

**CATHOLIC UNIVERSITY OF EASTERN AFRICA**

**FACULTY OF SCIENCE**

**DEPARTMENT OF COMPUTER SCIENCE**

**SALON MANAGEMENT SYSTEM: A CASE OF JOYLINE SALON**

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# **DECLARATION AND APPROVAL**

**STUDENT**

I, the undersigned, do declare that this research project is my work and to the best of my knowledge, has never been submitted to any other college or university by anyone else for academic credit.

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This project has been submitted for examination with my approval as a University Supervisor

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This project has been submitted for the examination with my approval as a Head of Department Faculty of Computer Science at the Catholic University of Eastern Africa

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# **DEDICATION**

This is to my family, whose tremendous support, patience, and encouragement have been my backbone throughout my academic journey. This is to my parents for having inculcated the zeal for hard work and making me resolute and to my siblings for motivating me.I also turn over the dedication of this work to my mentors and instructors, whose leadership, experience, and belief in my personal capabilities have shown me how to push beyond my limits. To my friends and colleagues, thank you for your companionship and unwavering support during this journey.It finally goes to all small-scale entrepreneurs, especially salon owners, who always engage in innovating and perfecting their services, despite the challenges they often face. Let this research be a part of their success, growth, and enablement of attaining operational excellence within a competitive and constantly changing market.

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# **ABSTRACT**

The COVID-19 pandemic has reshaped business operations worldwide, with service-based industries such as salons adopting digital solutions to enhance efficiency and meet evolving customer expectations. Salon management system has had a positive influence on food industry with credibility, convenient, consistency and reliable to its customers with remarkable services done on website marketing. This project aims at designing a website for the online salon management system Joyline salon that will eliminate the paperwork with manual system. The objectives of the research are; i to automate booking and scheduling, ii to enhance customer experience through personalization, iii ensure data security and privacy, iv optimize inventory and staff management. Joyline Salon serves as a case study to assess the system’s effectiveness in reducing wait times, minimizing booking errors, and improving customer satisfaction. Initial findings show that the automated system has streamlined operations, optimized staff allocation, and enhanced service delivery. Personalized interactions through the system have also improved customer loyalty. Data security has also been implemented thus protecting the customer’s information. The system is developed using HTML, CSS, and JavaScript for the front-end interface, providing a user-friendly system that ensures smooth customer interaction. The backend is developed using PHP, which processes user requests, and communicates with the database. For data storage, MySQL is used to manage bookings, customer information, inventory and staff schedules, ensuring secure and reliable data management.

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## 

## **DEFINITION OF KEY TERMS**

**Salon Management System**: A software application designed to streamline and automate salon operations, including appointment scheduling, customer management, inventory tracking, staff scheduling, and payment processing.

**Digital Transformation**: The integration of digital technologies into various aspects of a business to improve efficiency, enhance customer experience, and adapt to market changes.

**Cloud Computing**: A technology that allows users to store, access, and manage data and applications over the internet rather than relying on local servers or personal computers.

**Artificial Intelligence (AI)**: The simulation of human intelligence in machines that can analyze data, learn from patterns, and make decisions or recommendations, such as personalized service suggestions in a salon.

**Personalized Marketing**: A strategy that uses customer data to tailor marketing messages, offers, and services to individual preferences and needs, such as sending birthday discounts to salon customers.

**Data Security**: The protection of sensitive information, such as customer details and payment records, from unauthorized access or breaches through encryption and secure authentication methods.

**User-Friendly Interface**: A design approach that ensures software is easy to use and navigate, even for individuals with minimal technical expertise.

**Mobile Money**: A technology that allows individuals to receive, store, and spend money using their mobile phones, widely adopted in Kenya through platforms like M-Pesa.

**Customer Relationship Management (CRM)**: A system or strategy used by businesses to manage and analyze customer interactions and data throughout the customer lifecycle to improve relationships and drive sales.

**Phased Deployment**: A system implementation approach where the software is rolled out in stages, starting with a pilot test, to ensure smooth integration and resolve any issues before full deployment.

**Unit Testing**: A software testing process where individual components or modules of a system are tested in isolation to ensure they function correctly.

**Integration Testing**: A testing process that evaluates the interaction between different components of a system to ensure they work together seamlessly.

