**CHAPTER ONE**

**INTRODUCTION AND BACKGROUND TO THE STUDY**

**1.0 Introduction**

This chapter aims to provide a comprehensive overview of the research proposal on the design of a computerized inventory management system for Munuki Top Supermarket. It will outline the background and context of the study, as well as the problem statement, objectives, significance, and scope.

**1.1 Background to the Study**

The ever-evolving world of technology has greatly impacted various industries, with computer technology being at the forefront. In particular, the use of computers has become a necessary tool for the promotion of internet technology and the establishment of information highways. This has given the IT industry a competitive edge in the market (Yongchang and Mengyao, 2015). In this digital age, there is a vast amount of data waiting to be processed and transmitted, making the development and utilization of databases crucial. However, small and medium-sized supermarkets in the domestic market have been lagging behind their larger counterparts in terms of informatization. Despite this, these enterprises still require efficient handling and management methods for resource management, information storage, and processing in order to stay competitive. Therefore, there is an urgent need to accelerate the computerization process in supermarkets.

Small and medium-sized supermarkets play a significant role in the economic development of South Sudan. Currently, there are numerous small and medium-sized supermarkets spread throughout the country, but their level of information technology is still low. With the advancement of technology, computer operations and management have become increasingly simplified, and computer knowledge is becoming more widespread. At the same time, with the fast-paced market economy and intense competition, it has become an inevitable trend for the supermarket industry to utilize computers for inventory management, sales tracking, and other processes. As small and medium-sized supermarkets primarily focus on selling products, they face various challenges in their current system operations. For instance, all sales orders are manually entered, which is time-consuming and prone to errors. Inventory is also manually recorded, making it difficult to keep track of the most accurate inventory situation. Additionally, calculating sales performance for each business membership and product is a tedious process that requires a lot of time and effort. In order to address these issues and improve economic benefits, it is imperative to implement computerized management in supermarkets.

The focus of this research is Munuki Top Supermarket, a well-known supermarket located in Juba. Like many other supermarkets in the country, Supermarket faces significant challenges in managing its inventory efficiently and accurately. The current system heavily relies on manual processes, including manual stock counts, handwritten records, and manual order placement. These manual procedures make it difficult to track inventory levels accurately, resulting in frequent stock outs, overstocking of certain products, and difficulties in timely replenishment. These challenges not only lead to customer dissatisfaction but also increase operational costs and potential revenue loss.

In the context of Munuki Top Supermarket, the research problem identified is the lack of a computerized management system that can streamline and automate key processes of the supermarket. The existing manual system is time-consuming, error-prone, and hampers the supermarket's ability to maintain optimal stock levels. Consequently, the supermarket faces challenges in accurately forecasting demand, managing stock replenishment, and coordinating inventory across different departments. These issues not only affect operational efficiency but also impact customer satisfaction and financial performance.

The proposed research aims to design a comprehensive computerized Supermarket management system that addresses the challenges faced by Supermarket. The system will automate key inventory processes, including stock monitoring, order management, demand forecasting, and inventory replenishment. By implementing such a system, the supermarket expects to improve inventory accuracy, reduce stock outs and excess inventory, optimize order placement, enhance demand forecasting capabilities, and ultimately enhance customer satisfaction.

**1.2 Problem Statement**

The problem addressed in this project is the absence of an automated and comprehensive management system in Munuki Top Supermarket in Juba, South Sudan. The current manual system used by the supermarket is time-consuming and prone to errors, resulting in inefficiencies in stock management, sales tracking. Therefore, there is a need to develop a system that is tailored to the needs of Supermarket.

**1.3 Objectives**

**1.3.1 Main Objective**

The main objective of this research project is to create a computer system that helps Munuki Top Supermarket manage their inventory and sales tracking better.

**1.3.2 Specific Objectives**

**The specific objectives of this project are:**

1. To design a user-friendly and customizable Supermarket Management System.

2. To automate the supermarket’s daily operations, including inventory management, sales tracking, and customer management.

