

**DESIGN AND IMPLEMENTATION OF AN AUTOMATED INVENTORY
MANAGEMENT SYSTEM CASE STUDY: SMART SHOPPERS MASAKA**

Team project Report submitted to

*Kampala International University in partial fulfillment
Of the requirement for the award of the degree*

Of

Bachelor of Science in Computer Engineering

by

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SCHOOL OF ENGINEERING AND APPLIED SCIENCES
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DECLARATION

This is to certify that the project entitled "**DESIGN AND IMPLEMENTATION OF AN AUTOMATED INVENTORY MANAGEMENT SYSTEM CASE STUDY: SMART SHOPPERS' MASAKA**" is our original and the results embodied in this report has not been submitted to any other university or institute for the award of any degree or diploma.

Signature..... Date

KIMBUGWE JAMES

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APPROVAL

The project entitled, “**DESIGN AND IMPLEMENTATION OF AN AUTOMATED INVENTORY MANAGEMENT SYSTEM CASE STUDY: SMART SHOPPERS’ MASAKA**” is hereby approved by Kampala international university, Department of Electrical and Telecommunication Engineering as a creditable study of research topic and has been presented in a satisfactory manner to warrant its acceptance as prerequisite to the degree for which it was submitted.

Project Supervisor

Mr. ADABARA IBRAHIM

Signature

Date

DEDICATION

We dedicate this piece of work to our parents, they have been source of inspiration, engine of courage and secret of our achievements since our childhood. We also dedicate it to our sisters and brothers for all the support.

ACKNOWLEDGEMENTS

First of all, we thank the Almighty God the most gracious and most merciful for the wisdom and knowledge, the health and protection and all that he has bestowed on us so that this report becomes a success.

Sincere gratitude to our beloved parents and guardians for the spiritual moral and financial support accorded to us throughout the entire course of our education.

We would like to take this opportunity to express our gratitude towards all the people who have in various ways, helped in the successful completion of our project proposal.

We must convey our gratitude to **Mr. ADABARA IBRAHIM** for giving us the constant source of inspiration and help in preparing the project, personally correcting our work and providing encouragement throughout the project.

We also thank all our faculty members for steering us through the tough as well as easy phases of the project in a result oriented manner with concern attention.

ABSTRACT

The general purpose was to develop an efficient Inventory Management System (IMS) that improves service delivery at Smart shoppers' Masaka. The main objectives were to collect and analyze user requirements that provide the researchers with enough information of what the system users want the system to accomplish, to design an Automated Inventory Management System, to implement a prototype and to test and validate the designed prototype.

The methodology used includes Interviews, Questionnaires and observation to identify the requirements for the system. The system was designed, and the system was implemented using Ms Access 2010 and Microsoft Visual Studio 2010. Testing and validation was achieved by component, testing, bottom up integration testing, and system testing.

The research findings from system design depicted fast information flow and relationship between entities.

The researchers recommend that as the Company establishes branches all over the nation, the system be made web based such that all branches can use the system at the same time on the Web. The researchers also recommend that the system should be upgraded in order to report on products that have been hired out. The system can also be expanded to include information requirements for human resource management. This introduction to the research is dedicated to fully understanding the nature of the problem and coming up with a solution to it. It also explains the significance of the system to smart shoppers'.

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LIST OF ACRONYMS

AIMS	Automated Inventory Management System
AIS	Automated information Systems
ARMS	Automated records management System
DFD	Data Flow diagram
EJISDC	Electronic Journal of Information Systems in Developing Countries
ERD	Entity Relationship diagram
ICT	Information Communication technology
IMC	Integrated Marketing Competition
IS	Information Systems
JAD	Joint Applications development
LANS	Local Area Network
MRP	Material Requirement Planning
MS	Management System

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CHAPTER ONE: INTRODUCTION

The research served to develop an Inventory Management System that covered the product information storage needs for Smart shoppers' Masaka. With the implementation of this prototype, the company information will be far safer and much better accessible. This chapter is dedicated to fully understanding the nature of the problem and proposing a solution to it. It also explains the significance of the system to the Company.

1.2 Background of the Study

Smart shoppers' is one of the large supermarkets in Masaka and has gained such a wealth of experience in the industry. It has 2 branches in Masaka town and the other in Nyendo with its Headquarter in Masaka town. Its vast interest is in Business Venture spans across a wide Market Area with Stores and Warehouses in Masaka town.

The supermarket offers wholesale, retail and distribution services of their products to its customers. For the matter of wholesale services, it is only carried out from the stores and warehouses while the retail services are offered at their chain of supermarkets where distribution services are offered in both places.

The existing system for the wholesale services was characterized by manual field registration and file based system which was susceptible to an excessive number of mistakes, data redundancy and the difficulty of updating information about the goods in stock are but just a few of the challenges the company faces.

1.3 Study Findings

The researchers first understood how the existing System was working and the way the business activities were undertaken and monitored.

1.4 Existing System

During the data collection method the researchers found out the following;

- i. The sales manager for the super market records information of the products and stock on paper, later on using the Microsoft Excel sheet program to record the whole data from the paper work, he uses the program to edit the information before sending the reports to the top level management.
- ii. For the paper file systems, they are kept in the file cabinets for future use
- iii. For customers placing orders, they were recorded down on paper and also stored using the paper file systems.
- iv. On the matter of payment from customers, a receipt containing the details of orders of the customer was being issued to them.
- v. Information about the customers, suppliers were also captured using the file based system, and processed in the Microsoft Excel sheet program.

The flow chart of the Existing system

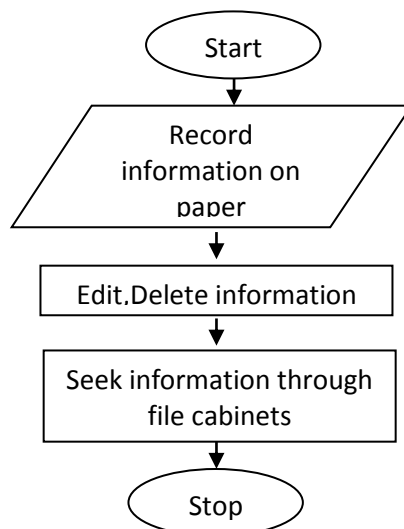


Figure 1.0 Flow chart of the former system

1.5 Challenges of the Existing System

From what was gathered, it was clear that most of the problems with the old (manual) system originated from;

- i. Inefficiency in record tracking due to over reliance on paper work.
- ii. Wastage of office space due to compilation of manual files.
- iii. Poor storage, retrieval and manipulation of data when required; a lot of time was normally wasted while trying to carry out all these and hence there was need for a new system that would solve problems of Stock control, data redundancy, time wasting, reduce search time, allow easy data manipulation, with ability to sort information, put out reports among others.

1.6 Statement of the Problem

Smart shoppers' Masaka Stores and warehouses use manual ledger systems that results in a lot of undesired drawbacks. There is a lot of time wasting since the information is first written on hard copies then typed into a spreadsheet program. It takes a very long time to search for a particular record with the current system and lots of paper and ink are wasted too. This makes the system very inefficient.

With flat files, data duplication is a common problem that results in all sorts of problem such as update and delete errors just to mention but a few. Since the manual ledger system can easily be manipulated and ledger books can also get lost thus leading to loss of data which is very vital for the company; this makes the system insecure.

This therefore resulted into a need for an Automated Inventory Management System to be put in place which would help in improving the system. The advent of an Automated Inventory Management System would thus rid of the problems nurtured by the manual ledger system used by **Smart shoppers' Masaka**

1.7 Significance of the Study

Due to the current problems in in existing system, the designed system can be more important to the company in the following ways.