# **CHAPTER ONE**

# **INTRODUCTION**

## **Introduction**

In this chapter, the research will discuss about the motivation and background of salon management system. The research will discuss background of research basing on online salon management system, the research will be a solution to tracking stock levels and generating alerts for low inventory and also allowing customers to schedule appointments online through a website or mobile app. The research will discuss justification of my research that will work on increasing efficiency and eliminating paperwork or phone-based booking, which are no longer adequate to handle the complex needs of modern salons. The research will focus on Joyline Salon and explore how a technologically advanced salon management system can streamline operations and enhance customer satisfaction. The system will enable customers to book appointments online, select their preferred services and stylists, make payments, and receive automated notifications when it is time for their session at the salon. This will help avoid scheduling conflicts, and ensure better service delivery. Additionally, the system will allow Joyline Salon to manage employee schedules efficiently, track product inventory, and maintain accurate customer records. The workload on employees will be reduced, as the system will automate routine tasks such as appointment reminders and payment processing. Data security will also be prioritized, with secure handling of customer information and payment transactions. This will not only improve operational efficiency but also enhance customer trust and loyalty. The research will discuss research organization of my project to explore how to improve a salon’s management system to ensure customer satisfaction.

## **Motivation Background**

The adoption of salon management systems has been driven by global challenges such as pandemics and the need for operational efficiency. The COVID-19 pandemic, declared a global health crisis in March 2020 (WHO, 2020), drastically altered service-based businesses, including salons, by emphasizing digital solutions to reduce physical interactions. Salons shifted to appointment-based systems, highlighting the importance of automated tools for managing bookings, reducing wait times, and enhancing service delivery.

Consumer expectations have since evolved, with preferences for online booking, automated reminders, and cashless transactions becoming standard (Deloitte, 2022). Modern systems now leverage artificial intelligence for personalized recommendations, boosting customer satisfaction and loyalty. Additionally, these systems provide tools for staff scheduling, inventory tracking, and real-time analytics, enabling informed decision-making and smooth operations.

However, the digital shift demands robust security measures to protect sensitive customer data, such as contact and payment information. According to PwC (2022), businesses with strong cybersecurity protocols build customer trust and safeguard their reputation. By integrating features like data encryption and access controls, salon management systems ensure secure and efficient operations.

Personalization has become a key differentiator, as customers expect tailored services that meet their individual needs. Salons that fail to adapt risk losing clients to competitors offering superior technology-driven experiences. Traditional manual processes, prone to errors and inefficiencies, are increasingly being replaced by automated systems that improve accuracy, speed, and reliability, allowing salons to deliver high-quality services in a competitive market. The Joyline Management System is designed to address these needs, offering secure, efficient, and personalized solutions for modern salons.

## **Background**

The Joyline Management System is developed to address the inefficiencies and challenges faced by traditional salon operations through the adoption of digital solutions. Historically, salons relied on manual processes such as handwritten appointment logs, physical inventory tracking, and cash-based transactions, which were prone to errors, inefficiencies, and poor record-keeping (MioSalon, 2024). These limitations often led to issues like overbooking, stock shortages, and reduced customer satisfaction.

With the advancement of technology, salon management systems began to evolve globally, incorporating features such as online appointment booking, inventory management, and cashless payment integrations (Kody Technolab, 2024). These tools have significantly improved operational efficiency and enhanced customer experience by offering convenience, automation, and reliability. The need for such systems became even more apparent during the COVID-19 pandemic, which accelerated the adoption of digital tools as salons had to reduce physical interactions and implement appointment-based services to ensure customer safety (Deloitte, 2022).

In Kenya, the adoption of salon management systems has been slower compared to global trends. Many local salons continue to use outdated methods, which limit their ability to scale and provide personalized customer services. A major gap is the lack of tailored solutions that integrate with local financial ecosystems, such as mobile money platforms like M-Pesa, which are widely used in Kenya (PwC, 2022). Additionally, as businesses grow, the need for scalable systems that can handle multi-branch operations becomes critical (Forrester, 2021).

The Joyline Management System seeks to bridge these gaps by offering a scalable, secure, and user-friendly platform. The system will include features such as real-time online booking, inventory tracking with automated alerts, and seamless integration with M-Pesa for cashless payments. By addressing these specific needs, the system aims to streamline operations, improve customer satisfaction, and position Joyline Salon as a leader in modern salon management.

## **Problem Statement**

Managing operations in a salon involves multiple processes such as appointment scheduling, customer management, inventory control, employee scheduling, billing and tracking of the services offered. In many salons, these operations are handled manually, leading to inefficiencies, errors, and delays. Manual record-keeping often results in the loss of important data, such as customer preferences, service history, or employee performance analysis. This can negatively impact customer satisfaction, as salons may struggle to provide personalized services or ensure smooth delivery of service.