3. To provide accurate and real-time information on inventory levels, sales, and customer data.

4. To improve the efficiency of the supermarket’s daily operations.

**1.4 Significance of the Study**

The proposed Supermarket Management System will benefit Munuki Top Supermarket by providing an efficient and accurate solution to manage their daily operations. The system will automate the supermarket’s inventory management, sales tracking, and customer management, making them more efficient and accurate.

The system will also provide real-time information on inventory levels, sales, and customer data, enabling the supermarket to make informed decisions. Additionally, the system will be customizable, allowing the supermarket to tailor it to their specific needs.

**1.5 Scope of the Study**

This study will focus on the development of a Supermarket Management System for Munuki Top Supermarket. The system will be developed using Web technologies and will be designed to automate the supermarket’s daily operations, including inventory management, sales tracking, and customer management.

**CHAPTER TWO**

**Literature Review**

**2.0 Introduction**

This chapter provides a comprehensive review of the literature related to the development of a web-based supermarket management system. The literature review is structured around the research objectives of the proposed study, which are to identify the challenges faced by Munuki Top Supermarket, and to develop a computerized supermarket management system that addresses these challenges. The review begins with an overview of the supermarket industry in developing countries, followed by a discussion of the challenges faced by supermarkets in these countries. The review then examines existing supermarket management systems and their limitations. Finally, the chapter concludes with a discussion of the potential benefits of the proposed supermarket management system.

**2.1 General Overview of Supermarket Management System**

The supermarket management system is a comprehensive solution for effectively managing all aspects of a supermarket. This innovative system handles tasks such as product information, inventory management, sales tracking, customer data, and billing with ease. It offers a streamlined and efficient approach to managing supermarket operations. This project focuses on automating the sales and billing process in a supermarket. The admin has the authority to add, modify, or delete items and their rates in the system. Only authorized personnel have access to these functions, ensuring secure and accurate data management. As customers make purchases, the user simply enters the item name and quantity, making the process quick and hassle-free. The software is designed to handle all sales activities, maintain stock details, and generate reports for specific time periods. This eliminates the need for manual calculations and paperwork, allowing users to focus on monitoring the supermarket. The user-friendly interface makes it easy for employees to navigate and operate the system efficiently.

With this system, customers can easily browse through items by selecting the first letter of the product name. A separate bill is generated for each customer and stored in the database for future reference. The system also allows for periodic record viewing and automatic ordering from designated vendors when stock levels are low. Payments are deducted from the total sales amount, making it a seamless and convenient process. To ensure security, each employee is provided with a unique username and password by the admin for login purposes. This advanced system not only simplifies supermarket management but also enhances overall efficiency and customer satisfaction.

**2.2 Evolution of Supermarket management system**

**2.2.1 History of Supermarket Management Systems**

The concept of supermarkets first emerged in the early 20th century, with the opening of the first self-service grocery store in 1916 by Piggly Wiggly. This marked a significant shift in the retail industry, as it allowed customers to browse and select their own products rather than relying on a store clerk. However, the management of these early supermarkets was still largely manual, with paper-based systems for tracking inventory and sales.

In the 1970s, the introduction of barcode technology revolutionized the supermarket industry. This allowed for more efficient and accurate tracking of inventory and sales, as well as faster checkout processes. Supermarkets also began to adopt electronic cash registers, which allowed for more detailed sales data to be collected.

**2.2.2 Advancement in Technology and Their Impact on Supermarket Management Systems**

The 1990s saw a rapid advancement in technology, particularly in the field of computing. This had a significant impact on supermarket management systems, as it allowed for the development of computerized systems that could handle large amounts of data and automate many processes.

The introduction of point-of-sale (POS) systems in the 1990s further improved the efficiency and accuracy of supermarket management. These systems allowed for real-time tracking of sales and inventory, as well as automatic updating of pricing and promotions.

The rise of e-commerce and online shopping also had a significant impact on supermarket management systems. With the increasing popularity of online shopping, supermarkets began to adopt online ordering and delivery systems, which required more sophisticated management systems to handle the increased volume of transactions.

**2.2.3 Comparison of Manual and Computerized Systems**

The use of manual systems in supermarket management has several limitations. These include human error, time-consuming processes, and limited data storage and analysis capabilities. Manual systems also require a larger workforce to manage tasks such as inventory tracking and sales reporting.

