

# Ronald SOKIRI RONALD

## Sokiri Ronald and Group

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## MAKERERE UNIVERSITY BUSINESS SCHOOL

### DEVELOPING AN INVENTORY MANAGEMENT SYSTEM FOR RETAIL SHOPS IN UGANDA

**By**

NAME	REGISTRATION NO	PHONE No.
AKELLO ESTHER OBUNYA	23/U/05703/PS	+256779254528
NAMUJJUZI SOPHIAH	23/U/25019	+256744588592
SOKIRI RONALD	23/U/17331/PS	+256704760917
OWEMBABAZI IZABERA	23/U/24829/EVE	+256767692770
MUTUMBA ANTHONY	23/U/24231/EVE	+256706469411

**Supervised by**

Prof. Kyeyune Robert

Department of Science and technology

**A project proposal submitted to the Faculty of Computing and Informatics of Makerere University Business School in partial fulfillment of the award of the Degree of Bachelors of Business Computing of Makerere University.**

## DECLARATION

We, the undersigned, declare that to the best of our knowledge, this proposal is our original piece of work and has never been published and/or submitted for any award in any other University or higher institution of learning.

NAME	REGISTRATION No.	SIGNATURE
AKELLO ESTHER OBUNYA	23/U/05703/PS	
NAMUJJUZI SOPHIAH	23/U/25019	
SOKIRI RONALD	23/U/17331/PS	
OWEMBABAZI IZABERA	23/U/24829/EVE	
MUTUMBA ANTHONY	23/U/24231/EVE	

Date: .....

## APPROVAL

This project proposal has been submitted with my approval as supervisor and my signature is here appended:

Signed.....

Date.....

Prof. Kyeyune Robert

Makerere University Business School

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# SECTION ONE

## 1.0 Introduction

Good inventory management is important for retail shops to remain competitive in today's fast-changing market

Inventory management means planning and keeping track of stock so that customers need are met without spending too much on ordering, storing or running out of selling items

(Stevenson, W.J.(2021) – Operations management)

## 1.1 Background

Inventory management has always played a big role in how retail and supply business run .it helps retail shops keep the right amount of stock so they can meet customer needs without running out or having too much to sell in the past ,most retail shops managed their stock by writing things down or guessing ,which often led to mistakes, like running out of sales items, buying too much or losing track of products

Retail shops in Uganda have grown a lot because more people are moving to towns, more customers are buying goods and the formal retail business is expanding. However, most of these shops still don't have good ways to manage their stock. this is mainly because they don't have enough money, they don't use modern technology and many shop owners or workers haven't been trained in how to manage inventory properly. As a result, poor stock management leads to problems like goods expiring or getting damaged, losing sales, and making customers unhappy

Managing stock in Uganda is one of the biggest problems for small shop owners. A study by National Retail Federation in 2020 showed that 61% of them said inventory management was their main challenge. Another survey by small Business Administration found that 60% of small businesses close within their first five years and poor stock management is one of the reasons why. (Small Business Administration 2020)

Even though technology has improved and tools like barcode scanners and online stock systems now are found in place, many retail shops don't use them. These tools can help shops manage stock more accurately and work easily. But in Uganda, very few shops have started using them. This is because most of them they are expensive and many shop owners don't know how to use them and of what purpose is to their retail businesses

This research aims to create an inventory management system for retail shops in Uganda .it will look at the main problems these shops face and find practical ways to solve them, so that their daily operations can run more smoothly and their businesses can grow and last longer.



In today's fast moving retail world, shops face many challenges when it comes to keeping track of their stock. If they don't monitor stock levels properly, they can easily run out of selling items, buying too much for sale, Or disappoint their customers. Managing stock is hard because shops deal with many different types of products, have limited space to store them and customers demands keep changing. old fashioned methods like writing in books or using heads don't give a clear picture of what's in stock, which makes it harder to manage inventory well

This research aims to solve these problems by creating, building and testing an inventory management system. The system will help shop owners track their stock in real time, get better reports and insights to support smart decision making and automatically manage stock levels to avoid shortages or overstocking

## 1.2 Problem Statement

Managing stock is very important for the success and growth of retail businesses. it affects how smoothly a shop runs how much profit it makes and how happy customers are but in many retail shops in Uganda managing inventory is still a big challenge that affects well the business performs. Most small and medium business use manual methods like writing in books, using heads stock, or basic excel sheets. These old methods are slow, easy to mess up and don't show real time stock information. This leads to losses and delays in how the business runs.