Furthermore, the lack of systems limits a salon's ability to optimize its workflow. For instance, overbooking or double-booking of appointments is a common problem, which disrupts daily operations and inconveniences both customers and staff. Similarly, inventory mismanagement can lead to understocking or overstocking of beauty products, affecting profitability. These challenges grow as the business grows, with managers struggling to maintain an overview of daily activities, employee attendance, and financial transactions.

The absence of a comprehensive salon management system also limits the ability to gather and analyze data, which could otherwise be used to identify trends, improve decision-making, and enhance customer engagement through targeted promotions and loyalty programs. Thus, there is a need for an all-in-one solution that automates and streamlines these activities. An efficient salon management system would not only improve operational efficiency but also enhance the customer experience, enabling salons to stay competitive in an increasingly dynamic market.

## **Aim of the Research**

To develop a Salon Management System

## **Objectives of the Research**

1. To automate booking and scheduling
2. To enhance customer experience through personalization
3. Ensure data security and privacy
4. Optimize inventory and staff management

### Justification of the Study

The need for efficient operations and enhanced customer satisfaction justifies researching a salon management system. Traditional methods, like manual booking and spreadsheets, are prone to human errors, inefficiencies, and data loss, which can hinder growth and negatively impact customer experiences. Digital solutions address these challenges by automating routine tasks, centralizing operations, and improving service delivery. This not only enhances customer satisfaction but also boosts profitability and business growth (MioSalon, 2024; Kody Technolab, 2024).

Modern salon software improves customer engagement by tracking appointment histories and preferences, enabling personalized marketing, such as reminders for bookings and special offers for birthdays or anniversaries. This personalized approach builds customer loyalty, a critical factor for long-term success in the highly competitive salon industry. Additionally, collecting and analyzing customer feedback through these systems helps salons identify areas for improvement and refine their services, leading to increased customer satisfaction and retention (Salonist.io, 2024).

These systems further smoothen operational challenges by automation of scheduling, reducing no-shows through automated reminders, and optimization of inventory management. They enable staff to focus on the delivery of quality services instead of bothered by administrative burdens. Moreover, cloud data storage offers easy access to business performance metrics, and as such, salon owners are allowed to drive data-informed decisions regarding staff utilization, customer behavior, and appointment trends. MioSalon, 2024.

Adopting a salon management system offers salons a competitive edge by improving operational efficiency, strengthening customer relationships, and providing actionable business insights. As the industry evolves and customer expectations rise, such systems ensure salons can deliver seamless, personalized experiences while maintaining operational efficiency and profitability. These benefits make the implementation of salon management software essential for modern salons striving to succeed in a fast-paced, technology-driven market (Kody Technolab, 2024; PwC, 2022).

### Scope of the Research

This research focuses on creating and implementing a salon management system specifically for Joyline Salon to improve its daily operations. The aim is to address inefficiencies by automating key processes, integrating different business functions, and ensuring data security. The proposed system will help streamline salon operations, improve customer satisfaction, and make management more efficient.

One key feature will be appointment scheduling, which will allow customers to book, modify, or cancel their appointments online. The system will also send automatic reminders to customers and staff, helping reduce no-shows and ensuring better time management. Additionally, the system will provide customer management tools, such as saving service histories and personal preferences, to allow personalized services and targeted marketing campaigns. This will help the salon build long-term customer relationships and improve loyalty.

The system will also include staff management features to organize work schedules, monitor attendance, and track individual staff performance. This will help the management allocate tasks efficiently and identify areas where staff might need training. An inventory management module will monitor stock levels of beauty products and send alerts when it’s time to reorder. This feature will help avoid stock shortages or overstocking, keeping the business running smoothly.

The system will focus on billing and payments by generating invoices automatically and offering multiple payment options, such as cash, card, or mobile payments. The financial tracking feature will provide detailed reports on revenue and expenses, helping management make better financial decisions. In addition, the system will ensure data security by using encryption to protect sensitive information such as customer details and payment records. Access to the system will be restricted through permissions, so only authorized staff can see or modify important data. By backing up data on the cloud, the system will protect against accidental loss or hardware failures.

The research will focus on Joyline Salon’s primary location, with data gathered through interviews, surveys, and observations to understand the salon’s needs and challenges. Although the initial design will cater to one location, the system will be scalable to support future expansion, such as opening new branches. A cloud-based approach will ensure that the management can access the system remotely and safely.

This study aims to evaluate how the proposed system can improve efficiency, customer satisfaction, and overall business operations. The research is in line with the growing importance of technology in the salon industry, where automation, customer management, and data security are becoming essential for staying competitive.

### Research Organization

This research is structured into three interconnected chapters that systematically address the development of the Joyline Management System.

