions and their sorted responses were shown as follows:

(a) What are the things that bother you when you are using social media?

- Irrelevance of the content. One gets content even those they are not interested in.
- Use of bad and abusive languages.
- Disrespectful content involving body parts and disrespectful activities.
- Fraud and impersonation. Fake accounts and fake businesses online.

- False news dissemination for the sake of getting views and follows.

(b) If there gets to be such a network suggested in 2 above, what services other than the ones provided by social media should be added?

- Put limitations to content creation and dissemination.
- Eliminate fraud and impersonation of businesses and public figures.
- Limit or remove individuals with disrespectful content or comments that will be viewed and absorbed by users.

### 4.1.4 Developed System

The interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS), and other stakeholders, is a platform that brings together different individuals to get official news concerning SACCOS and SCCULT. It makes use of different mobile technologies to capture news and put them in public for community consumption. Filter out any displeasing content in the comments of the posting section before it is released to the public to be reported later. Figures 15, 16, and 17 are designs of the login page, admin panel, and home page for SACCOS / stakeholders. The application was developed to mimic these designs (three selected to represent others).


**Figure 15: Design of the login page**


**Figure 16: Design of the admin control panel**

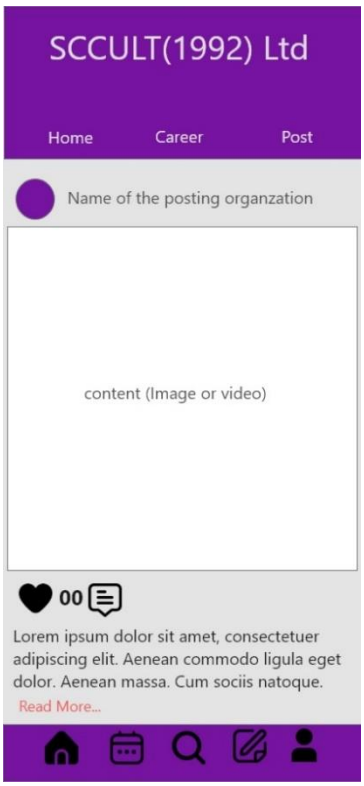



**Figure 17: Design of the SACCOS/ Stakeholder home page**

### 4.1.5 Advantages of the Mobile Application

Different studies have been done to show the effectiveness of centralization of the same content to enhance interaction and discussion about products to raise consumers' interests (Phang *et al.*, 2013). Information being easily reached on the same subject in bulky has proven better engagement and a sense of better representation. In addition, engagement with consumers in product creation fosters creativity and ensures the acceptability of the product and the satisfaction of the users. This is because consumers are given room to input their insights on products that reflect their needs (Yepeng *et al.*, 2022). Nevertheless, traditional ways are still required to retain customers, while the platform will exist to help acquire new customers (Perez-Vega *et al.*, 2022).

(i) The mobile application brings news and information about SACCOS and SCCULT to individuals in society to a glimpse of their hands.

(ii) The mobile application allows users to know about the different events that will take place in the Cooperative realm.

(iii) The mobile application allows SACCOS to register to attend different events.

(iv) The mobile application allows its users to use map navigation to physically locate the SACCOS of their choice.

(v) The mobile application allows SACCOS and SCCULT to post different video and picture media files for all users to view and learn.

(vi) The mobile application allows normal users (others than SACCOS and SCCULT) to put comments on the different posts

(vii) The mobile application gives information about SCCULT on a special page.

(viii) The mobile application gives admin capabilities to control all users, their content, comments, and accounts.

### 4.1.6 Application of the System

(i) The mobile application can be used by other SACCOS unions anywhere in East African countries.

(ii) With minor modifications, the application can be used for other businesses that seek to disseminate specific types of content to their users.

### 4.1.7 System Architecture

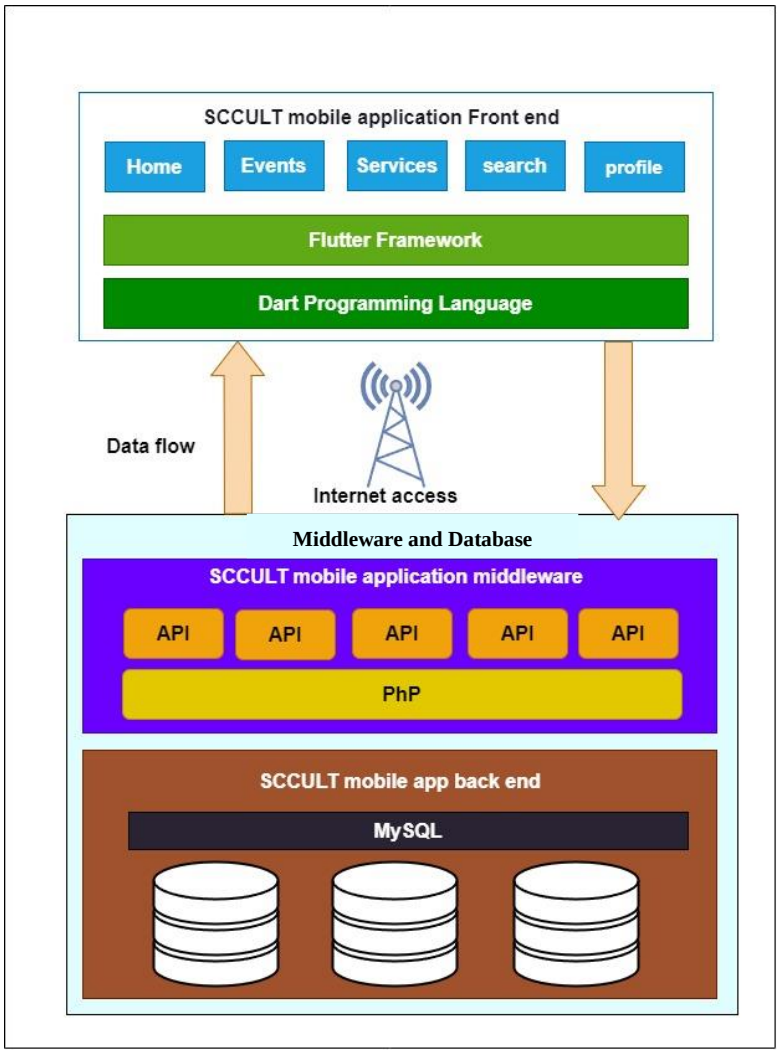



**Figure 18: System architecture**

Figure 18 shows the developed system architecture. The developed system is a mobile application to foster communication of news and information from SACCOS to their affiliated stakeholders. The application consists of mobile application users, the internet, the application server, and the database. The users are of three types, normal users, SACCOS/stakeholders, and system administrators. The internet is an important constituent since a user will not be able to access the application contents if they are not connected to the internet. The application server is where the source code for the application is hosted. The database is the last component where data is being stored. The application server is the controller that manages the interaction between the database and the application user. The Android development kit with the Flutter framework as shown in the Fig. 19 in the front end.

