**CHAPTER ONE**

**GENERAL INTRODUCTION**

**1.0 INTRODUCTION**

In recent years, advancements in information technology have significantly impacted various industries, including the food service sector. These developments have transformed how food is ordered and delivered, introducing new customer experiences and operational efficiencies (Jones, Comfort, & Hillier, 2021; Mukherjee & Nath, 2021). Traditional methods of ordering food, which involve in-person visits or phone calls, are being replaced by more efficient online systems (Kimes, 2021). These online food ordering systems allow for better data management, reduce operational costs, increase profit margins, and provide a competitive edge to businesses that optimize their delivery processes (Mukherjee & Nath, 2023).

Each food service business typically follows its own procedures for processing orders and delivering food to customers. Commonly, customers place orders directly with the restaurant, which then prepares and delivers the food. This process is often manual, leading to inefficiencies such as time delays and incorrect deliveries due to the involvement of multiple parties (Ryu, Lee, & Kim, 2021). Some businesses centralize their ordering through a single platform, but this approach still relies on manual processes, which can be time-consuming and error-prone (Jones et al., 2021).

RIKI Mart, located in Remo North local government, Ogun State, is a prominent food service provider catering to a diverse clientele. To enhance its efficiency and improve customer satisfaction, RIKI Mart recognizes the need to develop an e-service system for online food ordering and delivery. Motivated by this need, researchers at RIKI Mart have initiated the development of a prototype online food ordering system.

This paper presents the prototype model, designed to offer convenience to both customers and the business. By examining literature and reviewing other food service providers' online ordering systems, this study aims to showcase a model that streamlines the food ordering and delivery process. The goal is to improve efficiency, reduce errors, and enhance the overall customer experience at RIKI Mart.

**1.1 BACKGROUND OF STUDY**

Starting a small-scale business in today’s competitive market is extremely challenging, especially when facing competition from well-established businesses. In the current fast-paced environment, people are often busy with their daily activities and are particular about how they order food. Modern patrons are drawn to online ordering not only for its convenience but also for the transparency in pricing, menu options, and the streamlined ordering process.

This study proposes an online food ordering system designed specifically for RIKI Mart, a food service provider, but applicable to any food delivery industry. The key advantage of this system is the simplification of the ordering process for both the restaurant and its customers. When users visit the ordering webpage, they are presented with an updated, interactive menu. Customers can easily choose items to add to their order list, which can be reviewed for visual confirmation, ensuring the accuracy of their selections.

For the restaurant, this system reduces the stress associated with manual order processing by automating the entire process. Once a customer places an order on the webpage, it is stored in a database and retrieved in real-time through a desktop application with an admin login on the restaurant's end. Within this application, orders are displayed alongside delivery details and corresponding options in a concise and easy-to-read format. This allows restaurant employees to quickly access orders as they are placed, ensuring that the required items are prepared and delivered promptly, without delay or confusion.

By implementing this online food ordering system, RIKI Mart aims to enhance customer satisfaction, streamline its operations, and remain competitive in the ever-evolving food service market. This system not only meets the demands of modern customers but also improves operational efficiency, providing a robust solution for the challenges faced by small-scale food service providers.

**1.2 MOTIVATION AND PROBLEM DESCRIPTION**

The rapid evolution of digital technologies has significantly impacted the food service industry. Traditional methods of food ordering—relying on in-person visits or phone calls—have become inefficient and do not meet the demands of modern consumers who seek convenience, speed, and reliability.RIKI Mart, a well-known food store in Saapade, Ogun State, faces challenges with its current manual ordering and delivery processes. Customers often experience long wait times, incorrect orders, and inconsistent service, which negatively affects customer satisfaction and operational efficiency.

The motivation for developing a new online food ordering and delivery system for RIKI Mart is to address these challenges and align with technological advancements. The proposed system aims to automate and streamline the food ordering process, enhancing convenience, accuracy, and efficiency.

Key benefits include:

* **Convenience**: Customers can order anytime and from anywhere.
* **Accuracy**: Automated processing reduces errors.
* **Efficiency**: Streamlined operations optimize kitchen and delivery workflows.
* **Customer Satisfaction**: Improved reliability and convenience boost customer loyalty.

This project will analyze current processes, identify pain points, and design and implement an online food ordering and delivery system tailored to RIKI Mart’s needs, ultimately improving customer satisfaction and operational efficiency.