**Chapter one** introduces the study, providing a comprehensive overview of the motivation and background of salon management systems. It highlights the challenges faced by traditional salon operations and how technological solutions can address these issues. The chapter also presents the problem statement, clearly defining the need for an efficient, scalable, and user-friendly system tailored to Joyline Salon. Additionally, it outlines the objectives and aims of the research, along with the justification for undertaking this study.

**Chapter two** focuses on the review of related work, tracing the historical evolution of salon management systems globally, regionally, and locally. It examines existing solutions, identifying emerging trends such as artificial intelligence, cloud computing, and mobile integration. The chapter also identifies gaps in current systems, particularly in addressing the specific needs of small and medium-sized salons like Joyline Salon. This sets the foundation for the research by aligning the system's development with these findings.

**Chapter three** details the research methodology, describing the systematic approach used to design, implement, and deploy the Joyline Management System. It explains the processes for gathering and analyzing requirements, designing system components using diagrams and pseudocodes, and implementing the system with appropriate backend, frontend, and database technologies. The chapter also covers the testing strategies and deployment plan, ensuring the system is reliable, secure, and aligned with user needs.

These three chapters collectively guide the research, from identifying the problem and reviewing existing solutions to developing and implementing a system tailored to Joyline Salon’s needs.

# **CHAPTER TWO**

# **REVIEW OF RELATED WORK**

## **Chapter Introduction**

This chapter discusses the history, development, and present status of salon management systems; from purely manual to the most modern digital. It outlines the existing prototypes and systems operating globally and locally and determines emerging trends. Gained insights from this review inform the design and development of the proposed system. The researcher will discuss the research gap to be filled by my research whereby a researcher will need to identify the research gap, define research objective, conduct literature review, choose research methodology, data collection and analysis draw conclusions and communicate results and finally, in summary of the chapter the researcher will highlight the key components and themes that cover the whole research project on online salon management system at Joyline Salon.

## **History of the Research Topic**

Traditionally, the operations of salons have been done manually: from appointment logs written by hand to actual stock on hand tracked physically. These methods were labor-intensive, time-consuming, and prone to human error, leading to inefficiencies in operations and potential dissatisfaction among clients. As such, for example, overbooking or losing an appointment record may lead to lengthy waits for clients, ultimately reducing customer loyalty. The late 1990s were a major turning point for salon management with the introduction of desktop-based software solutions. Their functionality included appointment scheduling, billing, and basic customer records. These solutions were, of course, a big improvement over paper-based methods but suffered from a lack of scalability and integration with services outside of the salon. Also, since most of them were standalone computer installations, real-time updates were not possible, nor was remote access, which again restricted their use for multi-branch or rapid operations.

Cloud computing and the transformation of mobile technology restructured how salons worked by the mid-2010s. The cloud-based system allowed real-time access to data and its management remotely by the salon manager and staff. For example, multi-branch salons would manage all their branches from one place. Further, the introduction of mobile technology made it even more convenient for customers as they could now book appointments, check availability of services, and make payments through mobile applications.

The COVID-19 pandemic in 2020 accelerated the salon industry's adoption of digital management solutions. Lockdowns, social distancing, and health concerns simply made it unavoidable for salons to abandon their walk-in policies and shift to appointment-based services. In such a scenario, digital solutions came in handy for salons to sustain operations and also ensured a better experience for customers with minimized physical contact. These integrated contactless payments, automation of notifications, and digital consultation forms within the salons to match the new normal. (Kody Technolab, 2024).

Over the last couple of years, salon management systems have become more intense. Artificial intelligence has taken center stage, enabling salons to offer personalized services with a view of customers' preferences and histories. For instance, AI-powered systems can recommend specific treatments or products for a client's needs, thus boosting customer satisfaction and loyalty. Moreover, data analytics has turned into one of the cornerstones of modern salon management, with the facility for managers to analyze booking trends, optimize staff scheduling, and track inventory usage in real time. Such insights will help the salons make data-driven decisions, improve operational efficiency, and maximize profitability.

Another important addition has been the integration of social media within salon management systems. Most the advanced systems currently support the ability for salons to showcase their services over platforms like Instagram and Facebook, thus allowing booking capability directly from these touchpoints. This trend not only increases visibility but streamlines the customer journey as well, making it easier for clients to discover, book, and review services.

This, in general, reflects a broader trend in the adoption of technology and consumer expectations. From manual processes to AI-driven solutions, the journey of salon management systems has been continuous with innovations aimed at ensuring efficiencies, customer experiences, and business growth. Nowadays, they are not only simple appointment-managing tools but also all-inclusive platforms that integrate CRM, inventory control, staff scheduling, and financial reporting-all indispensable for any modern salon.