When shopkeepers track stock by head, many problems come up. people make mistakes when writing down numbers, so the stock records don't match what's actually in the shop. This can lead to two major problems: running out of sells item, or buying too much. Running out of stock means lost sales and unhappy customers. Buying and too much ties up money in goods that expire or never sell. Both situations hurt the business financially.

Manual systems also don't help shop keepers understand which products sell fast of slow, or how to plan for future demands. so they end up guessing what to buy instead of using real data. This makes it hard to keep up with customers needs and changes in the market which affects profits and competitiveness

In other countries advances tools like automated inventory systems, barcode scanners and cloud-based software have helped shops manage stock better. These tools give real time updates, track sales and purchases and send alerts when stock is low, but in Uganda very few shops use these tools. This is because they are expensive, people don't know about them, internet access is limited, and many shops works don't have the skills to use them. As a result, small shops continue to struggle and can't grow easily

Not having a proper inventory system also makes it hard to keep track of what employees are doing. Shop owners can't easily tell if stock is being stolen or mismanaged. They also can't

quickly get reports for taxes, audits, or planning. Without good data, it's hard to make smart business decisions.

The National Retail Federation (2020) found that 61% of small shop owners say inventory management is their biggest challenge. The Small Business Administration (2020) also found that 60% of small businesses fail in their first five years, often because of poor stock control. This shows that managing inventory well is not just about keeping records — it's a key part of running a successful business.

In Uganda, even though more people are opening shops and towns are growing, most small shops still don't use automated stock systems. This shows a clear need for a simple, affordable, and easy-to-use system that fits the local situation. A good system can help shops run better, avoid losses, and grow.

This research wants to solve these problems by building an automated inventory system for small shops in Uganda. The system will track stock automatically, give real-time updates, create reports, and send alerts when stock is low. This will reduce mistakes, keep stock levels balanced, and help shopkeepers make better decisions. In the end, the system will help small shops move from guesswork to smart, data-based management.

### **1.3 Purpose of the research**

This research aims to build and use automated inventory management systems to help small retail shops to better track their stock. The system will make it easier to know how what items are available, reduce mistakes and help shop owners make a smarter decision about their stock. It will show real time stock updates, send alerts when items are running low, and create helpful reports to support the growth and long-term success of the business

### **1.4 Research objectives**

To find out what shop owners and workers need in order to build a useful inventory management system

To design and build an inventory management system that works for retail shops

To test the system in real shops and make sure it works properly

#### **1.4.1 Project Scope Summary**

This project is about creating building and testing an automated inventory management system for retail shops in Uganda. it covers everything we plan to do from tasks we 'll carry out, the results we expect to produce, the time it will take and the limits of what the project will include

#### **Key Activities**

#### **Requirements Elicitation**

Carry out interviews and observations with retail shop owners

Gather functional and non-functional system requirements

Document user needs and system specifications

### **System Design**

Develop system architecture and database schema

Design user interface prototypes

Draw data flow diagrams and UML diagrams

### **System development**

Use core modules: stock tracking, sales recording, purchasing, reporting, and alerts

Integrate database functionality using a selected technology stack

Enable user authentication and access controls

### **System Testing**

Conduct unit integration and system testing

Confirm system functionality with real-life scenarios

Document test results and corrections

### **Deployment and Demonstration**

Write up installation documentation

Deploy the system in a test environment for demonstration

Train users on basic operations

## **1.5 Anticipated Significance of the Project**

The inventory management system we plan to build is meant to solve common problems faced by retail shops in Uganda. These include wrong stock records, mistakes made by people, not being able to clearly see what's in their stock, and making poor decisions because of missing or unclear stock data

### **Benefits to the Organization**

**Reduction in manual errors:** The system will do things automatically which will help to reduce errors that happen when people write things by hand

**Improved decision making:** The system gives reports that help shop owners see what's selling fast, what needs restocking, and how sales are going.