On the other hand, computerized systems offer numerous advantages over manual systems. These include increased efficiency and accuracy, real-time data tracking and analysis, and reduced labor costs. With computerized systems, supermarkets can also easily integrate their online and in-store operations, providing a seamless shopping experience for customers.

**2.3 Benefits of a computerized supermarket management system**

1. Efficiency and accuracy in sales and inventory management.

One of the main benefits of a computerized supermarket management system is the increased efficiency and accuracy in sales and inventory management. With a computerized system, all sales transactions are recorded in real-time, eliminating the need for manual record-keeping and reducing the chances of human error. This leads to more accurate and up-to-date data on sales, allowing managers to make better-informed decisions about restocking and inventory management.

2. Cost savings and time efficiency

Implementing a computerized supermarket management system can also result in significant cost savings and time efficiency for the store. With automated inventory tracking and restocking, managers can avoid the costs associated with overstocking or under stocking products. This can also lead to reduced waste, as products are less likely to expire or go unsold.

3. Improved customer service and satisfaction

A computerized supermarket management system can also greatly improve customer service and satisfaction. With accurate and up-to-date inventory information, customers can easily find the products they need, reducing wait times at checkout. The system can also generate real-time pricing information, ensuring that customers are charged the correct amount for their purchases.

4. Security and data management

A computerized supermarket management system also offers enhanced security and data management compared to manual systems. With a computerized system, all sales and inventory data are stored electronically, reducing the risk of data loss or theft. The system can also be password-protected, limiting access to authorized personnel only.

**2.3 Review of Related Literature**

A supermarket is a self-service shop that offers a wide range of food and household products, organized into aisles. It is larger in size and has a wider selection than traditional grocery stores, but is smaller and more limited compared to hypermarkets or big-box markets. The concept of an inexpensive food market relying on large economies of scale was first developed by Vincent Astor in 1915. He invested $750,000 into a corner of Manhattan and created the Astor Market, which sold meat, fruit, produce, and flowers. However, the market did not attract as many customers as expected and eventually closed in 1917.Entrepreneur Clarence Saunders introduced the concept of a super market with his Piggly Wiggly stores in 1916. These stores were successful and Saunders began offering franchises. The Great Atlantic & Pacific Tea Company, established in 1859, also became a successful grocery store chain in Canada and the United States in the 1920s.The general trend in retail has been to stock shelves at night so that customers can obtain their own goods and bring them to the front of the store to pay for them. This reduces labor costs, although there is a higher risk of shoplifting. There was initially debate about the origin of the supermarket, with various contenders such as King Kullen, Ralphs, Weingarten's Big Food Markets, and Henke & Pillot. To settle this debate, the Food Marketing Institute, Smithsonian Institution, and H.J. Heinz funded research to define the attributes of a supermarket as "self-service, separate product departments, discount pricing, marketing, and volume selling. “It was determined that the first true supermarket in the United States was opened by Michael J. Cullen, a former Kroger employee, in 1930. The store, King Kullen, operated under the slogan "Pile it high. Sell it low." Other established American grocery chains initially resisted Cullen's idea but were eventually forced to build their own supermarkets as the economy sank into the Great Depression and consumers became more price-sensitive. Supermarkets continued to proliferate in Canada and the United States after World War II, with most located in suburban strip shopping centers. In Canada, Loblaw is the largest supermarket chain, operating under various regional names such as Fortinos, Zehrs, No Frills, and the Real Canadian Superstore. Sobeys, with locations across the country, is the second largest supermarket, operating under different banners including Sobeys IGA in Quebec. In 1934, Québec's first supermarket, Steinberg's, opened in Montréal.

According to Yang and Burns (2003), self-service shopping took longer to become established in the United Kingdom. In 1947, there were only ten self-service shops in the country. It wasn't until ex-US Navy sailor Patrick Galvani, son-in-law of Express Dairies chairman, pitched the idea of opening a chain of supermarkets across the country in 1951 that the concept gained traction. The UK's first supermarket under the new Premier Supermarkets brand opened in Streatham, South London and was a huge success, taking ten times more per week than the average British general store at the time. Other chains followed suit and after Galvani lost out to Tesco's Jack Cohen in 1960 to buy the 212 Irwin's chain, the market underwent consolidation resulting in the dominance of four major retailers today: Tesco, Asda (owned by Wal-Mart), Sainsbury's, and Morrisons.