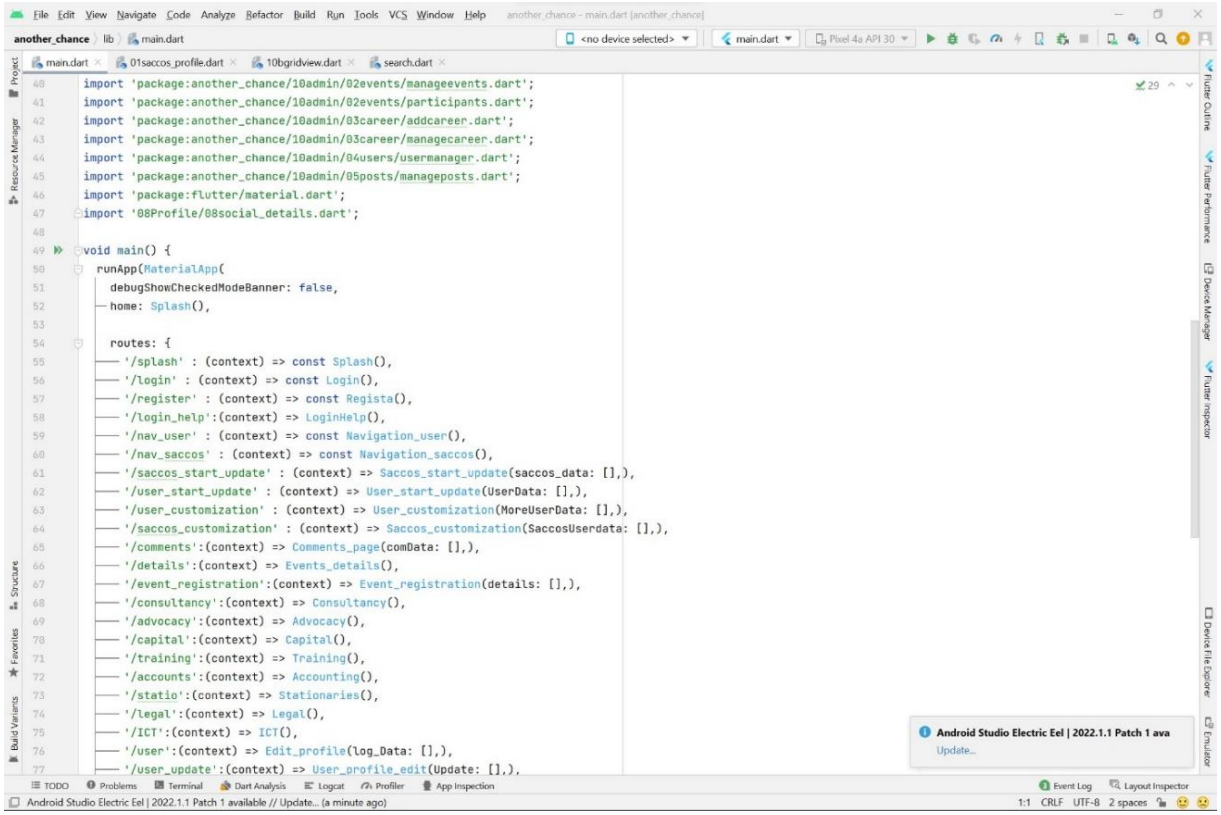



**Figure 19: Android studio integrated development environment**

### 4.1.8 Outcomes of the Mobile Application

The interactive mobile application for information sharing between SCCULT, cooperative members SACCOS, and other stakeholders is created with several pages that work together and share data among themselves to make the application usage smooth. The application starts with a splash page leading to a login and registration page. These pages later on expand into the navigation bar that links main pages including the home page, events page, search page, services, and lastly the profile page. These pages are somewhat the root pages of many other subdivision pages, to make the application more self-explanatory. The following are the pages clustered based on their root pages and relationships.

#### (i) Start-up pages

The startup pages are comprised of the splash screen, login screen, register screen, and the help screen. The splash screen in Fig. 20 gets seen as the first page upon application start-up. It signifies that the application is open and loading the right page, and hence user needs to be patient.

If the user has an account but is not logged in, they will be directed to the login screen in Fig. 21 for them to let themselves in. The user will be required to insert their phone number and password in the interface in, for them to be logged in. If the password and username do match with the ones in the database, the user will be let into the system.

If a user does not have an account, they will be required to register to become members in Fig. 22. They will be required to provide their email address, phone number, and password as shown in the. Once all data is provided in their correct forms, the user login details will be accepted. The user will then be able to log in using their registered phone numbers and their password.


**Figure 20: Application splash screen**

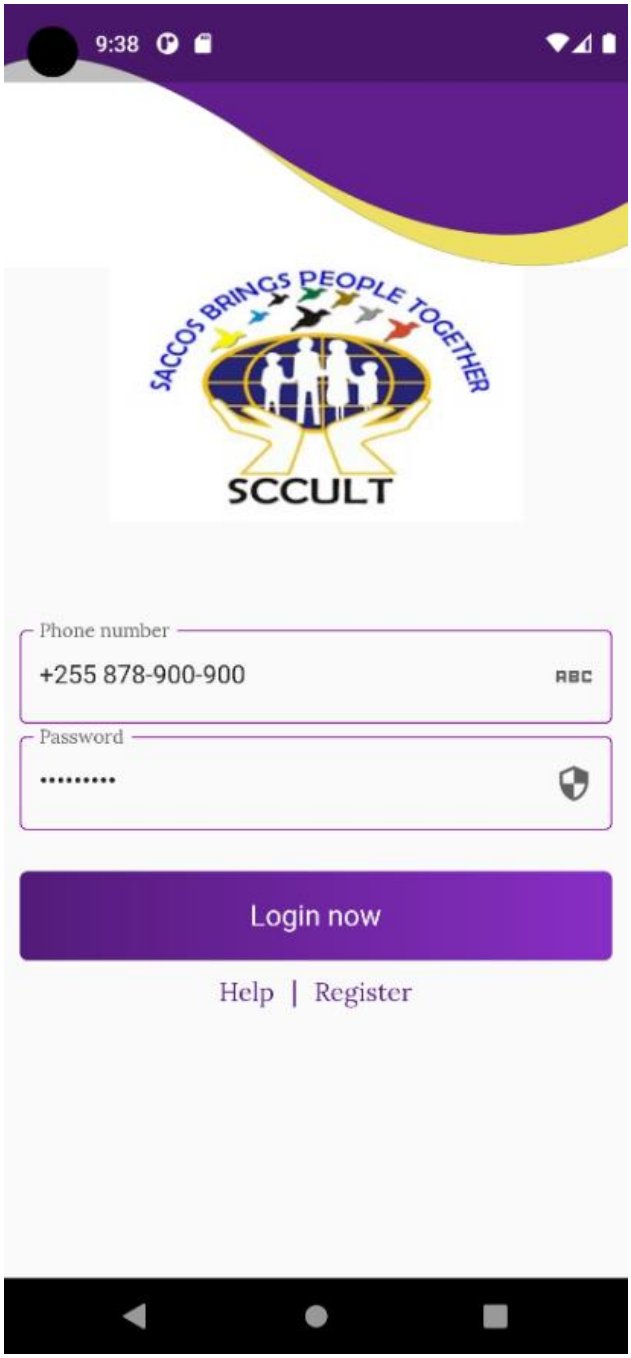



**Figure 21: Application login form**

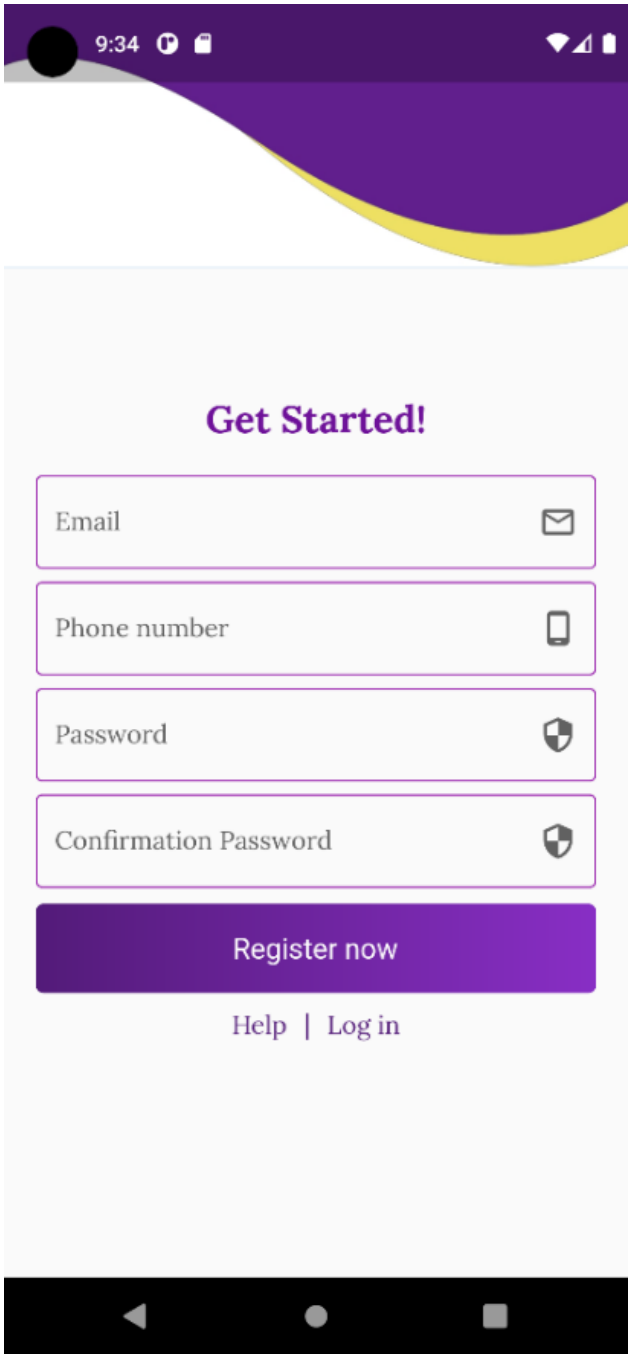



**Figure 22: Application registration form**

### (ii) Profile creation pages

Every user will be required to provide extra information about themselves on the first login. They will be prompted by the profile update screen in Fig. 23. The information provided will be used to create their profile. Some of this information will be displayed on the user's content such as comments or posters. The information provided differs between a SACCOS user and a normal user. For the normal user, only their names, usernames, and profile photos will be required, they will therefore make use of the interface in Fig. 24. While for the

SACCOS/Stakeholders extra information about their address, and about information will be required, see Fig. 25. This is to help users know better about their organization. Because the information required is different, then different profile creation pages are provided to the different user types.