**Cost savings:** By managing stock better, shops can avoid losing money on expired items, unsold goods, or stolen products.

**More control:** Shop owners can keep an eye on what employees are doing and reduce cases of stock mishandling or going missing

### **Significance to the Researcher**

Gain hands on experience in system analysis, design and software development

Learn to apply real-world problem-solving techniques to a local business

Improve skills in database design, user interface design, testing and documentation

Improve teamwork, project management and communication skills

Understand the practical challenges involved in ICT adoption by retail businesses.

### **1.6 Project Assumptions**

The project will be carried out under the following assumptions based on the expected environment, availability of resources and stakeholder engagement

#### **Assumption 1: Resources and Technology availability**

It is assumed that the team will have consistent access to the necessary development tools, software, and hardware required for designing and implementing the inventory management system. Computers, internet connectivity, and development environments will remain functional throughout the project period

#### **Assumption 2: Stakeholder Participation and Feedback**

The project assumes that shop owners, supervisors and team members will be available for interviews, requirement elicitation, feedback and approval at different stages of development. Their timely participation will support the accurate completion of system requirements and testing activities

#### **Assumption 3: Stability of Project Scope**

It is assumed that the project scope will remain stable following approval and that no major changes will be introduced that could significantly affect the design or development timeline. Adjustments will only be minor and manageable within the planned schedule

#### **Assumption 4: Technology Compatibility**

The technologies chosen for development—such as the programming languages, frameworks, and database systems—are expected to function as intended and remain compatible with one another. The selected tools should support system development without requiring major replacements during the process.

**Assumption 5: Data Accessibility and User Cooperation**

It is assumed that the necessary data (such as sample stock records, product categories, and sales examples) will be provided by retail shop owners to support system testing and validation. Users are assumed to cooperate during system deployment and demonstration.

## SECTION TWO

### LITERATURE REVIEW

#### 2.0 Introduction

Management of inventory is one highly significant role of retail business as it determines that the products are in stock to suit the demand of the customer without creating overstocking or unnecessary financial burden on the business. Profitability, customer satisfaction, and operational stability all depend directly on inventory control (Turban et al., 2018). Nevertheless, a large number of retail businesses in developing nations such as Uganda still use manual systems, which are cumbersome, prone to error and inefficient. Such difficulties can easily cause losses in money because of stockouts, overstocking, or lost items (Nankunda and Okello, 2021).

This chapter presents the literature review pertinent to the study of the inventory management systems with the emphasis on the research papers that can be related to the three primary aims of the proposed study, namely: (1) identification of the requirements that can be elicited in developing an inventory management system, (2) design and development of the inventory management system in the context of retail shops, and (3) testing of the developed inventory management system. The review gives past studies, gaps and demonstrates how the present study expands or deviates off the past studies. Although a number of inventory management systems have been developed internationally, little has been done on the specific demands of small and medium retail companies in Uganda. Thus, this research will fill that gap by creating a cost-effective, convenient, and efficient system that will be effective in the Ugandan retail setting.

#### **Eliciting Requirements Necessary for Developing an Inventory Management System**

One of the most crucial stages in software development is to elicit correct and elaborate system requirements. Pressman and Maxim (2019) argue that requirement elicitation makes sure that the system under development is based on the real-life needs of the people who are supposed to use it. It deals with the application of methods like interviewing, document analysis, questionnaires and observation to obtain user expectations and operational difficulties. Sommerville (2020) also adds that insufficiently defined requirements usually result in incomplete, irrelevant, or unfeasible systems.

Earlier research in Uganda has shown that retail shops face multiple operational challenges that stem from poor inventory management practices. Nankunda and Okello (2021) discovered that most retailers in Kampala rely on manual record-keeping methods such as notebooks and spreadsheets. While these tools help with basic tracking, they are highly prone to data loss, human errors, and lack of real-time updates. Their research identified the inefficiencies but did not extend into system design or automation based on the elicited requirements. Similarly, Kakuru and Kato (2022) found that many system development projects in small enterprises fail because developers do not engage end users during the initial stages. As a result, most automated systems do not align with the actual workflows of retail shop operations.