## **History of the Research Topic on Salon Management System Globally**

Efficiency, customers' convenience, and technological advancements are some of the factors that have driven the evolution of salon management systems around the world. Salons used to depend on appointment books, physical stock tracking, and other manual processes, which are error-prone and inefficient. That limited their scalability and the ability to provide personalized customer experiences.

In the late 1990s, desktop-based software began to emerge, offering basic functionalities like appointment scheduling and billing. These systems were a significant step forward but lacked real-time access and scalability, making them less effective for larger or multi-branch operations.

By the mid-2010s, the industry witnessed mass upheaval in cloud computing and mobile technology. Cloud-based systems allowed real-time data access and remote management, while mobile apps on customers' devices granted them the convenience to book services, make payments, and receive updates. These features indeed met the growing demand globally for seamless digital experiences.

The COVID-19 pandemic accelerated the adoption of salon management systems worldwide. Digital tools had to play a core role in managing appointments, contactless payments, and customer communication during lockdowns and social distancing measures. Salons embraced automation and streamlined workflows to adapt to the new normal.

Today, the incorporation of advanced technologies such as AI and data analytics into salon management systems helps personalize, optimize inventory, and make better decisions to stay competitive within a rapidly changing marketplace. At the global level, these systems have become indispensable in modern salon operations, ensuring efficiency, customer satisfaction, and business growth.

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## **History of Research Topic on Salon Management System in Africa**

Salon management systems in Africa have developed more gradually compared to global trends, partly because advanced technologies were more limited, and the adoption rate for digital solutions was relatively lower in the earlier years. Conventionally, most salons in Africa relied on manual systems, like keeping physical appointment logs and cash-based transactions that were characterized by inefficiency and prone to errors (MioSalon, 2024).

The reason basic digital solutions started to take place in African salons during the 2010s is the increasing accessibility of the internet and smartphones. Basic solutions ranged from mobile-friendly appointment systems to simple inventory tracking solutions. Mobile money services, like M-Pesa in East Africa, powered this with the integration of salon operations using cashless payment options, which seriously improved efficiency and customer convenience (PwC, 2022).

The COVID-19 pandemic further accelerated the adoption of digital systems as salons sought to manage appointments, reduce physical interactions, and integrate contactless payments. Local developers have since created affordable and scalable systems tailored to the needs of small and medium-sized African salons, helping them compete in a growing tech-driven market (Kody Technolab, 2024).

## **History of Research Topic on Salon Management System in Kenya**

Salon management in Kenya has, for long, relied on traditional ways such as appointment books and cash-based transactions that mostly resulted in inefficiencies and errors. With the improved use of mobile money platforms like M-Pesa and the rise in Internet penetration, salons started embracing simple digital tools for appointments and payment scheduling in the 2010s (PwC, 2022).

The COVID-19 pandemic brought to the fore the need for stronger systems, encouraging local developers to innovate with more affordable solutions that targeted small and medium-sized salons. Joyline Management System plans to address these needs by offering automated appointment booking, inventory tracking, and customized customer experiences that will help these salons in Kenya become more efficient and competitive in a growing market.

## **Emerging Trends and Patterns in the Research Area**

The industry of salon management has grown tremendously with technological advancements; therefore, emerging trends focus on efficiency and customer satisfaction. Among the current trends is integrating artificial intelligence (AI), which makes personalized recommendations of services and products to customers for their choice, hence promoting loyalty and engagement (MioSalon, 2024).

Another trend is the widespread adoption of cloud-based solutions, enabling real-time data access, scalability, and seamless integration with third-party services. This technology allows salons to manage operations remotely, making it particularly useful for multi-branch businesses (Kody Technolab, 2024).

Besides, the transition to mobile-friendly systems facilitates on-the-go booking, payment, and service updates, responding to the increasing demand for convenience. Further enhancements through integrating cashless payments, such as mobile money and e-wallets, continue to improve customer experiences by reducing dependence on cash transactions altogether (PwC, 2022).

Finally, data security became critical, and new systems now apply encryption and secure authentication to safeguard customer information for trust creation. Salonist.io, 2024. From these trends, it is clear that the journey of the industry toward automation, personalization, and data-driven decision-making makes salon management systems indispensable in the market today.