- i. Research is used by academicians in their researches as reference when it comes to reviewing literature.
- ii. The company is able to save a bit more money on expenses as it wouldn't need to buy much paper and ink.
- iii. The system also goes a long way in reducing fraud as it would neatly keep track of all the assets in the company.
- iv. The customers are better served as information access with the new system would be far much faster.
- v. The suppliers for the company also benefit as the new system makes it easier to know which items need to be restocked.

1.8 Objectives of the Study

1.8.1 Main Objective

The general objective was to develop an Automated Inventory Management System (AIMS) that will effectively manage the inventory of Smart shoppers' Masaka in their Stores and warehouses.

1.8.2 Specific Objectives

1. To collect and analyze user requirements that was to provide the researchers with enough information of what the system users want the system to accomplish.

- 2 To design an Automated Inventory Management System that acts as the blue print for the new system.
- 3 To implement a prototype of the designed system that realizes the system designs and provides the real first taste of the actual system.
- 4 To test and validate the designed system that ensures all systems requirements are met.

1.9 Research Questions

- i. What are the problems associated with the existing Inventory management system?
- ii. What are the requirements for designing The Inventory management system?
- iii. What are the methods used to test and validate the proposed system?

1.10 Scope of the Study

The project that was implemented is an Automated Inventory Management System for the company which was covering the storage needs of all the products that the company possesses and Placing Orders made by the registered customers in the system

The project lasted four months.

Smart shoppers was used as a case study because they are a big store and do not have an inventory management system to manage their product sand stock is kept within and carries out wholesale and distribution services

CHAPTER TWO: LITERATURE REVIEW

2.1 COMPREHENSIVE OVERVIEW

According to Microsoft Encarta (2009), Inventory is the quantity of goods and materials on hand that a manufacturer uses to represent those items that are ready and available for sale.

An inventory control system is a set of hardware and software based tools that automate the process of tracking inventory.

This chapter provides a critical review of the issues that are explored and studied theoretically and empirically in the existing literature made by other scholars and academicians on various subjects. Literature review covers knowledge of some of the required system tracked with an inventory control system that can include almost any kind of quantifiable goods including food, clothings, books, equipment and other items that consumers, retailers, or wholesalers may purchase. Modern inventory control systems are exclusively based on using technology to track and control inventory. (Kotler, 2003)

Inventory control systems work in real time using technology to transmit information to a central computer system as inventory is monitored and as transactions occur to

ensure an organized management system and generate detail-oriented records and reports that cover all aspects of the business. (Harry, 2005)

2.2 Manual Inventory Management System

Many small business owners, especially if the business has very few products, keep track of inventory manually using a spreadsheet. Spreadsheets are set up to calculate when products need to be reordered. At the start of each week, the owner manually counts products and materials that are on hand and enters the values in the spreadsheet and also enters expected usage based on existing orders. Using the appropriate spreadsheet formulas, the owner can determine if he has enough materials for the week or if purchases should be made. Manual systems allow the small business owner to manage inventory with very little investment in systems or training. Maintaining data integrity is a major downside to manual inventory management as a single data entry or formula error can cause major inaccuracies in the data output. (Lysons, 2001)

2.3 Information Systems

Information system is an integrated set of components for collecting, storing, and processing data and for delivering information, knowledge, and digital products. Business firms and other organizations rely on information systems to carry out and manage their operations.

According to the journal *Information Systems* that published articles concerning the design and implementation of languages, data models, process models, algorithms, software and hardware for information systems. Information systems are the software and hardware systems that support data-intensive applications.

2.3.1 Components of Information Systems

Input is anything we wish to embed in a system for some type of use. A variety of sources are used to input: keyboard, scanner, microphone, mouse, even another computer. What we input has a purpose - but until it is processed and generated in some form of output, it doesn't do us much good. An example in this matter is Microsoft Excel, Printer etc.

Processing takes place in the internal parts of the computer. It is the act of taking inputted data and converting it to something usable. Is the result of our input being processed by some program so we can have usable output: for the system built it takes the stock filled in the system and converts it to a report which becomes very useful to the top management.

Output, or processed information in a usable format, comes in many different forms: monitor or printer for visual work, a speaker for audio. Sometimes our output is short-term, such as printing a photo, and sometimes what we work on needs to be kept around for a while. That's where storage comes in. In this case we can relate to a Customer Invoice, Sales report, Stock report etc. found in the Automated Inventory Management system.

Storage is the term used to indicate we will be saving data for a period of time. We store for many reasons: for future reference; to prevent full loss of data; because we forget to purge. But, storage is vital. There are several mediums on which we can keep output and processed data: a hard disk, a USB drive, a CD.

2.4 Warehouse management System

This is the management of storage of products and services rendered on the product within the four walls of a warehouse. (Sande, 2003)

It is a key part of the supply chain and primarily aims to control the movement and storage of materials within a warehouse and process the associated transactions including shipping, receiving, put away and picking. It can be described as the legs at the end of the line that automates the store, traffic and shipping management.

A warehouse management system (WMS) is a key part of the supply chain and primarily aims to control the movement and storage of materials within a warehouse and process the associated transactions, including shipping, receiving, putaway and picking.

A warehouse consists of area, equipment, items, devices and people. According to Microsoft Encarta 2009, it is a large building or store in which goods, commodities, or raw materials are stored. Within this warehouse, the processes of purchasing, receiving, put away, storage, value added services, picking, packing and shipping are constantly taking place. To aid in this endeavour, the use of Warehouse Management Systems have been introduced. It spans the areas of warehouse resource management, warehouse configuration, task management, advanced pick methodologies and value added services. Warehouse Management Systems optimize the material handling business processes for warehouses, manufacturing facilities and distribution centres, as well as, providing integrated barcode scanning and label generation to improve material transactions and advanced shipping process. (Gramaccioni, 2009)

A crucial part of a manufacturing organization's supply chain inventory management involves proper storage and transportation of products to a chain of retailers and wholesalers. Poor supply chain inventory management could spell disaster for any company. The higher the inventory investment as a percentage of total assets of a company, the higher the damage caused by poor inventory control. To ensure that this does not happen, Warehouse Management System uses a user defined rules engine coupled with its Advanced Task Framework to ensure inventory accuracy.

Warehouse Management System can provide rules driven processes meaning that flexibility meets needs without customizations. The rules driven processes eliminates

customization, can easily be changed or evolved, increases long-term flexibility, and accelerates implementation. They are also supported for directed picking, directed putaway, task assignment, costing and labelling. Through the rules engine, companies can enforce proper work processes and employees interact with the system with instructions that are fed and tasks that follow a predefined work process based on conditions found in the warehouse. (Finchley, 2001)

Warehouse management system is not just managing within the boundaries of a warehouse; it is much wider and goes beyond the physical boundaries. It acts as an interpreter and message buffer between existing systems. It does not just start with receipt of products but with actual initial planning. It monitors the progress of products through the warehouse. It uses the physical warehouse infrastructure, tracking systems and communication between product stations to monitor and deal with receipt, storage and movement of normally finished goods to intermediate storage locations or to a final customer. It helps in optimal cost of timely order fulfilment by managing the resources economically. (Haywood, 1985)

Importance of Inventory Control Systems:

Inventory control systems acts as a blueprint for picking, packing and shipping items from a warehouse and receiving items into a warehouse or other storage locations to cut down product obsolescence and spoilage. (Monzerka, 2002)

Inventory control is important to ensure quality control in businesses that handle transactions revolving around consumer goods. (Benson, 1999) Without proper inventory control, a large retail store may run out of stock on an important item. A good inventory control system will alert the retailer when it is time to reorder. Inventory control systems are important means of automatically tracking large shipments.