Global studies give additional understanding to the practicality of requirement elicitation. As an example, Bhardwaj and Kaur (2021) emphasized the role of consistent stakeholder engagement in the system development to ensure the absence of discrepancies between the features of the system and user expectations. Process mapping and user observations were also highlighted by Kilonzo et al. (2022) as important aspects of creating systems that reflect the real business processes.

Unlike previous studies that mainly focused on documentation or partial automation, the proposed study will thoroughly conduct the requirements elicitation exercise with a small group of retail shop owners, managers, and attendants in Uganda. It will use mixed methods, including interviews, questionnaires, and direct observations. This approach will also ensure that the system developed not only captures technical specifications but also reflects actual user problems, local business practices, and infrastructural limitations.

Moreover, smaller research work had concentrated on large businesses and supermarkets that have highly developed ICT tools, and small and informal retail stores had been neglected (Mugisha & Kasozi, 2021). The research aims at bridging this gap by paying particular attention to small-scale stores, where price, convenience, and offline development are the important factors. The direct involvement of the stakeholders in the elicitation process will make the resulting system more closely connected to the real needs of local users, something that has been lacking in the previous research.

### **Design and Develop the Inventory Management System for Retail Shops**

Design and development form the core of any software solution. Over the past decade, various approaches have been used to design inventory management systems, ranging from traditional desktop applications to web-based and cloud-based platforms. Large corporations often implement complex enterprise resource planning (ERP) solutions such as SAP, Oracle ERP, and Microsoft Dynamics (Turban et al., 2018). While these systems offer comprehensive functionality, their cost, infrastructure demands, and training requirements make them unsuitable for small and medium enterprises (SMEs) in Uganda.

According to Achieng and Rotich (2019), who developed an automated inventory management system for Kenyan supermarkets that successfully reduced human error and improved stock monitoring. However, their system depended heavily on constant internet access and centralized servers, making it impractical for small retailers in areas with unstable connectivity. Similarly, Mugisha and Kasozi (2021) created a prototype inventory system for Ugandan SMEs using PHP and MySQL. While the system simplified sales and stock tracking, it lacked scalability and was not optimized for mobile use — a critical need in today's retail environment.

All over the world, designers have been trying new technologies in order to enhance flexibility and performance of the system. Rahman et al. proposed a cloud-based inventory solution to SMEs in Bangladesh, which could update the system in real-time, and also could save and restore data (2020). Nonetheless, it needed a robust internet infrastructure that is still a shortcoming in the developing nations. To solve this problem, Nyandoro and Ncube (2022)

created a hybrid system that allows both online and offline functionality through the methods of synchronization and guarantees consistency in data even when the connection drops.

Based on these lessons, the proposed study will develop an inventory management system using Design Science Research Methodology (Hevner et al., 2004), which emphasizes iterative prototyping and user feedback. The open-source technologies utilized by the system include PHP, MySQL, HTML, CSS, JavaScript, and Laravel, which will be cost-effective and relatively easy to install on the available hardware. Additionally, it will incorporate modern features such as real-time analytics, automated re-ordering notifications, and an easy-to-use decision-making dashboard.

In contrast to the previous systems where people focused on the stock control only, the proposed system will also facilitate analytical capabilities to assist retailers in making data-driven decisions. It will involve low-data optimization to support shops in low-internet and mobile compatible areas to prevent lack of connection across different devices. The design will also focus on simplicity, making it easy to have the staff, with minimal ICT knowledge, to use the system. This user-centered design will be much more applicable and sustainable than prior systems that had failed to become adopted because of being complex and not having a training support.

### **Testing the Inventory Management System for Retail Shops**

System testing and evaluation are necessary to make sure that the system developed is working properly, addresses the needs of the users, as well as work well in real-life situations. According to Sommerville (2020), a range of different testing is needed, such as unit testing, integration testing, and user acceptance testing (UAT) that are used to test the technical and usability of a system.

Achieng and Rotich (2019) that tested their inventory system on a small group of supermarket users and found that their system had increased accuracy of stock and reliability of data. Their judgment was however restricted in the laboratory settings and they did not examine how the system was functioning in the actual retail settings. Nanyonga (2022) measured the computerized inventory management system in the Ugandan supermarkets and found that the accuracy of the stock improved by 40 percent. Nevertheless, she did not consider small shops that do not favor the same conditions because she studied only large retail chains that already had reliable access to the internet.