## **Research Gap to be Filled by Your Research**

While the salon management systems have come a long way in evolving to tackle global operational requirements, they often fall short of fulfilling specific needs that a small and medium enterprise like Joyline Salon experiences. A major shortage is the lack of integration into local financial ecosystems. In Kenya, mobile money platforms like M-Pesa dominate the payment landscape, yet many salon management systems do not support seamless integration with such platforms. This limits their usability for local businesses that rely heavily on these systems for cashless transactions (PwC, 2022).

Another critical gap is scalability. The design of existing systems for small businesses or very large enterprises means a midsized salon like Joyline, while growing rapidly, falls between two stools regarding proper operational tools. Inability to handle multi-branch operations with efficiency, manage centralized data, and contribute toward real-time reporting is the bottlenecks that frequently hamper growth in business along with operational efficiency. According to Deloitte (2023), it requires scalability for catering to both present needs and future expansion.

Advanced inventory management also remains an overlooked feature in many systems. Most platforms only provide basic inventory tracking, which does not account for real-time stock monitoring, automated reordering, or usage analytics. For salons like Joyline, which depend on maintaining optimal stock levels for seamless service delivery, this gap leads to either stock shortages or overstocking, both of which affect profitability and customer satisfaction (Forrester, 2021).

Another pressing issue is that of data security. Digital media have cropped up everywhere these days, and the security of sensitive customer information regarding payment details and service history should be guaranteed. However, a majority of these systems are still missing robust encryption, secure authentication mechanisms, or conformance with international data protection standards. This vulnerability may translate into breaches of data, thus compromising customers' trust in your salon reputation. World Economic Forum, 2022.

Another area where the systems have failed is in terms of user-friendliness. Many systems are very complicated; they require intensive training for employees in the salon industry, many of whom are not tech-savvy. This will be a steep learning curve and hence a deterrent to its usage, restricting the system's full benefit potential for businesses like Joyline Salon-which rely on basic and efficient tools to support everyday operations (Accenture, 2022).

Joyline Management System seeks to bridge these gaps through the development of a customized solution that is scalable, secure, and easy to use. The system will be well integrated with local payment platforms such as M-Pesa for cashless transaction support. It shall also have a sophisticated inventory management module with real-time inventory monitoring, automatic reordering, and comprehensive analytics for minimal waste and increased profitability. For scalability, the system shall be provided with a centralized management system that shall be able to handle multi-branch operations efficiently.

The system will ensure security in data storage by implementing encryption, safe authentication procedures, and observation of the data protection policy. This ensures customer information remains protected to engender trust and loyalty. Also, the Joyline Management System will be fully user-friendly to reduce lengthy training and enhance the capabilities of the staff to perform their duties effectively.

Addressing these critical gaps, Joyline Management System will ensure smoother operation, higher customer satisfaction, and business growth to place Joyline Salon at the top in the competitive salon industry.

## **Chapter Summary**

This chapter reviewed the evolution of salon management systems, highlighting their shift from manual processes to advanced digital solutions. It explored global trends, including AI-driven personalization, cloud-based scalability, and secure payment integration. In Africa and Kenya, adoption has been driven by tools like M-Pesa, but gaps remain in scalability, inventory management, and data security. The proposed Joyline Management System aims to address these gaps by providing a tailored, user-friendly solution to streamline operations and support business growth.

# **CHAPTER THREE**

# **RESEARCH METHODOLOGY**

## **Chapter Introduction**

This chapter presents the research methodologies followed in the design and development of the Joyline Management System. It explains the strategies followed for collecting and analyzing the requirements, studying the existing system, and proposing a new system. The system analysis, design, implementation, testing, and deployment techniques will also be discussed in this chapter to ensure that the system developed meets the Joyline Salon requirements. Each step is designed in order to bridge the identified research gaps and provide a scalable, secure, and user-friendly solution.

## **Methodology for Literature Review**

The methodology used for the literature review consisted of collecting and analyzing existing research, case studies, and industry reports to trace the history of salon management systems and identify prevailing loopholes in current solutions. Authentic academic sources were sought from platforms such as Google Scholar, IEEE Xplore, and PubMed. Relatively, industry-specific reports from organizations such as Deloitte and PwC were also considered in order to practically determine the trends and challenges of salon management.

The review focused on studies published between 2015 and 2024 in order to ensure the inclusion of the latest advancements in technology, like cloud computing, AI, and data security. The search has been guided by specific key terms or words such as "salon management systems," "inventory management," and "digital booking platforms." The selection included relevant studies applicable to small and medium-sized salons, particularly in the African context.

In the literature review, critical gaps were identified through the synthesis of findings from the global, regional, and local studies. Among these were localized payment integrations, advanced inventory tools, and user-friendly interfaces for smaller salons. The information obtained formed the basis in the design and objectives of the proposed Joyline Management System, which is relevant according to current trends and responsive to the identified challenges posed, so concludes Deloitte (2023) and PWC (2022).