**Figure 23: Profile customization start page**

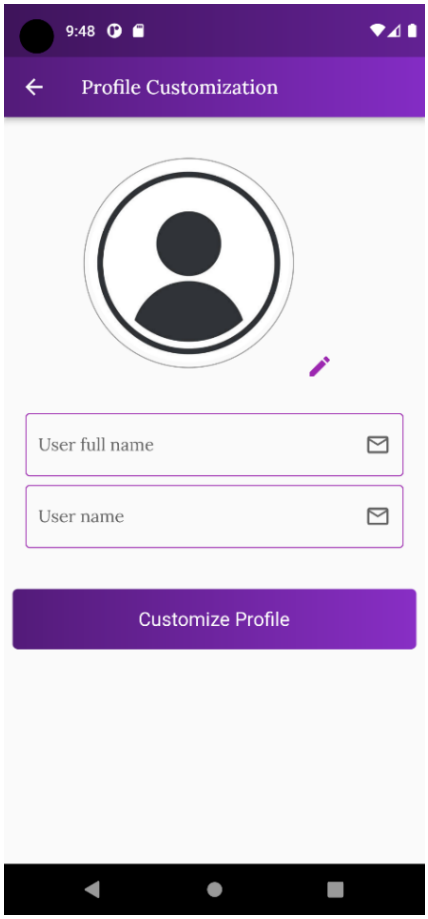



**Figure 24: Normal user profile customization page**

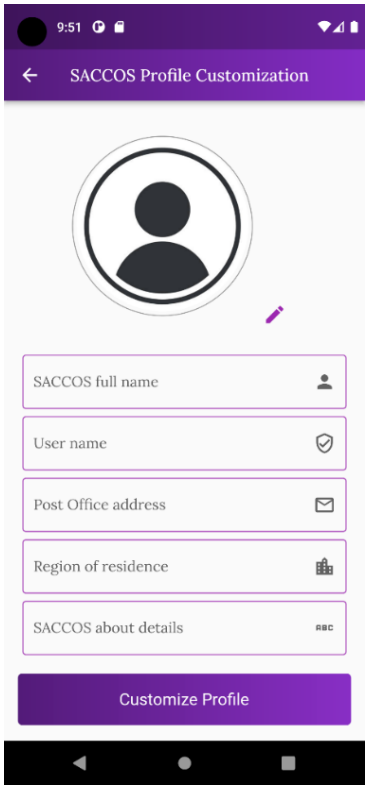



**Figure 25: SACCOS profile customization page**

### (iii) Home pages

Once the profile is set up, the user will be prompted to log in again to adapt the changes and place the information in the right places in the application. Upon the second login, the user will be taken to the home page. Three types of users have three different home pages.

The system admin is taken to the dashboard as their homepage in Fig. 26. The dashboard is equipped with tiles that will help the admin manage different items in the entire mobile application. The admin can manage SACCOS by registering them. By registering the SACCOS, they earn the right to do extra roles in the application and have a profile different from the normal users. The admin can as well manage posts in general, events, normal users, and comments.

A normal user is taken to a home page characterized by a navigation bar that will enable them to navigate through five pages. The homepage, events page, search page, SCCULT services page, and their profile. The homepage of the user has only two tabs, one for contents view and the other for career view as seen in Fig. 28.

SACCOS/stakeholders' homepage is slightly different home page since they as well have a posters page. The posters page is the place where posts can be created. This, therefore, means that SACCOS/stakeholders have the right to create content. While normal users will only view the contents and put comments s seen in Fig. 27.

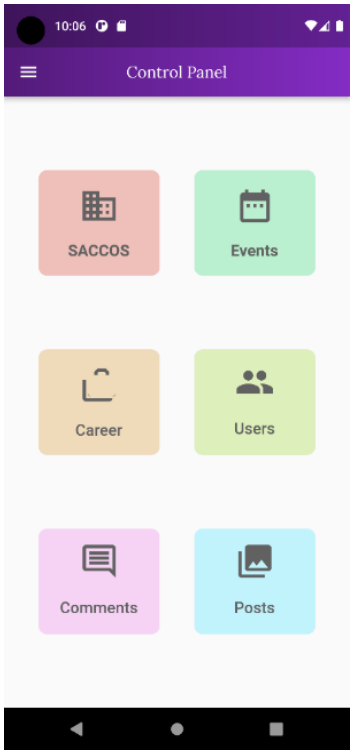



**Figure 26: Admin control panel**


**Figure 27: SACCOS/Stakeholder homepage**


**Figure 28: Normal user home page**

**(iv) Events page**

Is the page that advertises the different pages that are to be hosted by SCCULT. These events are dedicated to SACCOS, though users can also view them to stay updated on the different activities done by SCCULT and SACCOS. The events page is characterized by two tabs. The first is for the events summary and the second one is for event report's view Fig. 29. The events summary allows the user to view details. Within the events details page, one can choose to register for the event Fig. 30. The SACCOS registering for the event will need to specify the number of participants they are willing to send. The application will calculate the total amount to be paid. The user will choose to carry on with the registration by confirming registration or ignore the registration by going back to Fig. 31.