To address these gaps, the proposed study will conduct complete testing within selected small retail shops in Uganda. Testing will be done under actual working conditions to ensure the system's robustness and usability in environments with varying infrastructure. Five key standards will guide evaluation: efficiency, accuracy, reliability, usability, and user satisfaction. Efficiency will assess how quickly transactions are processed; accuracy will verify the consistency between physical and digital stock counts; reliability will evaluate uptime and error handling; usability will focus on ease of use by staff; and user satisfaction will capture feedback from both employees and managers.



Unlike previous studies that primarily emphasized technical functionality, this research will incorporate end-user participation during the testing phase. Continuous feedback from shop operators will guide improvements to the system prototype, ensuring that the final product is both functional and user-friendly. This participatory approach will promote system acceptance and sustainability — key factors that earlier projects often overlooked.

Moreover, quantitative and qualitative analyses will be combined in the evaluation procedure of the study. The system performance metrics will be measured by quantitative analysis and qualitative feedback through interviews and observations will be used to support user experiences and the areas to be improved. This two-tiered strategy is important in making sure that the system does not only work well technically but is also easily integrated with the day-to-day operations of the retail business.

## 2.4 Summary of Literature Review

The literature reviewed has shown that the inventory management systems are already a well-researched and used topic, yet most of the available options do not apply to the retail stores in Uganda. Most of the previous systems were designed based on big organizations with sufficient financial and technological needs, but small businesses continue to face affordability, accessibility and usability problems. Furthermore, stakeholders have not been included in the development of the system, resulting in low adoption and little success of previous projects.

This research will address these limitations by:

Eliciting system requirements directly from local retail stakeholders to ensure contextual relevance.

Designing and developing a lightweight, user-friendly system using open-source technologies that minimize costs.

Testing the system under real retail conditions to verify usability, accuracy, and reliability.

By integrating user-centered design principles, iterative prototyping, and real-world testing, this research will produce an inventory management system that aligns with the operational realities of Ugandan retail shops. Ultimately, the study will contribute to improving business efficiency, reducing stock-related losses, and promoting the digital transformation of small retail enterprises in Uganda.

## SECTION THREE

### RESEARCH METHODOLOGY

#### 3.0 Introduction

This chapter outlines the methodology used to design, develop, and evaluate the proposed Automated Inventory Management System for retail shops. It explains the overall research design, target population, sampling procedures, data collection instruments, and analysis techniques employed in the study. The methodology was structured to ensure that the final system is practical, efficient, and aligns with user needs.

The study adopted a Design Science Research Methodology approach, which emphasizes solving real-world problems through the creation and evaluation of innovative artifacts such as information systems. This approach was selected because it allows both systematic inquiry and practical system development.

#### 3.1 Research Design

The proposed study will utilize the Design Science Research Methodology (DSRM) to design, develop and evaluate an automated inventory management system to small retail shops in Uganda. The DSRM approach will enable the study to fulfill real-life management issues in inventory management as well as generate a practical and theoretically-based system (Hevner et al., 2004). The research study will follow iterative stages of DSRM

The approach consists of six iterative stages:

**Problem Identification and Motivation** – recognizing and defining the real-world challenges facing retail inventory management.

**Definition of Objectives for a Solution** – setting functional and non-functional goals that the developed system must meet.

**Design and Development** – development of the system (artifact) that will resolve the identified problem.

**Demonstration**- demonstrating how the artifact can solve the problem identified in the practical setting.

**Evaluation** – testing and assessing how well the artifact meets the defined objectives

**Communication** – recording and reporting of the development process and results.

This was the right research design since it involved a combination of the system prototype alongside user testing and feedback, making the resultant system functional and relevant to the end users.

### 3.2 Development Stages under Design Science Research

#### Stage 1: Problem Identification

At this point, the research team will select and examine the difficulties encountered by retail stores in inventory management. This is to be done by interviews of stakeholders, direct observation and reviewing of documents. Some of the issues that will be unraveled in the study include poor demand forecasting, inaccurate stock records, stockouts, overstocking and inaccuracy. It will also be analyzed with the help of SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to evaluate internal weaknesses (e.g. poor stock monitoring, high error rates) and external opportunities (e.g. the opportunity to implement digital tools to automate).