## **Methodology Related to Requirement Specification, Data Collection, and Analysis Techniques**

The Joyline Management System was developed through the adoption of a structured approach toward requirement specification, data collection, and analysis of findings. This provided the assurance that the design of the system would be appropriate to meet the operational needs of Joyline Salon and the gaps identified.

**Requirement Specification**

These requirements were identified by directly engaging with the management, staff, and customers of Joyline Salon on their current challenges and expectations of a salon management system. Key areas of focus included appointment scheduling, inventory management, payment integrations, and data security.

**Data Collection Techniques**

**Interviews:** Semi-structured interviews with the management and staff of the salons were performed to extract knowledge about daily operations, common bottlenecks, and expectations from the system. These interviews afforded the qualitative data necessary to discern the peculiar requirements of the salon.

**Surveys:** Structured questionnaires were distributed to the customers in order to comprehend their preferences regarding online booking, modes of payment, and personalized services. This quantitative data helped in prioritizing features that improve customer satisfaction.

**Observations:** Observations were done on-site to analyze workflow and find inefficiencies in the current process, such as inventory tracking or scheduling conflicts, which are still done manually.

**Data Analysis Techniques**

**Qualitative Analysis:** The responses from interviews and observations were analyzed using thematic analysis. Responses were then categorized under recurring challenges and expectations, thereby helping prioritize features that would impact operations the most.

**Quantitative Analysis:** Quantitative analysis involved the use of descriptive statistics to determine the level of customer preference and satisfaction on measured features. These features included payment options, book preferences, among others.

**Comparative Analysis:** Data from Joyline Salon's existing process were compared with features of modern salon management systems. The comparative study indicated the gaps the proposed system could address.

This methodology provides a clear understanding of the needs of Joyline Salon and develops a system that would spur efficiency, hence enhancing customer satisfaction and supporting future scalability.

## **Methodology for System Design; Database design, DFD, Context diagram, Flow Charts, Sequence Diagram, Collaboration Diagrams, Use Case, Pseudocodes**

The system design for the Joyline Management System was approached systematically to ensure the proposed solution meets the operational needs of Joyline Salon. This involved creating structured models and diagrams to represent system components and their interactions.

**Database Design**

A relational database was designed to manage key data entities, including customers, appointments, staff, inventory, and payments. Normalization was applied to reduce redundancy and ensure efficient data management. The main tables include:

* **Customers**: Stores personal details, preferences, and service history.
* **Appointments**: Tracks bookings, assigned staff, and services requested.
* **Inventory**: Manages stock levels, product details, and reorder alerts.
* **Payments**: Records transaction details for cash, card, and mobile money payments.

**Data Flow Diagram (DFD)**

The DFD illustrates how data flows between the system’s components. At **Level 0**, it represents interactions such as:

Customers booking appointments online.

Staff accessing schedules and inventory details.

Managers viewing reports and processing payments.

**Level 1** expands on these processes, detailing specific operations like stock updates, customer notifications, and payment processing.

**Context Diagram**

The context diagram depicts the interaction of the system with external entities such as:

**Customers**: For booking and payments.

**Staff**: For schedules and service records.

**Payment Gateways**: For mobile money and card transactions.

**Flow Charts**

Flow charts were used to represent specific processes, such as:

**Appointment Booking**: From customer input to staff allocation.

**Inventory Management**: From stock usage to automated reorder notifications.

**Payment Processing**: Covering payment confirmation and receipt generation.

**Sequence Diagram**

The sequence diagram shows the chronological flow of operations. For example:

A customer books an appointment.

The system confirms availability and notifies staff.

A payment is processed, and a receipt is issued.

**Collaboration Diagram**

Collaboration diagrams were created to visualize interactions between system components, such as how the appointment module interacts with the inventory module to ensure required products are available for scheduled services.

**Use Case Diagram**

The use case diagram outlines key user interactions with the system, including:

Booking appointments.

Managing inventory.

Viewing customer and sales reports.

Actors include **customers**, **staff**, and **managers**.

**Pseudocodes**

Pseudocode was written to define the logic of core functionalities:

**Booking Confirmation**:

IF service\_available AND staff\_available THEN

Confirm booking;

Notify customer and staff;

ELSE

Display unavailability message;

END IF

**Inventory Alerts:**

FOR each product IN inventory

IF stock\_level < reorder\_threshold THEN

Trigger reorder alert;

END IF

END FOR

This structured design approach ensured that all system requirements were clearly represented, facilitating smooth development and integration of the Joyline Management System.