As Patton (1990) noted, in the 1950s, supermarkets often offered trading stamps as incentives to customers. Today, most chains have replaced these stamps with store-specific "membership cards," "club cards," or "loyalty cards." These cards provide special members-only discounts on certain items when scanned at check-out. Some supermarkets are also utilizing sales data from these cards as a significant source of revenue.

**2.4 Case Studies On Supermarket Management System:**

**Kroger's Inventory and Billing System**

Kroger, a popular supermarket chain in the United States, has implemented an advanced inventory and billing system to streamline their operations. The system is designed to track inventory levels, automate billing processes, and provide real-time data for decision making.

Kroger's inventory and billing system is powered by Oracle Retail software, a comprehensive solution for retail operations. It also utilizes barcode scanning technology to track inventory and automate billing processes. The implementation of the inventory and billing system at Kroger has resulted in improved efficiency, reduced errors, and cost savings. The use of Oracle Retail software has also provided the company with real-time data for better decision making. However, the project faced challenges such as data integration and training employees to use the new technology effectively.

**Coles' Automated Inventory and Billing System**

Coles, a leading Australian supermarket chain, has implemented an automated inventory and billing system to improve their operations. The system is designed to track inventory levels, automatically generate bills, and provide real-time data for decision making. Coles' automated inventory and billing system utilizes a combination of RFID technology and cloud-based software to track inventory levels and automate billing processes. The implementation of the automated inventory and billing system at Coles has resulted in significant cost savings and improved efficiency. The use of RFID technology has also enabled the company to track inventory in real-time, reducing the risk of stock shortages. However, the project faced challenges such as data integration and training employees to use the new technology effectively.

**CHAPTER THREE**  
**METHODOLOGY**

### 3.1 Introduction

This chapter outlines the research methodology used in developing the supermarket management system. The chapter provides an overview of the software development methodology adopted, the tools and technologies utilized, the system design, and the data collection methods employed.

### ****3.2 Software Development Methodology****

The supermarket management system was developed using the Waterfall model, a traditional software development methodology that follows a linear and sequential approach. The Waterfall model was selected due to its structured nature, which allows for a clear definition of project phases and deliverables.

The Waterfall model consists of the following stages:

System

Design

Requirement

Analysis

Implementation

Testing

Deployment

Maintenance

Figure 3.1 Waterfall Model

1. **Requirements Analysis**  
   During this phase, detailed requirements for the supermarket management system were gathered and documented. This included understanding the needs of different users—such as the Admin, Staff, and Customers—and defining the functionalities that the system must provide, like product management, order processing, and payment handling.
2. **System Design**  
   In this phase, the overall architecture of the system was designed. The design process involved creating data models, defining the system's structure, and designing the user interfaces. The design was carefully planned to ensure that all requirements were met, and that the system would be scalable, secure, and user-friendly.
3. **Implementation(Coding)**  
   The implementation phase involved translating the system design into actual code. The development team used PHP as the primary programming language and MySQL for database management. Each module, such as the product management system, order processing system, and user authentication, was developed according to the design specifications.
4. **Integration and Testing**  
   After coding, the individual modules were integrated to form a complete system. The integrated system then underwent thorough testing, including unit testing, integration testing, and system testing, to identify and fix any issues. The testing phase ensured that the system met the functional requirements and operated as expected.
5. **Deployment**  
   Once the system passed all testing stages, it was deployed to the production environment. This phase included setting up the necessary hardware and software infrastructure, configuring the system, and making it available for use by the Admin, Staff, and Customers.
6. **Maintenance**  
   The final stage of the Waterfall model involves the ongoing maintenance of the system. This includes monitoring the system for any issues, applying necessary updates, and making enhancements based on user feedback.

**Use Case Diagram:**

Use case diagrams are comprised of two fundamental components:

actors and use cases.

Actors represent individuals or entities that play a significant role in interacting with the system, while use cases depict the primary functionalities the system offers. The association between an actor and a use case indicates that a specific actor is responsible for initiating a particular function within the system.