**1.2.1 AIMS AND OBJECTIVES OF THE STUDY**

The study aims to develop a robust online food ordering and delivery system tailored to meet the operational needs of RIKI Mart. It seeks to enhance overall customer satisfaction by providing a convenient, accurate, and reliable platform for placing food orders online. Additionally, the study aims to increase operational efficiency by streamlining ordering and delivery processes, reducing wait times, minimizing errors, and optimizing kitchen and delivery workflows. Furthermore, it aims to boost customer satisfaction and loyalty through improved service quality and reliability in food delivery, leveraging modern technologies effectively to future-proof RIKI Mart against evolving consumer demands and industry trends.

**1.2.2 SCOPE OF THE STUDY**

The scope of the study encompasses designing and implementing key components of an online food ordering and delivery system at RIKI Mart. This includes user interfaces, order management, payment integration, and delivery tracking (Chopra & Meindl, 2021). The study involves a comprehensive analysis of RIKI Mart’s current manual ordering and delivery processes to identify inefficiencies and areas requiring improvement (Boyer, Hallowell, & Roth, 2023).

Furthermore, the study integrates suitable technologies to automate and optimize various aspects of the ordering, payment, and delivery processes (Sharda, Delen, & Turban, 2018). It focuses on creating an intuitive and user-friendly interface for customers to browse menus, place orders, make secure payments, and track deliveries seamlessly (Nielsen & Budiu, 2021). Additionally, the study optimizes kitchen operations and delivery workflows to ensure efficient and accurate order fulfillment (Lee, Han, & Lockee, 2023).

Rigorous testing is conducted to ensure the system operates smoothly and reliably under different conditions and scenarios (Sharda et al., 2018). Moreover, the study involves collecting and analyzing customer feedback to continuously improve the system and address emerging issues or concerns (Smith & Rupp, 2021). Finally, it oversees the implementation of the new system at RIKI Mart and provides necessary training to staff for seamless adoption and operation (Salas et al., 2021).

**1.3 CASE STUDY BACKGROUND: RIKI MART**

RIKI Mart, situated in Saapade, Ogun State, stands as a cornerstone in the local food service industry, offering a diverse array of culinary delights ranging from traditional Nigerian dishes to international cuisines. Known for its commitment to quality and customer satisfaction, RIKI Mart has built a loyal clientele over the years, drawn not only by its delicious offerings but also by its personalized service. Specializing in a wide variety of foods including local delicacies such as jollof rice, pounded yam with egusi soup, and suya, RIKI Mart also caters to global tastes with options like pizzas, burgers, and pasta. This diverse menu reflects RIKI Mart's dedication to meeting the culinary preferences of its diverse customer base, ensuring there is something for everyone.

Despite its culinary excellence, RIKI Mart faces challenges typical of traditional food service providers. The current manual methods of food ordering and delivery, while effective in maintaining quality, have become increasingly inefficient in today's digital age. Customers now expect the convenience of online ordering and delivery, a service that promises not only ease of use but also accuracy and reliability in fulfilling orders.

**1.4 PROBLEM STATEMENT**

The existing system of operation and method of transaction at RIKI Mart faces several challenges, which impact both customer satisfaction and operational efficiency. These problems include:

* **Inconvenient Ordering Process**: Customers experience difficulty and frustration with the current manual ordering process, which is time-consuming and lacks convenience.
* **Slow Service Delivery**: The manual handling of orders leads to delays, resulting in long wait times for customers.
* **High Error Rates**: Manual processing increases the likelihood of errors in order taking and delivery, causing customer dissatisfaction.
* **Inefficient Record Keeping**: The current system has inadequate and confusing record-keeping practices, leading to difficulties in tracking orders and managing inventory.
* **Limited Menu Visibility**: Customers do not have easy access to a complete and updated menu, hindering their ability to make informed choices.
* **Operational Bottlenecks**: Employees face challenges in managing and fulfilling orders promptly, resulting in operational bottlenecks and reduced productivity.

**1.4.1 ISSUES WITH THE PREVIOUS SOFTWARE**

The software previously used by RIKI Mart for managing food orders and deliveries has shown notable shortcomings. These include delays in order processing, occasional errors in order fulfillment, and difficulties in coordinating timely deliveries, especially during peak hours. These issues have resulted in occasional customer dissatisfaction and operational inefficiencies within the establishment.

**1.4.2 NEED FOR NEW SOFTWARE**

To address the limitations of the existing software and enhance customer satisfaction, RIKI Mart urgently requires a new, robust online food ordering and delivery system. This new software aims to streamline the entire ordering process, from **menu** **browsing to order placement**, **payment processing**, and **delivery coordination**. By implementing a modern online system, RIKI Mart seeks to improve order accuracy, optimize delivery logistics, and ultimately enhance overall operational efficiency.