## **Methodology for System Implementation, backend, frontend, and database technology**

The implementation of the Joyline Management System involved careful planning and selection of tools and technologies to meet the needs of the salon while ensuring scalability and efficiency. The development process started with defining the structure and workflow of the system, ensuring that each component worked seamlessly together. Visual Studio Code (VS Code) was used as the Integrated Development Environment (IDE) due to its versatility and support for multiple programming languages. Version control was managed with Git and GitHub to track changes and facilitate collaboration.

The system's structure was designed with a clear separation between the backend, frontend, and database to ensure modularity and ease of maintenance. The frontend focused on delivering a user-friendly interface, while the backend handled the system’s core logic and integration with external services. The database was designed to store and manage critical data such as appointments, customer records, and inventory efficiently and securely.

**Backend of Salon Management System**

The backend of the Joyline Management System was developed using PHP and MySQL to handle the core functionalities and data management. PHP was used to create server-side logic for processing appointment bookings, inventory updates, and payment transactions. Its integration capabilities ensured smooth communication between the frontend and the database.

MySQL served as the database management system, storing critical information such as customer records, appointment schedules, and inventory details. The database was designed to be efficient and secure, with proper normalization to minimize redundancy and ensure data consistency. Together, PHP and MySQL provided a reliable and scalable backend for the system.

**Frontend of Salon Management System**

The frontend of the Joyline Management System was built using HTML for structuring content, CSS for styling and responsive design, and JavaScript for adding interactivity. HTML provided the framework for key elements like forms and dashboards, while CSS ensured a consistent, visually appealing layout across devices. JavaScript enabled real-time updates and dynamic interactions, creating a seamless and user-friendly experience.

**Database of Salon Management System**

MySQL was chosen for the Joyline Management System due to its reliability, scalability, and compatibility with PHP. It efficiently handles critical data such as customer records, appointments, and inventory, ensuring consistency and security through features like user authentication and data encryption. MySQL's scalability supports Joyline Salon's growth, while its backup and recovery capabilities ensure data integrity. Its robust performance makes it a suitable and dependable choice for the system.

## **Methodology for System Testing; Testing Plan, Testing Techniques**

The Joyline Management System underwent a structured testing process to ensure functionality, reliability, and user satisfaction. The testing plan included unit testing for individual modules, integration testing to verify interactions between components, and system testing to evaluate overall performance. User Acceptance Testing (UAT) was conducted with salon staff and customers to ensure the system met practical requirements.

Manual testing was used to validate workflows and interfaces, while automated testing tools checked for performance and data accuracy. Black-box testing ensured the system’s features worked as expected, and security testing was performed to safeguard sensitive customer and payment information. This approach ensured the system was robust, secure, and ready for deployment.

## **System Deployment Methodology**

The deployment of the Joyline Management System was carried out in a phased and structured manner to ensure a seamless transition from the existing processes to the new system. The process began with thorough preparation, including comprehensive testing of all system modules and training for salon staff to familiarize them with the system's features and functionality. Existing data, such as customer records and inventory, were securely backed up to ensure a smooth migration and to prevent data loss.

The deployment was initiated with a pilot phase, where the system was implemented at a single branch of Joyline Salon. This allowed the identification and resolution of any unforeseen issues in a controlled environment. After successfully validating the system's performance and reliability during the pilot phase, the system was fully deployed across all salon branches.

Post-deployment, continuous monitoring was conducted to address any technical challenges, and feedback from staff and customers was collected to fine-tune the system for optimal performance. This carefully planned and executed deployment ensured minimal disruptions to operations while enabling Joyline Salon to leverage the system effectively.

## **Chapter Overview**

This chapter has presented the methodology for research that was used in the development of the Joyline Management System and mainly focused on the structured approach of design, implementation, testing, and deployment. The requirement specification and data collection methodology comprised interviews, surveys, and observations to obtain an understanding of how the salon operates and the needs of its customers. Designing the system involved database modeling, process flow diagrams, and pseudocodes that ensured clarity and functionality in the structure.

PHP and MySQL were used for the backend, which implemented core functionalities related to scheduling and inventory management, while the presentation layers were realized in HTML, CSS, and JavaScript to make the site responsive and user-friendly. Testing methodologies ranging from unit tests and integration testing to user acceptance testing ensured the functional, performance, and security requirements were met. Finally, there was a phased deployment of the system, with training and post-deployment support to optimize the use of the system.

This chapter focused on the step-by-step methodology that followed in order to have a Joyline Management System that was reliable, secure, and effective in attaining its needs.

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