An automated inventory control system helps to minimize the risk of error. In retail stores, an inventory control system also helps track theft of retail merchandise,

providing valuable information about store profits and the need for theft-prevention systems.

The systems also direct and optimize stock putaway based on real-time information about the status of bin utilization. A WMS monitors the progress of products through the warehouse. It involves the physical warehouse infrastructure, tracking systems, and communication between product stations, Piasecki, Dave. (2015).

More precisely, warehouse management involves the receipt, storage and movement of goods, (normally finished goods), to intermediate storage locations or to a final customer. Warehouse management systems often utilize automatic identification and data capture technology, such as barcode scanners, mobile computers, wireless LANs and potentially radio-frequency identification (RFID) to efficiently monitor the flow of products. Once data has been collected, there is either a batch synchronization with, or a real-time wireless transmission to a central database. The database can then provide useful reports about the status of goods in the warehouse.

The warehouse management system includes a logic management module for allowing the suppliers and retailers to enter information; a data storage module for storing the information; an information management module for synchronously updating the information to the data storage module; and an information display module for synchronously displaying the information on data processing devices. By the warehouse management system, integration of warehouse management can be achieved, such that management efficiency and economic benefits are enhanced.

General warehouses can be divided into several categories according to uses thereof, including one in companies for storing goods of daily sales; one in factories for storing stock materials and manufactured products for retailing; one referring to a large warehouse for temporary storage of import/export goods for inspection in airports and the Customs; and one referring to a specialized warehouse usually in an industrial or factory area for use with companies nearby.

If the warehouse management is not proper, profits would become useless waste materials in the warehouse; or if backup support is not sufficient enough, the business would become outdated due to competition. Thus, materials represent money, and the warehouse represents money storage, such that the warehouse management is considered critically important.

In the past, warehouse facilities were simple, and materials were simply categorized and stored in the warehouse or on shelves and can be retrieved upon demand. Nowadays, along with the development of international trade and the growth in size of manufacturers, the quantities and variation of types of incoming and output goods and materials are also increased.

Many businesses have built large and automated warehouses with heavy costs so as to adjust supply of raw materials and market fluctuation and prevent excess stocks that may hold up capital and affect company operation as well as avoid lack of raw materials on the production line, which may affect product output if being short of material stocks. Therefore, warehouse management is a very important task nowadays. Duties of a traditional warehouse manager include:

- i. Checking if arriving materials and goods are consistent with order request forms, receipts and other documents;
- ii. Inspecting whether the arriving materials and goods are damaged and if they comply to correct specification, if any of the materials and goods is damaged or not correct in specification, removing it from the stock, returning it to its shipping unit and ordering an replacement to be delivered in a specified period;
- iii. Recording incoming and output materials and goods on cards or material books according to their categories;
- iv. Deciding if the materials or goods should be stored in predetermined positions with specific facilities according to their material properties, and making

necessary marks and descriptions for these specifically stored materials or goods;

- v. After delivery of goods, applying for materials in need to maintain the stock level according to regulations or self-experience;
- vi. Running regular stocktaking to ensure the stocks complying with the records, and making notes for reporting.

Thus, the duties of the warehouse manager appear to be simple, but they are considered as an essential and important step in the overall trading activity. The procedures such as stocktaking, receiving, delivery and management of incoming and output goods must be planned in details and handled appropriately such that the trading activity can run smoothly.

However, along with the growth of computer and network technologies, the mode of warehouse management has changed over the time.

The traditional mode of warehouse management is individual management, that is, the business only manages its own warehouses by warehouse managers. Even if the business builds a network warehouse management system, such system is only for internal use but not connected to other businesses through a network.

This limits the application scope of warehouse management and subsequently affects revenue returns for the business. And most of the warehouses are only used for storing goods and performing simple search and stocktaking on the goods, and are not efficiently managed.

Therefore, the problem to be solved here is to integrate warehouse management systems of related businesses and achieve information communication between the related businesses.

2.3 Electronic Document and Records Management System

Once a document achieves the status of a record, the organization may apply best-practice or legally enforced retention policies which state how the second half of the record life-cycle will progress. This typically involves retention (and protection from change), until some events occur which relate to the record and which trigger the final disposition schedule to apply to the record. Eventually, typically at a set time after these events, the record undergoes destruction.

Micheal(2002) further explains that a document management system allows predesignated users at remotely located computer-based systems to perform document management. Components of the system include public data network, a publication facility, a remote storage facility and a document manager computer-based system.

The document manager computer-based system, the publication facility, the remote storage facility are all coupled to the computer-based systems used by the predesignated users over the public data network. The system allows authorized users from remote locations to perform secure document collaboration, share and archive documents, context index documents, digitally notarize documents, electronically file documents and publish documents.

2.4 Systems Development Methodologies

It is about the conceptual framework used for planning, controlling and structuring the whole process of developing an information system. Mostly one system methodology cannot suit all projects; different kinds of projects can be suited with specific methodology basing on various techniques, organizations and consideration from a project team.

Consequently, there is no single 'best' approach to systems development. Small problems may not even need a costly formal process; however, larger, more complex problems will require well-defined processes.

2.4.1 The Systems Development Life Cycle

As stated previously, the Systems Development Lifecycle (SDLC) provides a template for the development process. The SDLC follows the traditional, phased approach with specific activities allocated to each phase of development.

It has been the most widely used methodology for system development and although modern techniques and processes are gaining popularity is still seen as having a significant place in system development.

2.4.2 Rapid Application Development (RAD)

Rapid Application Development is an Object Orientated approach to software development that includes a method of development as well as software tools (Kendall and Kendall, 2002). The primary purpose of a RAD is to speed up the systems development process. Kendall and Kendall describe a RAD as having three phases: Requirements Planning; RAD Workshop; Implementation.

2.5 Related Systems

Trade Gecko is a private Limited Company found in Singapore which currently uses a cloud-based inventory management system platform empowering retailers and wholesalers. They have currently integrated their system with Microsoft excel, QuickBooks and Amazon.

This vision implied that they are able to help businesses manage their sales and supply chains through inventory control, customers are able to generate sales and purchase orders and it also creates reports and track inventory through multiple warehouses. The previous application process involved product filling paper-based application forms which it took a long time to process. Their current system introduced a computerized system to ease the pressure on Sales managers and Customers.

The new residence application system helped to eliminate the paper-based applications thereby speeding up processing as details were being captured in the database. This helped to eliminate the delays caused by the sequential checking of each product in the store for the availability of Stock.

The system also checks automatically for the available stock, the ones sold and tracks the customers who bought them for transparencies within the business process to help accelerate the Stock allocation process thus making it painless for the Stock and Sales managers for ordering a particular quantity for storage. AIMS (Automated Inventory Management System) was a system developed in order to advance from a manual way of doing things therefore helping the researchers by learning from it since it the researchers was in the same scenario.

Jomo Kenyatta University of Agriculture Inventory management system (JKUAIT) is a system designed to help in the registration of food products in the warehouse and also to keep track of the available Food products and the ones that have already been occupied. The system also manages the warehouse infrastructure and keeps track of the stock of the products and the ones sold to customers therefore enabling the effective management of the warehouse. From this, the researchers have managed to learn more on keeping track of available stock of food products therefore incorporating this knowledge into their research.

2.5.1 Challenges of the related systems

Denying unauthorized access to the system is very important. The secret here is to be a head of potential hackers at all times in terms plugging all loopholes that they can use to compromise the system.

Automated management systems go a long way in challenging theft within the company. Culprits always find all sorts of excuses not to use the system.