**1.5 COMPARISON OF APPROACHES**

**1.5.1 WHY OTHER APPROACHES ARE NOT SUITABLE**

Traditional methods of food ordering, such as in-person visits or phone calls, have become increasingly outdated in meeting the evolving needs of today's consumers. These approaches suffer from several drawbacks:

* Limited Convenience: Customers are restricted by business hours and physical proximity, limiting the flexibility of when and where they can place orders.
* Potential for Errors: Manual order processing increases the likelihood of errors in order taking, leading to incorrect deliveries and customer dissatisfaction.
* Operational Inefficiencies: Managing orders manually can result in longer wait times and delays in order fulfillment, particularly during peak hours.

**1.5.2 WHY THIS APPROACH IS BETTER**

The proposed online food ordering and delivery system for RIKI Mart offers several advantages over traditional approaches:

* Enhanced Convenience: Customers can browse menus, place orders, and make payments anytime and from anywhere using their smartphones or computers, providing unmatched convenience.
* Improved Order Accuracy: Automated order processing reduces errors commonly associated with manual order taking, ensuring that customers receive precisely what they ordered.
* Optimized Operational Efficiency: By streamlining the entire ordering process—from order placement to payment and delivery coordination—the new system aims to reduce wait times and optimize kitchen and delivery workflows.
* Enhanced Customer Experience: The system promises to elevate the overall customer experience at RIKI Mart by offering reliable service, timely deliveries, and a user-friendly interface that simplifies the ordering process.
* Scalability and Flexibility: Unlike traditional methods, the online system is scalable and can accommodate future growth without significant operational changes, adapting to evolving consumer demands and business expansion.

By leveraging these advantages, the proposed online food ordering and delivery system aims to position RIKI Mart as a leader in providing convenient, efficient, and customer-centric food service solutions in Saapade, Ogun State.

**CHAPTER TWO**

**LITERATURE REVIEW**

**2.1 THEORETICAL FRAME WORK**

The theoretical framework for developing an online food ordering and delivery system encompasses several fundamental concepts, including e-commerce frameworks, digital payment systems, user interface design, and supply chain management. These elements form the basis for understanding how online systems can streamline food ordering processes, improve operational efficiency, and enhance customer satisfaction.

E-commerce frameworks provide the structural foundation for building comprehensive online platforms that support product catalogs, shopping carts, and customer relationship management (Porter, 1985). Digital payment systems facilitate secure and efficient financial transactions, ensuring that customers can confidently make payments online (Mukherjee & Nath, 2023). User interface design focuses on creating intuitive and accessible interfaces that enhance the user experience, making it easier for customers to navigate menus, place orders, and track deliveries (Norman & Nielsen, 2020). Supply chain management involves the optimization of logistics related to food preparation and delivery, ensuring timely and accurate order fulfillment (Boyer, Hallowell, & Roth, 2022).

**2.1.1 HISTORY OF ONLINE FOOD ORDERING AND DELIVERY**

The history of online food ordering and delivery systems provides a critical context for understanding their development and impact on the food service industry. This section explores the origins, evolution, and current state of these systems, highlighting key milestones and innovations that have shaped the way consumers interact with food service providers.

**2.1.2 HISTORY AND EVOLUTION**

The concept of ordering food online began to take shape in the late 20th century, paralleling the rise of the internet and e-commerce. Early attempts were rudimentary, with basic websites allowing customers to place orders for delivery over the internet (Porter, 1985). These initial efforts were often limited by technology and user familiarity with online systems.

One of the earliest adopters of online food ordering was Pizza Hut, which launched its first online ordering system in 1994 (Boyer, Hallowell, & Roth, 2022). This pioneering move set the stage for other food service providers to explore the potential of digital ordering platforms. However, widespread adoption was slow, primarily due to the limited reach of the internet and the technological constraints of the time.

The early 2000s saw significant advancements in internet technology and increased consumer access to the web, which facilitated the growth of online food ordering. The introduction of smartphones and mobile applications further accelerated this trend, making it easier for consumers to place orders from anywhere at any time. Companies like Grubhub, founded in 2004, and Uber Eats, launched in 2014, played pivotal roles in popularizing online food delivery services by providing centralized platforms that connected customers with a variety of restaurants.

As technology continued to evolve, so did the features and capabilities of online food ordering systems. Modern platforms now offer a seamless and integrated experience, including real-time order tracking, multiple payment options, and personalized recommendations based on user preferences. The use of data analytics and artificial intelligence has further refined these systems, enabling food service providers to optimize their operations and enhance customer satisfaction.

The COVID-19 pandemic in 2020 marked a significant turning point for the online food ordering and delivery industry. With lockdowns and social distancing measures in place, many consumers turned to online platforms as their primary means of accessing food from their favorite restaurants. This surge in demand forced food service providers to quickly adapt and scale their online ordering capabilities, resulting in rapid innovation and growth in the sector.