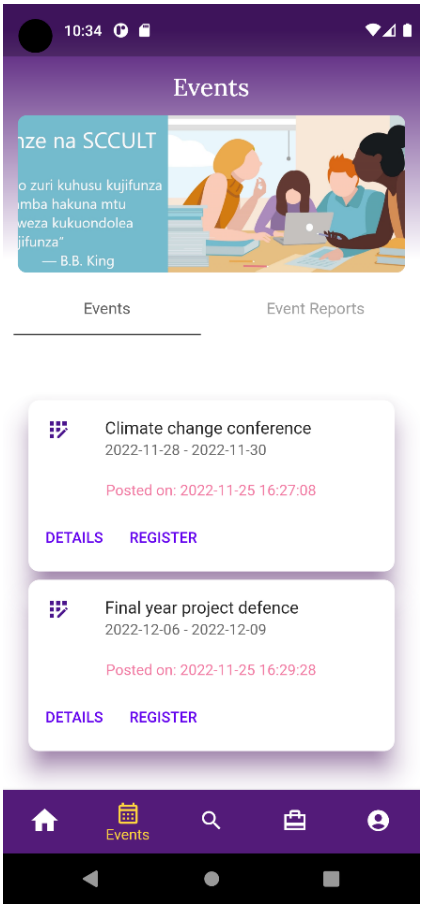



**Figure 29: Events list page**

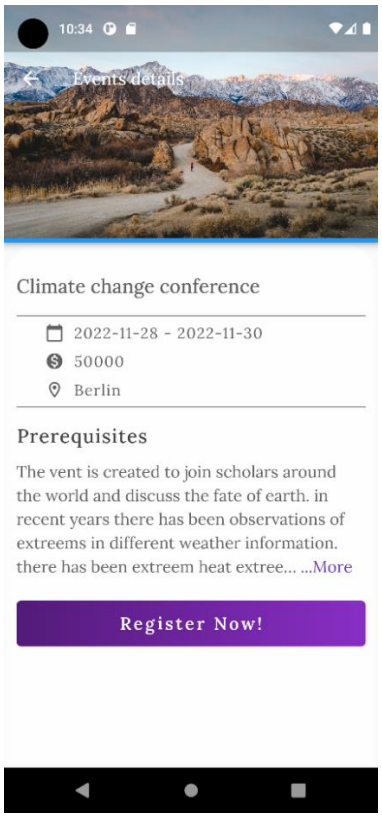



**Figure 30: Specific event view page**

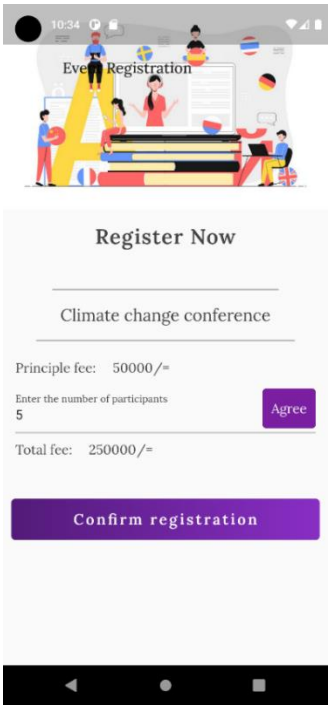



**Figure 31: Events registration page**

### (v) Search page

Figure 32 is the search page that was created specifically to help users find SACCOS based on different random parameters. The user can search for SACCOS by inserting in the search box the region of residence or some letters of the names of the SACCOS. The application will as well provide suggestions to the user to make the search slightly easier.

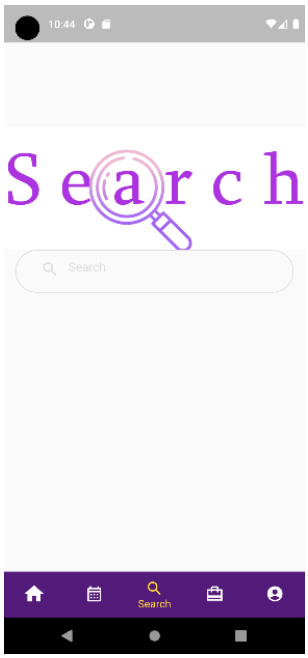



**Figure 32: Application search engine**

### (vi) Services page

The service page in Fig. 33 is a special page dedicated to SCCULT (owners of the application). The page is dedicated to giving different information about the league and its activities. The page is characterized by more pages in association with the specific service offered such as that in Fig. 34.

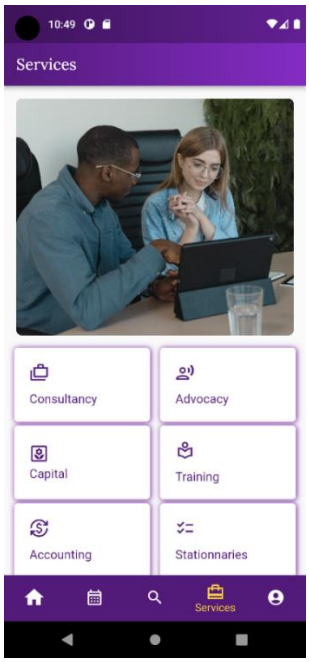



**Figure 33: Service page**


**Figure 34: Details of a specific service offered by SCCULT**

### (vii) Profile page

A page that explains in detail who this user is. Different profiles are provided for SACCOS and normal users. A normal user profile is simple Fig. 35. A profile for the SACCOS has more details and navigations as shown in Fig. 36. Information about their location through a map, they're about details depth, and social media information for further knowledge about the application.

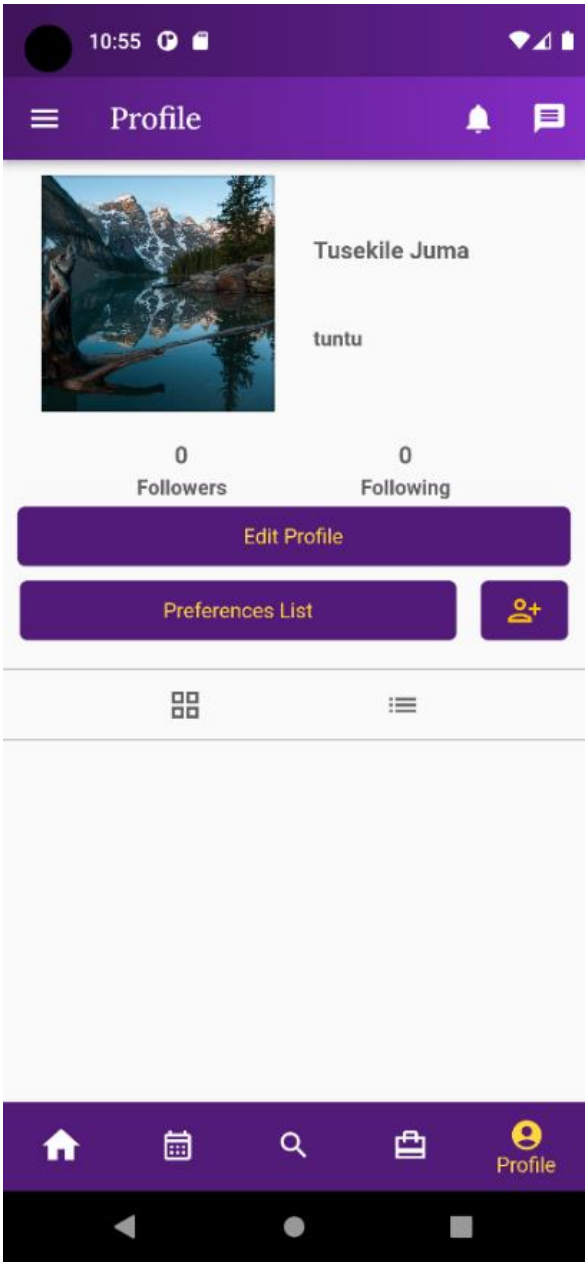



**Figure 35: Normal user profile**

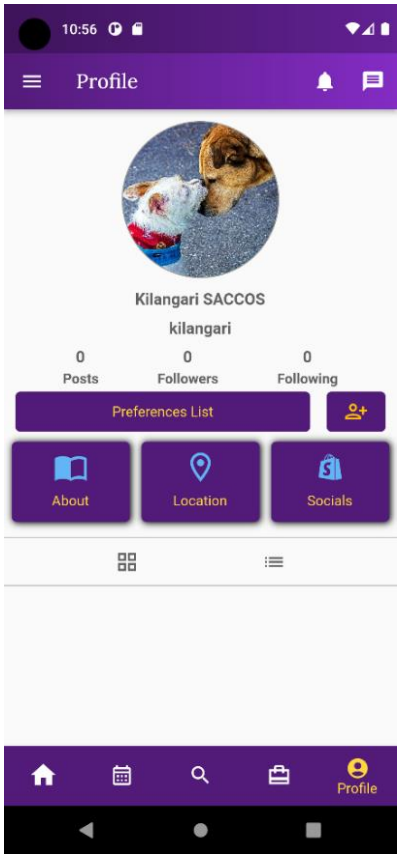



**Figure 36: SACCOS/ Stakeholders profile**

More information on the SACCOS pages from their profile pages.