2.6 Conclusion

With the collective knowledge reviewed, the researchers hope to be able to develop the Automated Management System that is as secure as possible with sound functionalities that make it very competitive in the Company.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 System Investigation

This chapter provides a general overview of the data gathering methods which were used to collect data for designing and implementing the Smart Shoppers' Masaka. Inventory management system, explains the data flow diagram of the current system, focuses on system flow and the architecture of the proposed system.

We used qualitative method of data collection because;

- Data is usually gathered from few individuals or cases therefore findings and outcomes cannot be spread to larger populations. However, findings can be transferred to another setting.
- Interviews are not limited to particular questions and can be redirected or guided by researchers in real time.
- The direction and framework of research can be revised quickly as soon as fresh information and findings emerge.
- Issues and subjects covered can be evaluated in depth and in detail. With this type of research, the researchers will have a clear vision on what to expect and collect data in a genuine effort of plugging data to bigger picture
- The data in qualitative research depends on human experience and this is more compelling and powerful than data gathered through quantitative research, this was be a big advantage in our development

In system analysis and design the researchers deemed it good and preferable to use system development life cycle (SDLC) as a means of developing the new system mainly because it follows the traditional phased approach with specific activities allocated to each phase of development as seen in the previous chapter. This provided a better approach for the researchers to comfortably develop the system therefore its use.

3.2 Population Study

This study was done using a target population in the wholesale section of smart shoppers. It enabled the researchers to acquire information that would be useful in developing the Automated Inventory management system.

The population included the Sales Manager, Store Keeper and System Administrators.

3.3 Data Gathering Techniques

3.3.1 Interviews

The researchers used the interview guide (Appendix I, II and III) to archive the collection and analysis of user requirements. The respondents of the respective interview guides were Administrators, Sales Managers and Customers.

Their responses were so useful to him of which they enabled him to develop the Automated Inventory Management System.

3.3.2 Questionnaires

The researchers used the questionnaires through series of questions asked to the customers, Administrators and Sales Managers. The researchers used the Close-ended questionnaires to obtain statistically useful information about his topic that was used to design an Automated Inventory Management System.

3.3.3 Observation

The researchers achieved the implementation of the designed system through the observation of the wholesale services carried out in the warehouse of Smart Shoppers. The researchers observed the procedures of how the products were being registered, added as stock in the warehouse and sold to the customers, the researchers made sure

that he had to get the first hand information before implementing the desired designed Automated Inventory Management System.

The procedures that he observed being carried out were very useful in determining the workflow Process and procedures. The results also made his work very easy in eliminating redundancy of data and designing the database system which was very useful in the implementation of the designed Automated Inventory Management System as well as during testing and validating the designed system

3.4 System Analysis

The data that the researchers got from questionnaires, Interviews and observation was analyzed critically, tabulated to acquire some statistics and later on analyzed qualitatively.

3.5 System Design

Tools used in designing the proposed system included; A context diagram, level 0 data flow diagram (DFD), Use Case Diagram and Entity Relation Diagrams (ERDs). It helped the researchers in looking for the functional requirements of the system. For the ER diagram, it simplified the researcher's work on relating the entities with the functionalities.

Prototype methodology was the kind of system development process the researchers used for the system that met the user requirements

3.6 System Testing

3.6.1 Component testing

The researchers did it on the developing Environment (Microsoft Visual studio 2010), immediately after the codes had been given the 'all clear' in the code walk-through. The code for the individual function was compiled and executed to see if it completed the

function that was designed to. If a section of code did not produce the required outcome then the code was checked against the requirements specification given for that section, and rewritten as required.

3.6.2 Bottom-up integration test

Integration testing is where all the components are combined together and checked to see if they work correctly. Integration testing was carried out and the developers noticed some errors in the system. Unit testing was reviewed again in order to pinpoint the problem and corrected it. According to Sommerville(2001), the integration test should ideally be completed on a machine that was not used during production of any individual sections of code.

Conclusion

Having followed all the step by step procedure during our data collection we manage to come up with the system which was later implemented

CHAPTER FOUR: PRESENTATION DESIGN AND IMPLEMENTATION

4.1 Determining the requirements of the system

A comprehensive system analysis was conducted to guide the development of the system. This chapter unveils three concrete requirements that identify user requirements, functional requirements and non- functional requirements.

4.2.1 User requirements

- i. Input and update information about products in the stock
- ii. View and search for information about different users, customers, vendors, Products and Orders of the customers
- iii. The user should be able to subscribe or login from the company whenever he or she likes

4.2.2 Functional requirements

The system should perform the following functionalities;

- i. The system should allow users to change passwords for security purposes
- ii. The system allows users to create a password of 5 char long when changing their passwords
- iii. The system should allow users to record all information about products purchased, products sold and those remaining in the store

- iv. The system should be able to export all the records stored to Microsoft excel as reports for Analysis

4.2.3 Nonfunctional requirements

- i. The system must be able to install with ease
- ii. The system must not occupy more than the required space for a normal program to disk space
- iii. It must be easy to learn and be used by a given set of user
- iv. The system must be platform independent

4.2.4 Software Requirements

The Software requirements for the system are as summarized below;

Windows XP, windows vista, windows7 and 8.x and RDBMS MS Access 2010

4.2.5 Hardware Requirements

The system minimum hardware requirements are summarized as below;

CPU of minimum Pentium 4 processor, RAM of minimum 512MB and Hard disk 40GB

4.3 Proposed System design

The Automated Inventory Management System design consists of such elements as the architecture, modules and components, the different interfaces of those components and the data that goes through that system.

It is meant to satisfy specific needs and requirements of a business or organization through the engineering of a coherent and well-running system.

4.4 System Modeling

In System modelling, systems need to be accepted by users, by having a user friendly interface and the system itself should be functioning. In this study the researchers used a User case as a model approach. The diagram below shows the users of the system and their roles on the system.