**Use Case Diagram:**

Supermarket Management System

Customer

Stuff

Admin

**3.3.1 Entity Relationship Diagram (ERD)**

Include

PRODUCT

\*

Orders

Associated

\*

Pass reset

Have

1

Payments

1

Customer

Place

1

1

1

## CHAPTER FOUR

## SYSTEM IMPLEMENTATION AND DOCUMENTATION

### 4.1 Introduction

This chapter outlines the implementation and documentation of the supermarket management system. It provides a comprehensive overview of the system's functionalities, the implementation process, and how each feature is integrated to ensure a seamless user experience. The system is designed to facilitate efficient management of supermarket operations, including user management, product management, order processing, payment handling, and receipt generation.

### 4.2 System Overview

The supermarket management system is structured into three main user roles: Admin, Cashier, and Customer. Each role has specific functionalities and access levels within the system:

* **Admin**: Has full access to all system features, including user management, product management, order processing, payment handling, and receipt generation.
* **Cashier**: Primarily interacts with the system to manage orders, process payments, and generate receipts.
* **Customer**: Can create an account, log in, view products, place orders, and manage their profile.

### 4.3 Programming Languages Used

* **PHP**: Utilized for server-side scripting to handle user interactions, database operations, and overall application logic.
* **HTML**: Used for structuring the content on web pages.
* **CSS**: Employed for styling the web pages to enhance user interface and experience.
* **JavaScript**: Implemented for client-side scripting to enable dynamic content and interactions.
* **SQL**: Used for database queries to manage and retrieve data from the database.

### 4.4 System Requirements

#### 4.4.1 Hardware Requirements

* **Processor**: Intel Core i3 or equivalent
* **RAM**: 4 GB or higher
* **Storage**: 20 GB free disk space
* **Network**: Reliable internet connection for web-based access
* **Display**: Minimum screen resolution of 1024 x 768 pixels

#### 4.4.2 Software Requirements

* **Web Server**: XAMPP (Apache server)
* **Database Server**: MySQL (bundled with XAMPP)
* **Operating System**: Windows, Linux, or macOS
* **Browser**: Latest versions of Chrome, Firefox, or Safari
* **Development Tools**: phpMyAdmin for database management, Visual Studio Code or similar IDE for code editing
* **Version Control**: Git for version control, GitHub for repository hosting

### 4.5 Login Page

#### 4.5.1 Description

The login page allows users to access their respective dashboards based on their roles. The page includes fields for username and password, and it provides options for logging in as an Admin, Cashier, or Customer. New customers can create an account directly from this page.

#### 4.5.2 Figure

### 4.6 Admin Dashboard

#### 4.6.1 Description

The Admin Dashboard provides a comprehensive interface for managing the supermarket’s operations. It includes the following sections:

* **User Management Panel**: Allows the Admin to add, update, and delete user accounts, including both Cashiers and Customers.
* **Customers**: Provides an overview of all registered customers, including their details and account status.
* **Products**: Manages the inventory of products, including adding new products, updating existing ones, and deleting obsolete items.
* **Orders**: Displays and manages all orders placed by customers, including order status and details.
* **Payments**: Handles the processing of payments and provides a record of all transactions.
* **Receipts**: Facilitates the generation and management of receipts for completed transactions.

#### 4.6.2 Figure

### 4.7 Customer Account Creation

#### 4.7.1 Description

New customers can create an account by providing their personal information, such as name, email, and password. This feature allows customers to access the system, view products, and place orders.

#### 4.7.2 Figure

### 4.8 Cashier Interface

#### 4.8.1 Description

The Cashier interface is designed for processing customer orders, handling payments, and generating receipts. It includes features for viewing current orders, processing transactions, and printing receipts.

#### 4.8.2 Figure

### 4.11 Conclusion

The implementation of the supermarket management system has been designed to streamline supermarket operations and enhance user experience. The system’s features are integrated to provide efficient management and easy access for Admins, Cashiers, and Customers. The use of XAMPP for server management and Git/GitHub for version control ensures a robust development environment and smooth deployment process. The documentation provided ensures that users and developers can effectively navigate and maintain the system.

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