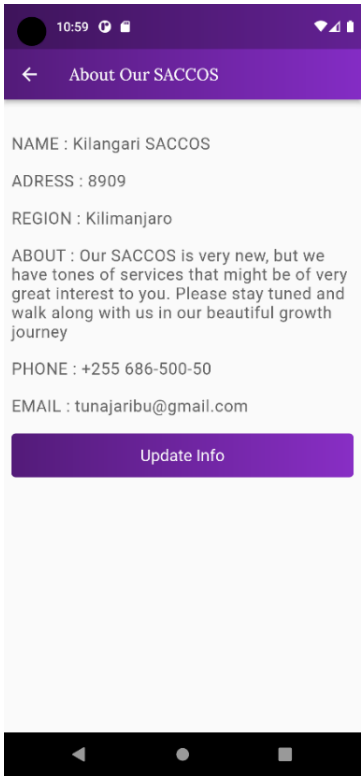



**Figure 37: About details page for SACCOS/ Stakeholders**


**Figure 38: Locations page for the SACCOS location**

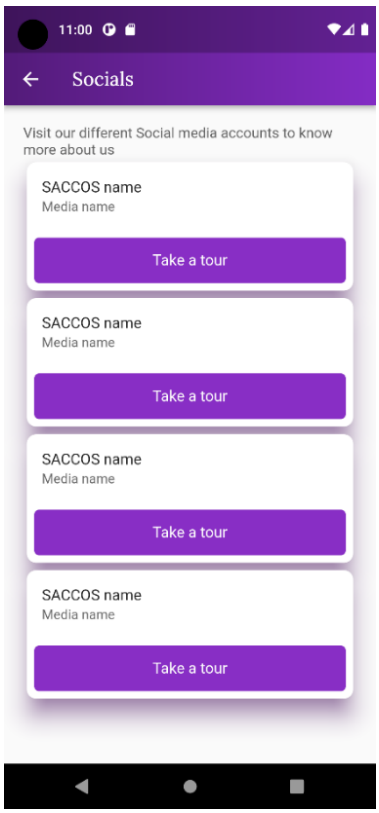
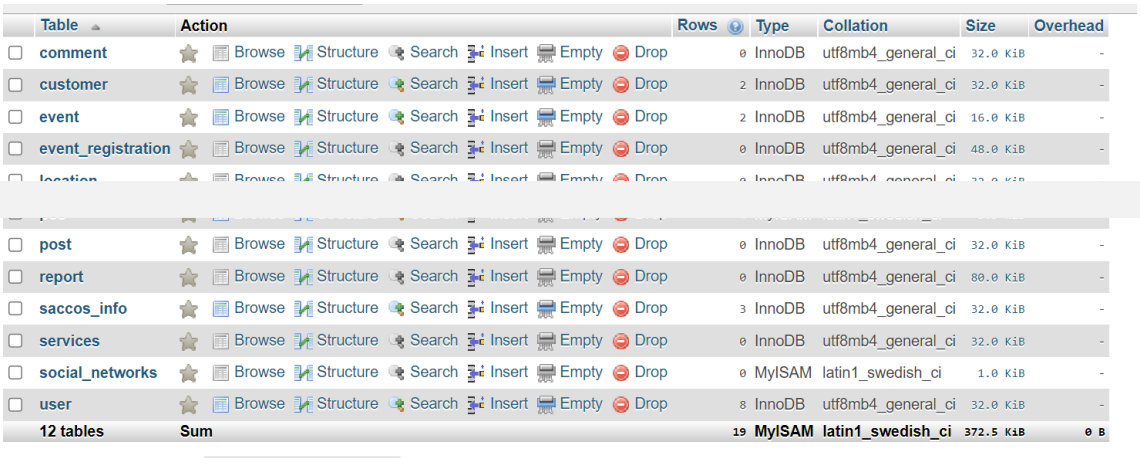



**Figure 39: Social media information about SACCOS/Stakeholders**

### (viii) Database

The interactive mobile application for information sharing between SCCULT, cooperative members SACCOS, and other stakeholders was implemented with a MySQL database. The database was chosen due to its high efficiency in managing relationships between entities in the database. The database is made with a total of 11 tables that store different information in the database as shown in Fig. 40.



| | Table | Action | Rows | Type | Collation | Size | Overhead |
|---|---|---|---|---|---|---|---|
| ☐ | comment | Browse Structure Search Insert Empty Drop | 0 | InnoDB | utf8mb4_general_ci | 32.0 KiB | - |
| ☐ | customer | Browse Structure Search Insert Empty Drop | 2 | InnoDB | utf8mb4_general_ci | 32.0 KiB | - |
| ☐ | event | Browse Structure Search Insert Empty Drop | 2 | InnoDB | utf8mb4_general_ci | 16.0 KiB | - |
| ☐ | event_registration | Browse Structure Search Insert Empty Drop | 0 | InnoDB | utf8mb4_general_ci | 48.0 KiB | - |
| ☐ | post | Browse Structure Search Insert Empty Drop | 0 | InnoDB | utf8mb4_general_ci | 32.0 KiB | - |
| ☐ | report | Browse Structure Search Insert Empty Drop | 0 | InnoDB | utf8mb4_general_ci | 80.0 KiB | - |
| ☐ | saccos_info | Browse Structure Search Insert Empty Drop | 3 | InnoDB | utf8mb4_general_ci | 32.0 KiB | - |
| ☐ | services | Browse Structure Search Insert Empty Drop | 0 | InnoDB | utf8mb4_general_ci | 32.0 KiB | - |
| ☐ | social_networks | Browse Structure Search Insert Empty Drop | 0 | MyISAM | latin1_swedish_ci | 1.0 KiB | - |
| ☐ | user | Browse Structure Search Insert Empty Drop | 8 | InnoDB | utf8mb4_general_ci | 32.0 KiB | - |
| | 12 tables | Sum | 19 | MyISAM | latin1_swedish_ci | 372.5 KiB | 0 B |

**Figure 40: A snap of the Database actual view**

### 4.1.9 Testing and Validation of the Developed System

V-model was employed for the testing of the system. All activities for speculation, collaboration, and learning were conducted to collect requirements, design, and development of the system. Alongside such, test cases were being developed and plans for testing were conducted in each stage. Thereafter, unit testing, integration testing, system, and acceptance testing were done as planned. The tests were done as shown below.

### (i) Unit Testing

Individual components of the application were tested by their input and output. All the inputs are inserted to get data that will be stored in the database for long-term use. The inputs taken from individual units are later manipulated and provided as output to one or other units in the system. The results of the named test were placed in Table 2. The result describes every unit component tested in the application.

**Table 8: Summary of the results from unit test**

| Unit Testing Areas | Outcome Test | Results |
|---|---|---|
| User Registration | Register by creating user login credentials and email details. | PASS |
| User login | Sign in with the user phone number and password. | PASS |
| User profile details | On the first login, the user is required to provide profile information, full name, user name, and display picture. For SACCOS more details is required. | PASS |
| Posters upload | SACCOS and stakeholders have access to uploading posters to other users in the form of videos or images with associated captions. | PASS |
| Poster's view | All users are able to view the posts created by SACCOS and Stakeholders in real-time. | PASS |
| Comments | All users of the system can put comments on the posted contents. | PASS |
| Events creation | The system admin creates events and posts them to all users to view and register if eligible. | PASS |
| Events details | Event details can be viewed by all users for the sake of them being updated about the different activities taking place in the SACCOS realm. | PASS |
| Events registration | Only SACCOS and their affiliated stakeholders are capable of registering for events. | PASS |
| Search engine | All users are capable of searching for SACCOS and Stakeholders in the system. | PASS |
| Profile view | All users can view their profile details on the profile page. | PASS |

**(ii) Integration Testing**

All pages in the system are connected to at least one other page. All the pages are connected using routes. The data are as well shared from one page to the next through route arguments and at areas of pages connected without routes, class arguments are used. For the pages that were used as landing sites for the data from the database, data is received through APIs and distributed to other pages using the methods mentioned above. The data were received through model classes created for each data cluster. With data passage through route arguments and

class arguments, it is easier to keep track of activities taking place from one page to another. This way, the privacy of individual data is guaranteed and so is the security of these data.

**(iii) System Testing**

The entire system was then tested after all the individual modules were linked to at least one other module and later on joined with all other modules. All modules' behaviors were here by tested to detail their behavior and responses on users hopping from one page to the other. The reflex on data output, the accuracy of the output, and the general response time for each output.

### 4.1.10 Validation of the Developed System

The validation process was done to validate and verify the system. This is to make sure that the system responds to different inputs by providing output. On top of that is making sure that the application does provide the correct and desired output to the user of the application. The validation test was done in several tasks and clusters as mentioned in 4.2.1 above. The validation was done by testing the different cluster components, in their unit forms, while integrated with other components and lastly the entire system as a whole. Several users were given the application to use and provide their views and feedback on different parameters. From the user experience, the system was accepted by the user with several changes from observation to make the application more relevant. Changes were like the formatting of the phone numbers, limitation to inputs by the usage of Regular Expressions, and at some point, use of user inputs validation.

**(i) User acceptance**

A questionnaire form (Appendix 3) was circulated among the tester application users to oversee their general experience with the application usage against several qualities expected from the stakeholders of the application. The following were the responses to the few most relevant questions concerning the subject matter. The questionnaire was circulated to the SCCULT workers and a few stakeholders of the organizations including 2 SACCOS. The questionnaire featured 30 respondents and the Table 9 that follows summarizes the frequencies and percentages of the responses. Furthermore, the graph in Fig. 41 that follows illustrates the responses.