4.4.1 Context Diagram

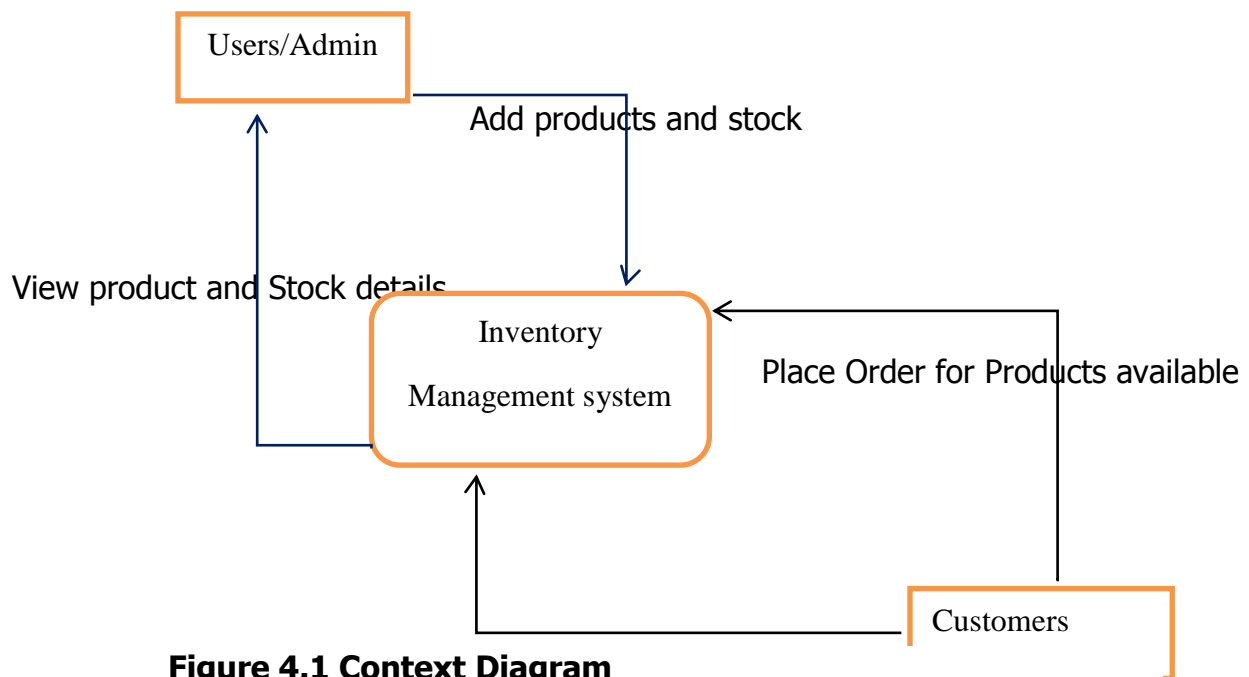


Figure 4.1 Context Diagram

Sell the products available

4.4.2 Level 0 Data flow diagram

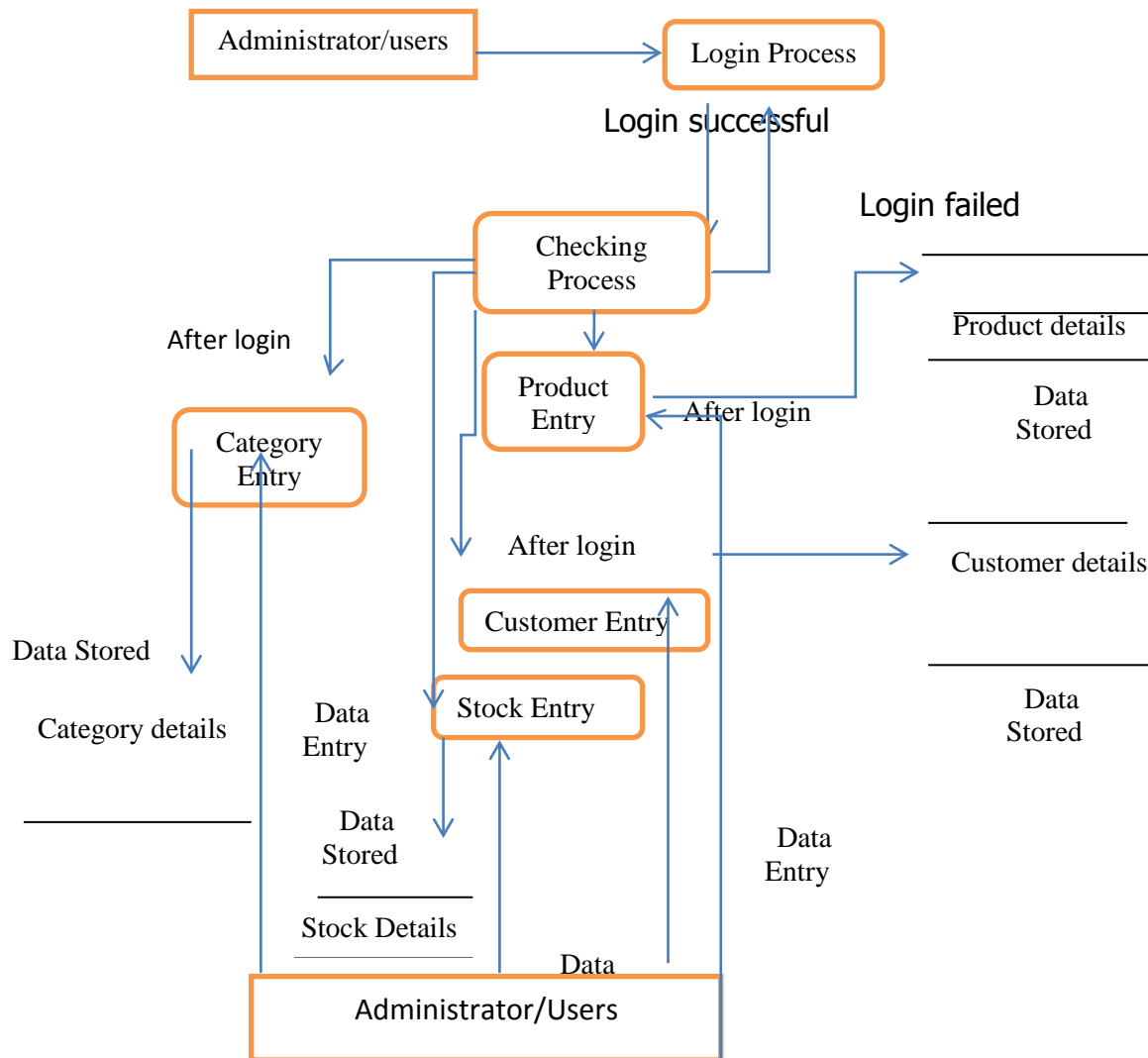
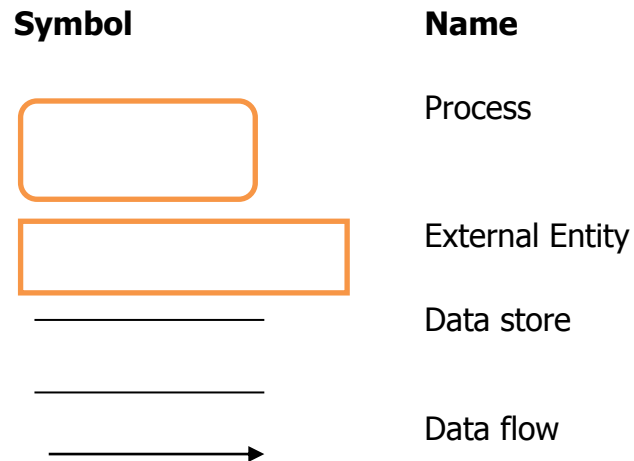


Figure 4.2 Level 0 Data Flow Diagram

4.4.3 Meaning of symbols



The figures above gives a description of the designed objects used in developing the system. They include processes, data flows, data stores, data reports and the external entities involved.

4.4.4 Description of processes

Table 4.1 shows the description of process

Processes	Descriptions
Login process	Deals with the details of users if they are valid
Checking process	Ensures that only the Valid users are authenticated
Category entry	Deals with the category of products stored in the system
Product entry	Deals with adding products in the system
Stock entry	Deals with adding Stock in the System
Customer entry	Deals with adding Customer profiles in the system

4.4.5 Description of data stores

Table 4.2 Shows Description of data stores

Data stores	Description
Category	Category details e.g. categoryID, categoryname
Product details	Products details e.g. product name
Stock details	Stock details e.g. Productcode
Customer details	Customer details e.g. customerID, customername

4.6.1.3 Description of external entities

Table 4.3 shows Description of external entities

External entity	Description
Administrator	Super User that manages other users.
Sales Manager	User that registers and manipulates product information, Stock and Suppliers
Supplier	Individuals who bring variety of Products to the Company

Customer	Individuals who buy products from the company
-----------------	---

4.7 Database Design

In this phase, the researchers focused on defining the data and constraints about the key entities, it involves identifying who are the entities, what data is stored about the entities and which fields about the entities are unique (primary keys) in designing the database for Inventory Management system.