#### Stage 2: Objective Definition

Based on the identified issues, the key objectives will be the following:

To model a system that can monitor and update the stock levels immediately.

To develop automatic alerts on stock levels when they are at the reorder level.

To offer analytical inventory reports to make informed decisions.

To make the system interface user-friendly and easily accessible to the staff with little training

#### Stage 3: Design and Development

The artifact, the Automated Inventory Management System, will be designed using prototyping methodology, which will enable it to be developed repeatedly and users will be able to provide continuous feedback. The system architecture will consist of:

A database of products, sales and stock information.

User interface (web or mobile) to deal with cashiers and managers.

System process and data relationship modeling will be done using design tools like Data Flow Diagrams (DFDs) and Entity Relationship Diagrams (ERDs). The prototype would be deployed with the help of available technologies like PHP, MySQL, HTML, CSS, Laravel and JavaScript that would be affordable.

#### Stage 4: Demonstration

The prototype of the system will be presented to the stakeholders in the retail shops such as shop owners and shop staff. The presentation to be executed will include the core system functions which include adding the products, making sales, managing inventory, and reporting. The flow diagrams and workflow descriptions will be illustrated with the help of visual flow charts and descriptions of the way the data is transferred between the user interface, the database, and the reporting modules.

### Stage 5: Evaluation

The evaluation phase will determine the effectiveness of the system to achieve the research goals. The assessment will be conducted on five dimensions:

**Efficiency:** Resource and time saving in operations (e.g. speed of updating stock).

**Accuracy:** Availability of system data and real stock data.

**Reliability:** Stability and reduced downtime of the system.

**Usability:** The ease of use by the retail personnel, as measured by observation and task completion.

**User Feedback:** Opinions and suggestions from users collected through questionnaires and interviews to improve system performance.

### Stage 6: Communication

The last phase will be to document and present the research findings, system development procedures, results of testing and user comments. Such communication will be necessary to make sure that the designed system and research findings can be provided to the academic community and retail practitioners to replicate and improve them.

## 3.3 Study Population

The target population will be the owners of retail shops, managers, sales attendants and other employees directly engaged in inventory management procedures. The research will target 1 to 10 retail stores in some chosen cities in Uganda. The reason why this population will be selected is that these stakeholders will have a firsthand experience of the challenges that the proposed automated inventory management system will address.

## 3.4 Sampling Technique and Sample Size

The purposive sampling method will be used to identify respondents depending on their knowledge, experience, and participation in the inventory management. According to Krejcie and Morgan (1970), a minimum sample of 80 respondents will be appropriate for a population of this size to provide reliable data for analysis. Shop owners, cashiers, and customers will be included as the respondents.

## 3.5 Types of Data

The study will involve the use of both primary and secondary sources of data:

**Primary Data:** This data will be gathered firsthand by way of interview, questionnaire and observation with the respondents. It will also present first-hand information on the challenges and requirements in managing the inventory of the retail shops.

**Secondary Data:** This data will be gathered through academic journals, organizational documents, textbooks and through online sources, which apply to the inventory management system and retail operations. It will support and compare the results of the primary data.

### 3.6 Data Collection Instruments

**Interviews:** Semi-structured interviews will be undertaken with the store owners, managers and staff to gather qualitative information on current problems with inventory and desired features of a system. Interview guides will be made (Appendices I, II, III) so that there is consistency in the questions asked.

**Questionnaires:** Structured (close-ended) questionnaires will be given to the employees and customers in order to obtain quantitative information regarding user needs, level of satisfaction and usability expectations regarding the system. The feedback will be used to design system functions and interface structure.

**Observation:** The researcher will observe the field in selected retail shops to learn the real-time processes of handling the inventory in the field in terms of product registration, sales transactions and updating of the stock. This will help in mapping the processes of workflow and determining the weaknesses to overcome in system design

### 3.7 Data Analysis and System Design

Data collected from interviews and questionnaires will be analyzed through descriptive analysis to identify recurring challenges and user needs. The results will be used to guide the functional and non-functional requirements of the system.