**Table 9: Summary of the system validation**

| Q.no | Question | Positive response | Percentage |
|---|---|---|---|
| 01 | Is the application user-friendly in the sense that it does not give user trouble in seeking components or pages? | 24 | 80 |
| 02 | Does the application allow easy navigation through pages? | 24 | 80 |
| 03 | Has the application made it easier for users to search and find information about the SACCOS and their stakeholders? | 30 | 100 |
| 04 | Is the application content relevant to the theme of the application that is content is centered to help users learn about SACCOS in depth? | 30 | 100 |
| 05 | Would you recommend the application to another user who does not know about it? | 30 | 100 |

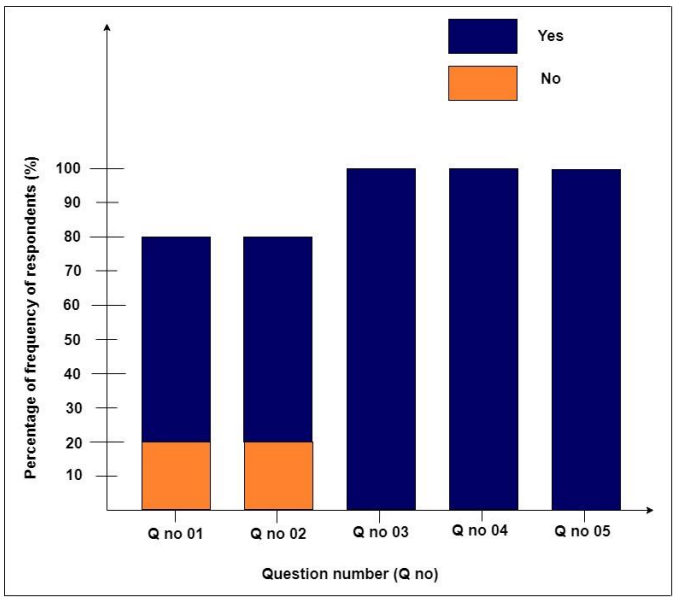



**Figure 41: Graph of percentage of frequency of respondents against specific question numbers (Questions about system validation)**

## 4.2 Discussion

The outcomes of this research were based on the aim of answering the research questions presented in chapter one. The goals were to come up with the best requirements for the interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS), and other stakeholders on one hand. To come up with the best fitting design for the application on the second hand. Lastly, to develop the designed mobile

application. All such is centred around the problem of poor means of communication in the SACCOS industry, and poor visibility when such industry entities engage in the use of modern platforms of communal communication. Studies conducted involving focus group discussion, interviews, and questionnaires, had results as shown in Chapter 4 section 4.2. the results circulated around understanding the public knowledge about SACCOS, their use of social media, their experience using social media, how far has social media helped SACCOS grow and what can be done to better solve the problem at hand.

An interview conducted with SACCOS and close stakeholders of SCCULT was done to find out the currently used marketing tools and how far they have been of assistance in solving the SACCOS growth problem. 80% of SACCOS agreed to be using social media as a marketing tool. 60% of SACCOS found social media as a good way of reaching the community based on their experience outside SACCOS. However, only 12% of SACCOS can approve of social media bringing positive change to their growth. This indicated that social media is an acceptable means of marketing for SACCOS and other entities in society. It is a good means to reach the mass all at once, but only when one has the right audience. Due to the lack of an audience, SACCOS still has not benefited from the positivity of social media. Specifically, the invisibility of SACCOS is due to the large number of content on social media platforms such that news amounts SACCOS is buried far from the reach of the audience. The interviews became a niche source of initial requirements for the system to be developed as summarised in Table 2.

From Table 5 which summarised the findings of the assessment of individual awareness about SACCOS, 68% of respondents had heard about SACCOS at some point in their lives, 98.7 % of the respondents were not members of any SACCOS stating the reason being not having enough information to influence them to join any SACCOS. This concludes that not enough information about SACCOS reaches the relevant amount of audience. Even though individuals hear about SACCOS it is not in-depth enough to influence them. The results in Table 6 braces the findings above. There is a large purge in usage of mobile applications, specifically social media applications. This is evidence by the more than 60% of individuals are aware of social media while 57.3% are active users of such. However, only 3.33% of social media application users have encountered news about social media. Looking at this in depth, it is evident that, the respondents who are also members of some SACCOS are the ones who encounter news about SACCOS on social media. Therefore, only members who are aware of SACCOS and their

affiliated stakeholders, are in a position to engage with SACCOS. This guarantees current members of SACCOS retention but does not ensure new members acquisition.

Lastly, the results from the survey questions in Table 7, examine the experience of users during the use of social media applications. The 60% of all respondents agreed that social media generate contents based on users' frequent searches. This places the most trending news in a better position to be viewed than the rest. About 84.4% of respondents agreed that there is an essence of separating news based on context. This would help user focus on one context at a time. Something that would give user more room to learn enough about a context and understand the industry. 80% of respondents agreed to the idea of having a dedicated platform for SACCOS. A place where individuals can visit and learn about the industry.

Modern technologies for mobile application development were employed to develop a mobile application that could help disseminate authentic news. The goal of the application is to persuade people into engaging with SACCOS and enjoy the benefits offered to them. The database, as the backend was created using PhP MyAdmin employing the MySQL database management system. The two components (front-end and back-end) are linked with APIs (Application Programming Interface) that help in the sending and receiving of data to and from the database and the application front-end. Three types of users are defined in the application, each user has different views of the application and has different roles they can perform with the application. Some roles are shared between the normal user and the SACCOS/stakeholder user, while the admin has more controlling power and has a view that is contrary to the rest of the users.

# CHAPTER FIVE

# CONCLUSION AND RECOMMENDATIONS

## 5.1 Conclusion

This project aimed to identify requirements for the interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS), and other stakeholders. Furthermore, the project was aimed at developing the named mobile application and finally validating the system. Through the employment of the agile software development methodology and qualitative and quantitative research methods, research was conducted to assess the awareness of individuals on SACCOS and their ideology on the usage of social media. This paved way for a clear state of the requirements for the mobile application and justification for the conduction of research altogether. The development of the mobile application was then conducted using modern technology tools observing performance, usability, and security features. The system was then provided to users for testing and validation. Tests were conducted by users and a questionnaire survey was distributed to gather users' validation responses after using the system.

The interactive mobile application for information sharing between SCCULT, their member cooperatives (SACCOS), and other stakeholders, has brought the centralization that was required by SACCOS. With this application, information shared is centered on the SACCOS industry. This has enabled less interruption in users' attention when following up on the information about the named industry. The application idea came as a result of the observation that, the online content has become too vast. With such a large extent of content, it is now possible to have too many sources of news about too many contexts of content. This is good on one hand such that information is readily available anytime, but it also results in some contents overshadowing other contents. This way some information is easily found because they trend while some other information may never be viral simply because they are out shadowed by the trending news. Therefore, some businesses and brands become well build while others fail to reach the peak of such virality.

Among many, a focus on content creation was put into focus to ensure the authenticity of the information shared in the application. The research concluded that, due to freedom of profile and content creation, some untrusted news sources may disseminate false news. This has led to fraud and individuals personating other individuals. This especially faces public figures or

business profiles. To other extents, fraud leads to online scams and theft alongside scandalous and false accusations on individuals as well as bad language usage on platforms. In the bigger picture, such claims and possibilities lead to some potential individuals to lose interest in engaging with social media and hence miss the chance to acquire information intended to be viewed by them.

To combat all such shortcomings, this mobile application isolates the Savings and Credits Cooperative Societies (SACCOS) and their stakeholders from overwhelming social media platforms. The aim is to provide a better chance for each SACCOS and stakeholder to be seen and provide a better interactive space with their stakeholders and customers with limitations to content creation. This will help in enhancing the authenticity of the news provided and limitation to fraud and impersonation of SACCOS and other important Stakeholders.

It is anticipated that the existence of this application will provide equal chances for each SACCOS to be viewed. It will provide users with the ease of access to the information they need to know about SACCOS enough for them to make decisions about whether they want to use their different products and services. Moreover, for the SACCOS that may not be as active in content creation, they can easily be found in the search engine, based on their region of existence, name, or username.