4.7.1 Logical Design

Table 4.4: Structure of the product table

Field Name	Data Type
ProductCode	Text
ProductName	Text
Category	Text
Weight	Text
Price	Number

Table 4.5 shows Structure of the ordered product table

Field Name	Data Type
OrderNo	Text
ProductCode	Text

ProductName	Text
Weight	Text
Price	Number
Cartons	Number
Packets	Number
TotalPackets	Number
TotalAmount	Number

Table 4.6 Shows Structure of customer table

Field Name	Data Type
B_name	Text
B_address	Text
B_landmark	Text
B_city	Text
B_state	Text
B_zipcode	Text
S_name	Text
S_address	Text
S_landmark	Text
S_city	Text
S_state	Text
S_zipcode	Text

Table 4.7 Structure of Stock Table

Field Name	Data Type
StockID	Text
ProductName	Text
Category	Text
Weight	Text
StockDate	Date/Time
Cartons	Number
Packets	Number
TotalPackets	Number

Table 4.8 Shows the Structure of Inventory category table

Field Name	Data Type
CategoryID	Text
CategoryName	Text

Table 4.9 shows Structure of registration table

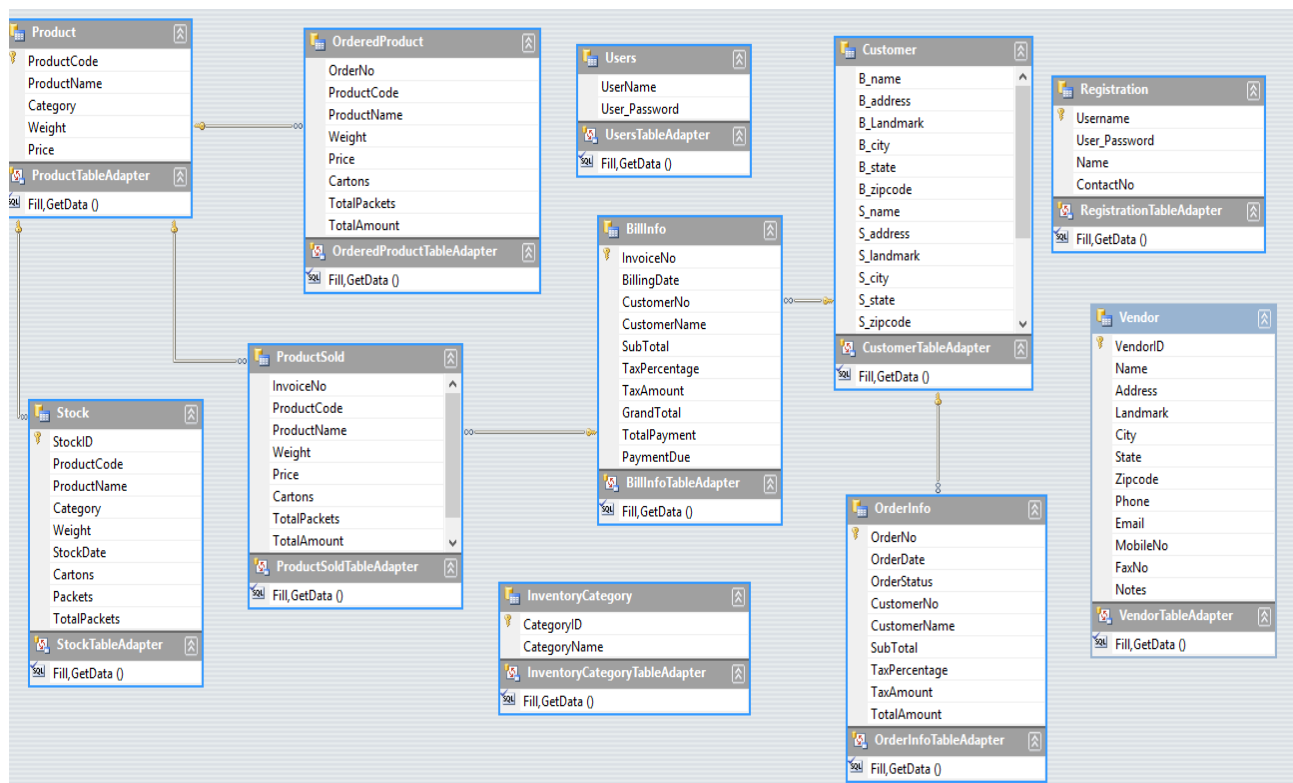
Field Name	Data Type
Username	Text
User_Password	Text
ContactNo	Text

Table 4.10 shows Structure of user table

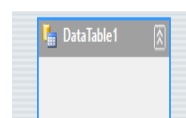
Field Name	Data Type
UserName(PK)	Text
User_Password	Text

4.7.2 Entity relationship diagram

The ERD below illustrates all the entities with their relations and associated attributes to make up the Inventory Management system.



-One to many relationship



-Entity

4.8 System Implementation

4.8.1 The Login form

This is what allows users to input their valid login details to allow them to access the system. Login form loads to the real user's interface depending on who has logged in,



Figure 4.8.1 Login form

4.8.2 Switchboard

This is the main menu of the system

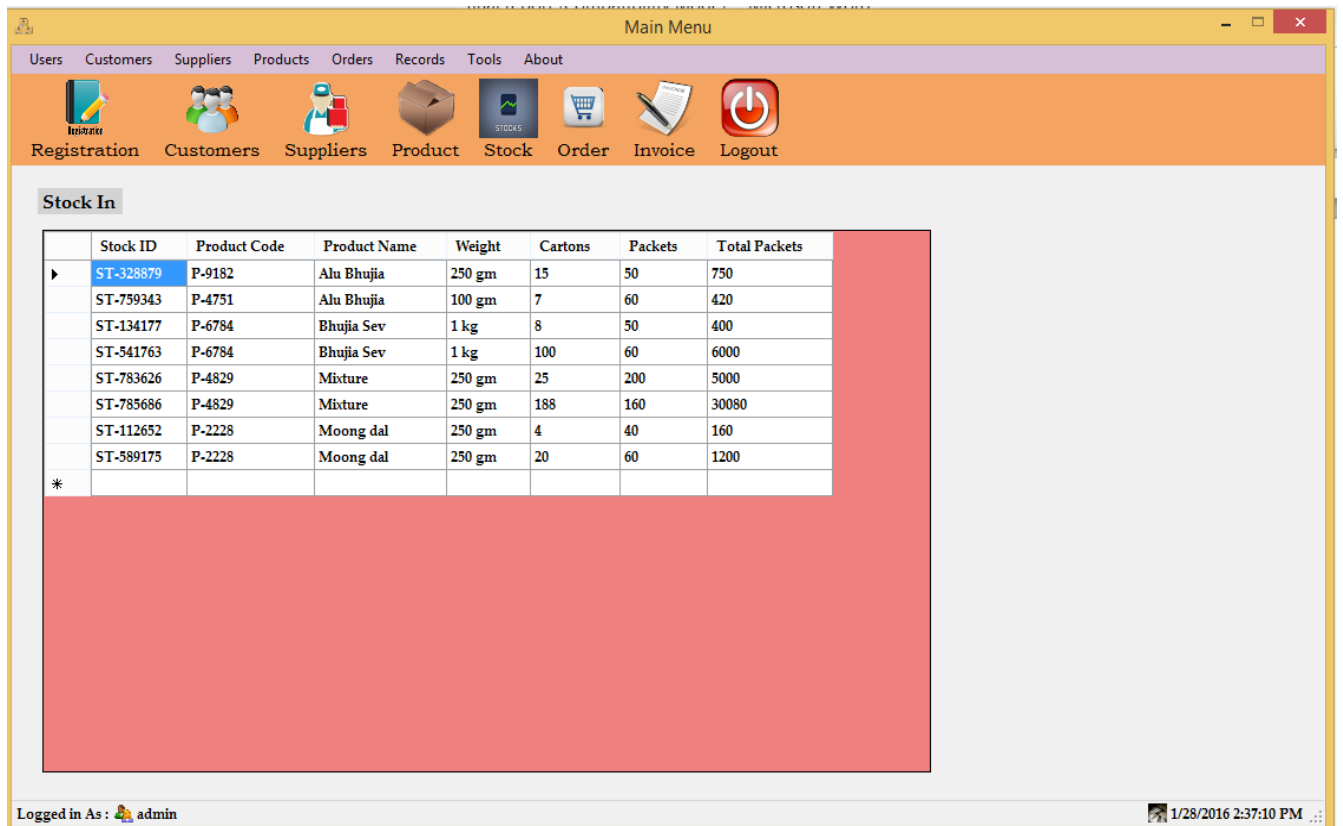


Figure 4.8.2 Main Menu

4.8.3 Registering customer

The User/admin uses this part of the interface for filling the information of customers in the system.