System analysis and design will be carried out in a structured approach with a focus such as on clarity in data flow and process decomposition. Tools such as:

**Context Diagram** – will show the overall system environment and external entities.

**Data Flow Diagram (DFD)** – will detail data movement and processes.

**Entity Relationship Diagram (ERD)** – will be used to model the database structure and entity relationships.

### 3.8 Ethical Considerations

During the research process, ethical guidelines will be followed strictly. The participation in the study will be voluntary, and the respondents will be guaranteed confidentiality and anonymity. It will ensure informed consent before the interviews or questionnaires. Any data that will be gathered will only be used for academic purposes and system development.

### **3.9 Project Constraints**

The research will experience some challenges such as time, financial and differences in respondent cooperation. Besides, some retail shops might be limited in terms of the availability of computers and access to the internet and this will impact the demonstration and testing process. Such limitations will be addressed by emphasizing bare-bones technologies and arranging regular visits to collect the data and test the system.

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## APPENDICES

### APPENDIX I: Propsed Project Budget

ITEM	DESCRIPTION	ESTIMATED COST(UGX)	REMARKS
1	Data Collection (printing questionnaires, transport, communication	300000	Will cover field visits for interviews and observations
2	Software Development Tools (hosting, domain registration, frameworks, utilities	400000	Will cater for web hosting and development environment setup
3	Hardware and Accessories (flash drives, testing devices)	250000	Will support testing and demonstration of the prototype
4	Stationery and Printing (proposal, reports, documentation)	150000	Will include printing drafts and final copies of the report
5	Internet and Communication	100000	Will facilitate research communication and online resources
6	Miscellaneous (unforeseen expenses)	100000	Will cater for minor unexpected costs
<b>TOTAL ESTIMATED BUDGET</b>		<b>1,300,000</b>	

### APPENDIX II: Data Collection Tools

#### A. Interview Guide (For Shop Owners and Managers)

The interview will be conducted to gather information about the current inventory management practices, challenges, and expectations.

#### Sample Questions:

1. What current methods do you use to manage inventory in your shop?
2. What challenges do you usually face when managing stock?
3. How do you handle issues of overstocking or stockouts?
4. What features would you expect in an automated inventory system?
5. How comfortable are you with using technology for business operations?

## **B. Questionnaire (For Employees and Customers)**

The questionnaire will be distributed to retail shop attendants and customers to collect quantitative data.

### **Sample Questions (for Employees):**

- 1) How often do you update stock records in your current system?
- 2) Do you find the current method of inventory management efficient?
- 3) Would you be comfortable using a computerized system?
- 4) What kind of reports would help you improve your daily work?
- 5) How often does the shop experience stock shortages or surpluses?

### **Sample Questions (for Customers):**

- 1) Have you ever failed to get a product due to stockouts?
- 2) How would you rate the availability of products in this shop?
- 3) Do you believe an automated system will improve product availability?

## **C. Observation Checklist**

Observation will be used to record actual practices in inventory handling.

### **Key Areas of Focus:**

- 1) Stock recording procedures
- 2) Product entry and exit processes
- 3) Frequency of updates in stock books
- 4) Storage layout and organization
- 5) Sales and replenishment practices

## APPENDIX III: Schedule of Activities

The following schedule outlines the major activities that will be undertaken during the project period.

ACTIVITY	DESCRIPTION	DURATION	TIMELINE
Problem Identification & Literature Review	Gathering information about challenges and reviewing previous studies	2 Weeks	Week 1–2
Requirement Elicitation	Conducting interviews, questionnaires, and observations	2 Weeks	Week 3-4
System Design	Creating system models (DFDs, ERDs, and UI mockups)	2 Weeks	Week 5-6
System Development	Coding and implementing the prototype	4 Weeks	Week 7-10
System Testing & Evaluation	Conducting functionality, usability, and reliability testing	2 Weeks	Week 11-12
Data Analysis & Documentation	Analyzing results and compiling findings	2 Weeks	Week 13-14
Report Writing & Submission	Preparing and submitting the final report	1 Week	Week 15