## 5.2 Recommendations

### 5.2.1 Implications to Policy Makers

The application is more of a tank that will collect enormous data from SACCOS, Stakeholders, and other normal users. Such data, in coming years, will be good for studies of trends and help in a better understanding of the industry. With this data, policymakers such as SCCULT, TCDC, TFC, Ministry for Finance, Ministry for Agriculture, BOT, and others: will make use of such data to come up with better accommodating policies for the SACCOS and their stakeholders. Furthermore, the data will be used to understand customers better, what they want and expects from their service providers to help strengthen the relationship and business.

### 5.2.2 Implication to Practitioners

The application is complete by 90% since no software is ever really complete. It is a great platform to be used to advertise SACCOS and their potential stakeholders. The application can

easily be modified to fit the requirements of the League since the leagues share many of their activities. The different SACCOS national leagues in EAC can adapt the application to help bust the popularity of the SACCOS they supervise. This can guarantee the growth of SACCOS by acquiring more customers and stakeholders to work with.

So far, the application is only capable of registering SACCOS and key stakeholders to attend different events. The application also advertises the different services offered by SCCULT and SACCOS. The event attendees will be required to payments for the events using payment credentials provided to them through short messages sent to them. But it will be a lot easier if a user will register and pay for the event instantly after they register. The same can be done for the different services any user would inquire about from SCCULT. Users will only be required to have proof of payment for them to be provided with the service they are entitled to.

The application is embedded with a career page, a place where SCCULT will be posting different job advertisements on behalf of SACCOS and other stakeholders of SACCOS to the mass. This is to bring further ownership to the careers brought about by the savings and credits cooperatives societies and the community. The platform should be further enhanced to allow job applicants to directly apply for the job they see themselves fit. This will further bring more activities to the application and influence visitation.

Savings and credit cooperatives do deal with monetary transactions. Deposits for savings, deposits for loan retirements, and withdrawals for loans to mention a few. All such transactions are done at the SACCOS locality. However, it might be easier if it can all be digitized in such a way that individuals can do their withdrawals and deposits. Alongside that, they can keep track of their balances while staying notified of new products and different offers from their SACCOS.

### 5.2.3 Limitations to the Project

The project is so far implemented to work with android platforms and will soon be available in Google play store. But it was not developed to work with the iOS platform, their related devices and be published in the Apple App store. In future the application iOS version will be developed to tackle such a limitation.

On the second hand, there was a great concern on the further auditing of the contents posted by the SACCOS. Not at all times are the SACCOS accounts admins wise enough to post perfect

contents. It would be proposed to implement a machine learning model that would be filtering specific contents which are considered bad by the SACCOS society.

### 5.2.4 Future Work

Savings and credit cooperatives do deal with monitory transactions. Deposits for savings, deposits for loan retirements and withdrawal for loans to mention a few. All such transactions are done at the SACCOS locality. However, it might be easier if it can all be digitized in such a way that individuals can do their withdrawal and deposits. Alongside that, they can keep track of their balances while staying notified of new products and different offers from their SACCOS

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# APPENDICES

## Appendix 1 Interview guide

**Interview Guide for SCCULT or SACCOS or Stakeholders to assess the means used to advertise SACCOS products and the essence of having a dedicated application for SACCOS**

**Project Title**: **Development of an Interactive Mobile Application for Information Sharing between SCCULT, Member Cooperatives (SACCOS) and Other Stakeholders in Tanzania**

**Section A: General Experience**

1. What is your name?
2. What is your job position in your SACCOS?
3. How long have you been in the SACCOS?
4. What is rough estimated number of customers are there in the SACCOS?
5. What is the rough estimated number of customers are acquired per annum?
6. How does the number of customers affect your work?
7. How were such customers acquired?
    a. Does it require outreach and spreading the word of mouth to reach customers?
    b. Do customers decide to come on their own to join the SACCOS?
8. What means are used to commercialize the different services and products of the organization to reach out to both potential new and existing customers?
9. How effective are the outreach means so far?
10. Does the SACCOS make use of any social media?
11. How effective are the social media so far?
12. Does social media help you easily reach to other SACCOS even those you do not know about?

**Section B: Key Questions on Interactive Mobile Application**

1. Do you think there is an essence of having an interactive mobile application that will bring together all the SACCOS, their customers and stakeholders for information sharing and outreach?
2. What do you think should be the services offered to users by the interactive mobile application?
3. What is the specific information about your organization would you like sharing to users?
4. Are there any suggestions on the functions and general operations of the interactive mobile application?
5. What would be the benefits of using an interactive mobile application to your organization?

**Thank you very much for your valuable time!**

**Appendix 2: Survey questionnaire for gathering requirements**

THE NELSON MANDELA AFRICAN INSTITUTION OF SCIENCE AND TECHNOLOGY

(NM-AIST)


A survey on the usage of social media platforms to disseminate and acquire news and updates about the Savings and Credit Cooperatives (SACCOS) in Tanzania

1. Do you know anything about the savings and credit cooperatives societies in Tanzania? (SACCOS)
   a. Yes b. No c. Maybe [ ]
2. Are you a member of any savings and credit cooperative society (SACCOS)?
   a. Yes b. No c. Maybe [ ]
3. Do you get enough information about the SACCOS such that it influences you to join or retain your membership?
   a. Yes b. No [ ]
4. Do you have any idea of what social media is?
   a. Yes b. No c. Maybe [ ]
5. Social media has a number of uses among them is the dissemination of news about products and services offered by individuals, offices or groups of individuals. Do you ever use social media to seek information about products or services?
   a. Yes b. No c. Maybe [ ]
6. Have you ever encountered any information about SACCOS in your social media page?
   a. Yes b. No c. Maybe [ ]
7. What are the things that bother you when you are using social media?

   _____

   _____

   _____

   _____

8. At all times the social media updates acquired and suggested are those of interest of the user. If it happens an individual has no idea about the existence of certain issues it becomes almost impossible for them to be exposed to such contents. Do you think this sentence is valid?

a. Yes b. No c. Maybe [ ]

9. Do you think there is an essence of separating news and updates from differing sectors in the social media in order to influence engagement and ease of access of information on that specific sector? Example separating updates of entertainment from finances and academic sectors?

a. Yes b. No c. Maybe [ ]

10. Do you think ease of access of information on a certain type of topic or content helps in the increase of engagement and participation in the different activities held in the named sector?

a. Yes b. No c. Maybe [ ]

11. Do you think there is an essence of having a dedicated network about the SACCOS in Tanzania with the aim of bringing closer to users news about such SACCOS

a. Yes b. No c. No [ ]

12. If there gets to be such a network suggested in 2 above, what services other than the ones provided by social media should be added?

_____

_____

_____

_____

_____

**Appendix 3: Questionnaire survey for system acceptance test**

THE NELSON MANDELA AFRICAN INSTITUTION OF SCIENCE AND TECHNOLOGY

(NM-AIST)

**A survey on the validation of the interactive mobile application for information sharing between SCCULT, its member cooperatives and other stakeholders (the SCCULT application)**

*INTRODUCTION*

With great advancements in Information communication technologies, the use of internet and socialization, communication of information has been made as easy as to the tip of the users' fingers. Social networks and media are being used to disseminate and acquire large amounts of information about different matters in the world in bulky. There rose an idea of having different platforms for specific types of news based on the sectors of their origin. A survey was conducted and a conclusion was drawn to create a platform for news, updates and that a user needs to know to be drawn to engage more in the sector.

The interactive mobile application for information sharing between SCCULT, its member cooperatives (SACCOS) and other stakeholders, is a mobile application dedicated to serving news around cooperative unions and their stakeholders. The following survey is to assess the impact brought by such a separation from major social platforms and its usability.