The screenshot shows a web application window titled "Customer Details". It contains three main sections for data entry:

- Customer Details:** Includes fields for *Name, *Address, Landmark, *City, *Town (a dropdown menu with "Kusum" selected), and *Zip/Post Code.
- Shipping Details:** Includes fields for *Name, *Address, Landmark, *City, *Town (a dropdown menu), and *Zip/Post Code. There is a checkbox labeled "Same as Billing Address" next to the section header.
- Additional Details:** Includes fields for Customer ID (with a "<" button), Phone, Email, *Mobile No., Fax No., and Notes (a text area with a vertical scrollbar).

On the right side of the form, there is a vertical stack of buttons: "New", "Save" (highlighted in blue), "Update", and "Delete".

Figure 4.8.3 Customer Entry Form

4.8.4 Registering Stock

This part of the interface is where stock is added, deleted or updated in the system

Stock Entry

Stock Details

Stock ID

<

Product Code

<

Product Name

Category

Weight (Per Qty)

Date

1/28/2016

Cartons

Packets (Per Carton)

Total Packets

Current Stock

	Product Code	Product Name	Weight	Cartons	Packets	Total Packets
▶	P-4751	Alu Bhujia	100 gm	7	60	420
	P-9182	Alu Bhujia	250 gm	15	50	750
	P-6784	Bhujia Sev	1 kg	8	50	400
	P-6784	Bhujia Sev	1 kg	100	60	6000
	P-4829	Mixture	250 gm	188	160	30080
	P-4829	Mixture	250 gm	25	200	5000
	P-2228	Moong dal	250 gm	4	40	160
	P-2228	Moong dal	250 gm	20	60	1200
*						

New

Save

Update

Delete

Figure 4.8.4: Stock Entry Form

4.8.5 Registering the Categories

This is the section where User/admin add delete or update category of products in the store from the system.

Inventory Category

Category Details

Category ID

<

Category Name

New

Save

Delete

Update

Get Data

Figure 4.8.5 Registering the Inventory

4.8.6 Registering Product

For this section the user/admin add deletes or updates a product in the store , categorising the product under a specified category added in the system.

The screenshot shows a window titled "Product" with a yellow border. Inside, there is a "Product Details" section with the following fields:

- Product Code:** A text input field followed by a small grey button with a left-pointing arrow (<).
- Product Name:** A wide text input field.
- Category:** A dropdown menu with a downward arrow (v) on the right.
- Weight (Per Qty):** A dropdown menu with a downward arrow (v) on the right.
- Unit Price:** A text input field.

To the right of these fields is a vertical stack of four buttons: "New", "Save", "Update", and "Delete". The "Save" button is highlighted with a blue border.

Figure 4.8.6 Registering The Product

4.8.7 Taking orders from customers

For this section of the interface the user/admin takes the order placed by the registered customer in the system, processes it and later on generates an invoice, the system also charges a V.A.T tax of the products bought by the customers.

He created a database using Microsoft Access 2010 using an OLEDB as the engine for the connection between the forms he created and the Microsoft access database. The system was debugged to remove any errors. The functions that users required were designed in particular forms basing on their functionalities.

In part of bottom-up integration testing The researchers combined all components that he was testing initially on the Integrated Environment Tool which was the Microsoft Visual Studio 2010 exported it as a stand-alone system and transferred it to a friend's laptop, there were few errors that he encountered but lastly he managed to correct and solved it of which the whole system was error free. The system was running without any errors and of which was also successfully packaged.

4.9 Conclusion

The system was tested to ensure that errors if any are fixed and was validated on the other hand to ensure that the system functionalities comply with the original system requirements.

It was tested at the various phases of development; Unit tests, integration tests and system tests were carried out to ensure that errors if any were Identified and fixed. Below is a table showing the results;

User category	Interface	System	Response time(seconds)	Comment
Developers	User friendly	Very Good	2	Very Good

Users	User friendly	Very good	3	Very good
-------	---------------	-----------	---	-----------

It was validated to ensure all the data fields accept the valid inputs, to avoid wrong user inputs. Further tests on validation were carried out on the system to verify that it met the specified user requirements. We presented the system to the users so as to get feedback about the system performance as to whether the system met their needs or requirements.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

In this study, we evaluated the existing system and analyzed the weaknesses in this system. Requirements for the proposed system that were defined guided the design, implementation and testing of the inventory management system. Overall, we achieved the objective of putting together a project for the Automated Inventory management system for Smart Shoppers.

5.2 Conclusion

The research findings from questionnaires, interviews and observation showed that there were significant delays in information flow, use of basic techniques of data storage and retrieval of products records.

The results generated from system design showed how different users interact with the system and how different entities relate with each other; this implied that the designed system meets the needs of each user catering for how each user would be relating with the system and how various entities within the system would be related.

The research findings from system design depicted fast information flow and relationship between entities. This implied the designed system would address the problem of significant delays experienced with current system and a clear understanding of entities in the backend.

The research findings from the System implementation showed user friendliness of the system which implied that the system is easy to use, less tiresome and would increase efficiency in handling daily routines as well as managing records in **Smart shoppers'**. The results from literature review were language restraints, lack of ability to handle strong data and high skilled IT personnel required. This called for language relevancy, provision to handle robust data and deployment of user friendly technologies to replace the current system.

The result from system testing and validation shows that the system is error free and suits the intended objective which implied it was ready for deployment.

5.3 Recommendation

- i. The researchers recommend that as the Company establishes branches all over the nation, the system may be made web based such that all branches can use the system at the same time on the Web.
- ii. The researchers also recommend that the system should be upgraded in order to report on products that have been hired out. The system can also be expanded to include information requirements for human resource management.
- iii. The researchers recommended that the management of **Smart shoppers' Masaka** should change the current system of handling day to day operations and managing records for effective management of records.
- iv. The researchers recommend that during the implementation time, the system should be deployed according to precise specifications of the system for successful usage.
- v. The researchers recommend that each group of users should have their own password to ensure adequate security of the system.
- vi. The researchers recommend that the top management of **Smart shoppers' Masaka** should ensure proper training of end-users on how to use the system efficiently.
- vii. The researchers also recommend that the senior management of **Smart shoppers' Masaka** should support the deployment of the system.

References

- Belle, J.-P. V., Michael, G. E., & Jane, N. (1999). *Discovering Information Systems* (2 edition, vol 20 pg. 59.). South African Library Press.
- Finchley, O.S. (2001). *Developing Strategic Rules Engine for Warehouse Management Systems*. Hollywood Illinois: Richard D Irion Inc.
- Gramaccioni, S.J. (2009). *Improving Warehouse Organisation*. California: Good Year Publishing Company.
- Harry, E.G. (2005). *Tracking Inventory*. London: Underwood Pitman.
- Haywood, R.J. (1984). *Warehouse Management Systems*. California: Academic Publishers Limited.
- Kotler, I.C. (2003). *Inventory Control Management in the 21st Century*. Charlotte (USA): Mac-Williams and Capital Publishers Inc.
- Lysons, M.C. (2001). *Systematic Planning for Change*. Palo Alto, California: Mayfield Publishing Company
- Michael, G.T. (2002). *RFID Concept: Principles and Practice*. New York: John Wiley and Sons Ltd.
- Microsoft Encarta Dictionary, (2009). *Inventory*. Retrieved May 24, 2011.
- Monzerka, J.G. (2002). *Sales Management: Theory and Practice*. London: Paul Chapman Publication.
- Piasecki, D. Glossary of Inventory Management and Warehouse Operation Terms. Retrieved (2016, January 8). From InventoryOps.com: InventoryOps.com/Glossary of Inventory Management and Warehouse Operation Terms
- Reilly, G. (2001). Comparing Approaches: Tele center evaluation experiences in Asia and Latin America. EJISDC, 117.

Sande, O.F. (2003). *Automated Warehouse Management Systems*. Journal of Information Technology, Massachusetts. Vol. 2, pp. 35-43.

Zenz, A.Z. (2004). *How Inventory Control Systems Really Work*. New Jersey USA: Peterson Educational Inc.

APPENDICES

Appendix I: Administrator Interview Guide

Our names are KIMBUGWE James and TWINAMASIKO Rashid, Students of Kampala International University pursuing a bachelor's degree of science in Computer Engineering. We are doing a research project to help us design and develop an Automated Inventory Management System with your corporation, we would be very glad for your assistance.

Name of the interviewees.....Title of the Interviewees.....

- i. How long have you been working with this Company?

.....

- ii. What is your present Position?

.....

- iii. How many employees are under your Supervision?

.....

- iv. Do you have any knowledge of using Computer?

YES ☐

NO ☐

- v. Please tell me the Business Process that occurs within the existing system.

.....

- vi. What kind of reports do you use in monitoring the business activities?

.....

- vii. What kind of challenges do you face within the existing system when monitoring the business activities?

.....

- viii. Any thoughts of how you see how these challenges can be reduced? And how if yes?

YES ☐

NO ☐

.....

Thank you so much for your time and patience have a nice day.

Appendix II: Sales Manager Interview Guide

- i. How long have you been working for the Company?

.....

- ii. Does your warehouse have any Information System?

YES ☐

NO ☐

- iii. What current system does the warehouse have in storing the product information?

.....

- iv. How does the system track the Inventory level in the stores?

.....

- v. What are the Procedures you follow when serving the Customers? Do you keep any records for the Customers if you have any Can we check on them please?

.....

YES

☐

NO

☐

- vi. What are the challenges of the existing Inventory Management System?
-

- vii. Are the Customers satisfied to the services you offer them?

YES

☐

NO

☐

- viii. Does the system perform to your expectations?
-

Appendix III: Customer Interview Guide

- i. How did you come to Know about the Company?
-

- ii. How long have you been Buying Products from this Company?
-

- iii. What kind of services does the company offer you?
-

- iv. What kind of challenges do you face when buying products from this company?
-

- v. What would you love to see being improvised in this company?
-

Ghant chart

	ACTIVITY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER
2	RESEARCH TOPIC				
3	REQUIREMENT ANALYSIS				
4	REQUIREMENT GATHERING				
5	WRITING THE PROPOSAL				
6	PROPOSAL PRESENTATION				
7	SYSTEM DESIGN				
8	SYSTEM TESTING				
9	SYSTEM IMPLEMENTAION				
10	REPORT PRESENTAION				
11					

Project budget

Item	quantity	Unit price	Total amount
VB software 2010	1	20000	20000
Designing	1	30000	30000
Internet	-	1000	20000
Transportation	-	4000	30000
Printing	9	-	75000
Miscellaneous	-	-	80000
Total			255000

Sample codes

Login Code

Imports System.Data.OleDb

Public Class frmLogin

Private Sub frmLogin_FormClosing(ByVal sender As Object, ByVal e As System.Windows.Forms.FormClosingEventArgs) Handles Me.FormClosing

End

End Sub

' My.User.CurrentPrincipal = CustomPrincipal

' where CustomPrincipal is the IPrincipal implementation used to perform authentication.

' Subsequently, My.User will return identity information encapsulated in the CustomPrincipal object

' such as the username, display name, etc.

Private Sub frmLogin_Load(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles MyBase.Load

End Sub

Private Sub LinkLabel2_LinkClicked(ByVal sender As System.Object, ByVal e As System.Windows.Forms.LinkLabelLinkClickedEventArgs)

End Sub

Private Sub login_button_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles login_button.Click

```

If Len(Trim(UserName.Text)) = 0 Then

    MsgBox.Show("Please enter user name", "Input Error",
MsgBoxButtons.OK, MessageBoxIcon.Error)

    UserName.Focus()

Exit Sub

End If

If Len(Trim>Password.Text)) = 0 Then

    MsgBox.Show("Please enter password", "Input Error",
MsgBoxButtons.OK, MessageBoxIcon.Error)

    Password.Focus()

Exit Sub

End If

Try

    Dim myConnection As OleDbConnection

    myConnection = New
OleDbConnection("Provider=Microsoft.ACE.OLEDB.12.0;Data
Source=|DataDirectory|\SI_DB.accdb;Persist Security Info=False;")

    Dim myCommand As OleDbCommand

    myCommand = New OleDbCommand("SELECT Username,user_password
FROM Users WHERE username = @username AND user_password = @UserPassword",
myConnection)

    Dim uName As New OleDbParameter("@username", SqlDbType.VarChar)

```

```
Dim uPassword As New OleDbParameter("@UserPassword",  
SqlDbType.VarChar)
```

```
uName.Value = UserName.Text
```

```
uPassword.Value = Password.Text
```

```
myCommand.Parameters.Add(uName)
```

```
myCommand.Parameters.Add(uPassword)
```

```
myCommand.Connection.Open()
```

```
Dim myReader As OleDbDataReader =  
myCommand.ExecuteReader(CommandBehavior.CloseConnection)
```

```
Dim Login As Object = 0
```

```
If myReader.HasRows Then
```

```
    myReader.Read()
```

```
    Login = myReader(Login)
```

```
End If
```

```
If Login = Nothing Then
```

```
    MsgBox("Login is Failed...Try again !", MsgBoxStyle.Critical, "Login Denied")
```

```
    UserName.Clear()
```

```
    Password.Clear()
```

```
    UserName.Focus()
```

```
Else
```

```
    ProgressBar1.Visible = True
```

```

        ProgressBar1.Maximum = 5000

        ProgressBar1.Minimum = 0

        ProgressBar1.Value = 4

        ProgressBar1.Step = 1

        For i = 0 To 5000

            ProgressBar1.PerformStep()

        Next

        FrmMain.ToolStripStatusLabel2.Text = UserName.Text

        Me.Hide()

        FrmMain.Show()

    End If

    myCommand.Dispose()

    myConnection.Close()

    Catch ex As Exception

        MessageBox.Show(ex.Message, "Error", MessageBoxButtons.OK,
        MessageBoxIcon.Error)    End Try

    End Sub

    Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As
    System.EventArgs) Handles Button1.Click    End

    End Sub    Private Sub LinkLabel1_LinkClicked(ByVal sender As System.Object, ByVal
    e As System.Windows.Forms.LinkLabelLinkClickedEventArgs) Handles
    LinkLabel1.LinkClicked

```

```

        Me.Hide() frmChangePassword.Show()    frmChangePassword.UserName.Text
=      ""                                     frmChangePassword.OldPassword.Text    =      ""
frmChangePassword.NewPassword.Text = ""

        frmChangePassword.ConfirmPassword.Text          =          ""
frmChangePassword.UserName.Focus() End Sub End Class

```