*QUESTIONS*

1. Do you know the SCCULT mobile application?
   a. Yes b. No [ ]
2. How many times a week do you interact with the application?
   a. Less than 10 times b. More than 10 times c. 100 times and above [ ]

3. Can you term the application as user friendly?

   a. Yes b. No c. Maybe [ ]

4. Is it easy to navigate through pages in the SCCULT application?

   a. Yes b. No c. Maybe [ ]

5. Has the application made is easier for user to search and find information about the SACCOS and their stakeholders?

   a. Yes b. No c. Maybe [ ]

6. Does the SCCULT mobile application bring a sense of better engagement with SACCOS information together with their affiliated stakeholders?

   a. Yes b. No c. Maybe

7. How easy is it for you to find a new SACCOS that you had no idea existed before?

   a. Easy b. Moderate c. Hard [ ]

8. The SCCULT mobile application has limited to only SACCOS to be able to post content to avoid irrelevant posts from normal users (non-SACCOS). Has this initiative made content creation better oriented and relevant?

   a. Yes b. No c. Maybe [ ]

9. Do you think the feature above should be retained or should it be revoked?

   a. Retain b. Revoke c. I don't know [ ]

10. Would you recommend this app to other users?

    a. Yes b. No c. Maybe [ ]

11. What feature do you think should be removed to make the SCCULT application more appealing?

    _____
    _____
    _____
    _____

12. What features do you think should be added to make the SCCULT application more appealing?

    _____
    _____
    _____

## Appendix 4: System Request

**Project name:** SCCULT news app.

**Project sponsor**

**Name:** Savings and Credit Cooperatives Union League of Tanzania (1992) Limited (SCCULT ( 1992) Ltd)

**Department:** Digital Field Operations

Phone: +255 222 185548/9

Email: info@sccult.tz

**Business need**

**Background**

The Savings and Credit Cooperatives Union League of Tanzania 1992 Limited (SCCULT (1992) Ltd) is the union that bring together all the Savings and Credit Cooperative Societies (SACCOS) in Tanzania. It was formed first in the year 1992 with the sore aim of gathering, moderating and supervising all the SACCOS in Tanzania. The league was a great success for many years until it ceased to exist many years later. It was once again formed in 2018, and has been striving to win the trust of SACCOS again while expanding their services and number of members to support itself. The journey for growth is slow due many reasons including funds and the means of outreach to the society and SACCOS at large.

**Business opportunity**

With key focus on helping SACCOS form and grow to maturity, SCCULT (1992) Ltd has a great opportunity in the growth of the number of members. With an increase in the number of services they can provide for SACCOS, corresponding to the increase of number of members who are potential buyers of the services, an income generation is guaranteed for SCCULT.

**Business objectives**

To empower and develop SACCOS through lobbying and advocacy, financial and technical assistance.

**Functionality**

| Priority | Key feature | Sub-feature |
|---|---|---|
| **#1** | Contents creation and interactions | SCCULT, SACCOS and key stakeholders (superior users) should be able to create contents. |
| | | All user should be able to view all the contents |
| | | All users should be able to express their impression through likes |
| | | All users should be able to express themselves through comments |
| | | There should be a distinction in appearance between ordinary users and the superior users. |
| | | |
| **#2** | Profiles | All users should have their profile customization details on first login. |
| | | All users should have a name, username and profile picture provided |
| | | Superior users should have a cooperative view of their profile |
| | | Superior users should be able to add contact and about information |
| | | Superior users should be able to add their social media profiles |
| | | Superior users should be able to add their location on maps |
| | | All users should be able to update their user credentials in the profile |
| | | All users should be able to edit their login information. |
| | | |
| **#3** | Events | All users should be able to view events summary |
| | | All users should be able to view events details |
| | | All users should be able to view the events registration form |
| | | Only superior users should be able to add the number of events participants |
| | | Only superior users should be able to register to attend events |
| | | |
| **#4** | Search | All users should be able to search SACCOS by name or by region of residence |
| | | All users should be able to view details of the searched SACCOS |
| | | |
| **#5** | SCCULT services | All users should be able to view SCCULT services in summary and in details |

**Expected values**

***Tangible***

- Paid services by SACCOS such as job advertisement by SCCULT.
- Income generation through eased event registration.

***Non-tangible***

- Increased SACCOS recognition in the society.
- Increased members of SCCULT.
- Availability of authentic and genuine news about SACCOS and their affiliated stakeholders.
- Easy search, get and learning about SACCOS by either name or region of residence.

**Special issues or constraints**

- Limited account creation and customization based on a user type.
- Content creation restriction to non-SACCOS users for relevance and elimination of garbage contents creation.
- Observation on the contents created to avoid the use of abusive and chaotic contents.

# Appendix 5: Poster Presentation

**DEVELOPMENT OF AN INTERACTIVE MOBILE APPLICATION FOR INFORMATION SHARING BETWEEN SCCULT, MEMBER COOPERATIVES (SACCOS) AND OTHER STAKEHOLDERS**

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## Introduction

The use of mobile devices and their affiliated software has brought about a very immense change in communication. From a different angle, marketing of goods and services for business entities has been made easier and better. However, it has been discovered that, to know about a specific entity one would need to have prior knowledge about it. This makes it hard for unknown entities to become reached by potential buyers. This is the case for SACCOS and SCCULT in Tanzania. The two become invisible to the consumer community due to their infamous nature, making their marketing difficult and hence, stunting their growth. SACCOS lend capital to Small and Medium Enterprises, and have been a source of close to 94.7% employments of their members. It contributes up to 40% of the Tanzania Gross Domestic Product (GDP).

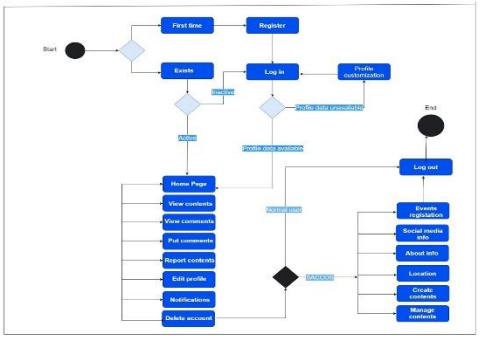
## Problem Statement

The use of outdated and common means of communication such as letters and fliers do not provide SCCULT, SACCOS and their stakeholders the right visibility for recognition and hence growth.

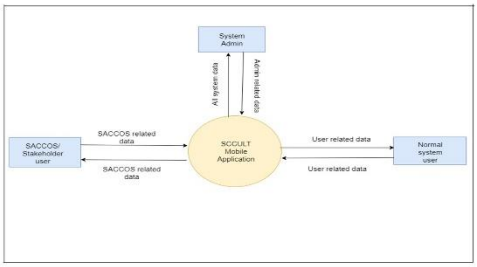
Digital marketing for service and goods is no longer an option, but rather a survival move. The use of communal digital spaces for marketing has not yet proven very efficient for SACCOS and SCCULT due to their **infamous** nature.

## Methodology

A qualitative research method and quantitative research method were used to gather information on the society's awareness of SACCOS, their knowledge, and usage of social media, and whether they have ever encountered news about SACCOS in their social media exploration.



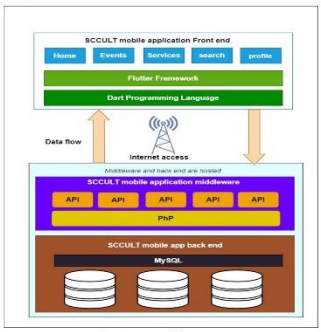

System activity diagram



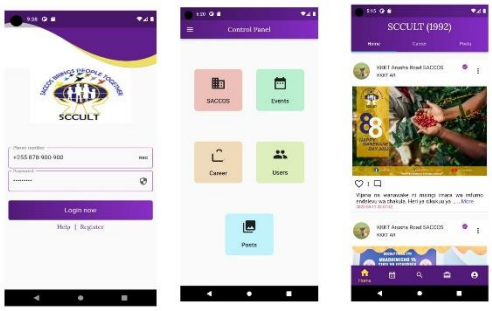

System context diagram

## Developed Solution

The interactive mobile application for information sharing between SCCULT, member cooperatives (SACCOS), and other stakeholders, is a platform that brings together different individuals to get official news concerning SACCOS and SCCULT. It makes use of different mobile technologies to capture news and put them in public for community consumption. Filter out any displeasing content in the comments of the posting section before it is released to the public to be reported later.




System architecture




Prototype Developed

## Results

An interview was conducted indicated that social media is an acceptable means of marketing for SACCOS and other entities in society. It is a good means to reach the mass all at once, but only when one has the right audience. Due to the lack of an audience, SACCOS still has not benefited from the positivity of social media. Results from questionnaires concluded that not enough information about SACCOS reaches the relevant amount of audience. Even though individuals hear about SACCOS it is not in-depth enough to influence them. Lastly, the results from the survey discovered that the most trending news in a better position to be viewed than the rest. Respondents agreed that there is an essence of separating news based on context. This would help user focus on one context at a time.

## Conclusion

The interactive mobile application for information sharing between SCCULT, their member cooperatives (SACCOS), and other stakeholders, has brought the centralization that was required by SACCOS. This has enabled less interruption in users' attention when following up on the information about the named industry.