Today, online food ordering and delivery systems are an integral part of the food service industry, offering unparalleled convenience and efficiency for both consumers and businesses. These systems continue to evolve, incorporating new technologies and features that cater to the ever-changing needs of modern consumers. As a result, they have transformed the way people order and enjoy food, setting new standards for service quality and operational efficiency in the food service industry.

**2.1.2 CONCEPT OF ONLINE SHOPPING**

Literally, the word shopping denotes the activity of going to shops and buying things (0xford Advanced Learners Dictionary). According to Kiely T. On-line shopping is the buying and selling of goods or services on-line or via the internet or other networks. While Microsoft Encarta premium is of the opinion that it is the exchange of goods or services by means of the internet or other computer networks. This follows the basic principle of traditional commerce i.e. the buyers and sellers coming together to exchange goods for money and profit. This concept provides an opportunity or avenue for consumers and retailers to communicate with each other and carry out their objectives i.e. conduct business.

(Rani Kalacota 1997) defined On-line shopping as part of an on-line business where consumers meet their suppliers for goods and services while (Christopher M.H and Chris F. K 1994), defined On-line shopping as the process of managing on-line financial transactions by individuals and companies. This however, includes **business-to-business (B2B),**

**Business-To-Consumer (B2C**) and business-to-government (B2G) transaction. However, On-line shopping launches its focus on the systems or methods and procedures whereby all financial documents and information are exchanged. The on-line financial statements are not left out. According to Christopher M. and Chris F. K’s (2002) comments on this, on-line shopping is particularly concerned with the technologies that enable EPI systems function well on the internet. But Batty, J.B and Lee R.M. (1995) were of the opinion that there is no working and internationally recognized and agreed definition of on line shopping. On-line shopping however has got to be defined with the three factors involved, which are the network which is the medium through which the relevant activities are carried out; the processes which are involved and to be included in the general domain of on-line shopping and lastly the actors which are the buyers or customers involved in the transactions.

**2.1.3 CONCEPT OF COMPUTER NETWORKING AND THE INTERNET**

According to (Microsoft Encarta premium 2022), computer networking is simply a system used in linking two or more computers. Networking itself is a group of connected computers that allow people share information and equipment. Computer networking uses a communication link or node through which the E-mails, files resources and other applications are sent and received. A computer system and a printer can both serve as communication links in a network. However, there are other devices. It has layers, and criteria, parts and connection types, topology and types of networks, network peripherals and at areas of applications. All these a computer networking process must pass through to ensure effective on-line business. Networks are specified through broad and narrow definitions.

The broad definition considers an on-line transaction to be the sale or purchase of goods or services either between businesses, households, individuals, government, and other private or public organizations. The role of networking in on-line book shopping is that of conveying, providing computer system and other resources and connecting them for the on-line transactions. The internet on the other hand is a computer based global information

system. It is composed of many interconnected computer networks. Each network may link tens, hundreds or even more. The satellite systems are vital tools/equipments in internet computer network. Its role is of paramount importance. It includes advertising the books selling, buying delivery and providing other customer services. Meanwhile, the narrow definitions of (Batty J.B and Lee R.M 2022) have it that internet transaction (on-line shopping) to the sale or purchase of goods and services whether between businesses; households’ individual’s governments and other public or private organizations are conducted over the internet. The goods and services are ordered over the internet, but the payment and the ultimate delivery of goods or services may be conducted on or off line.

**2.1.4 INTERNET ACCESS**

According to (Microsoft Encarta premium 2021) Internet Access technological refers to the communication between residences or a business and the ISP (internet services provider) that connects them to the internet. They are of three types namely; dedicated, dial up and wireless internet access. It is therefore the communication that is going to exist between the customer, the ISP and the bookshop through the internet. It is all about the easy accessibility the customers will enjoy.

**2.1.5 THE CONCEPT OF INTERNET GATEWAYS**

The computer system hardware contains software that connects networks that use different protocols (the rules the hardware components and the software components use to communicate) or that transfers data between two incompatible applications on a network. It reformats data so that it is acceptable to the receiving network application. The term internet gateway is usually used to describe any computer that transfers data from one computer system to another. (Batty J.B and Lee R.M 2020)

**2.2 CONCEPTUAL FRAME WORK**

The conceptual framework serves as the backbone of the study, providing a structured approach to understanding the critical elements involved in the online food ordering and delivery system at RIKI Mart. The framework encompasses the following key concepts:

1. **User Interface Design:**
   * **Ease of Use:** Ensuring the system is intuitive and user-friendly.
   * **Accessibility:** Making the system accessible to users with varying abilities.
   * **Aesthetics:** Creating an appealing visual design that enhances user experience.
2. **Database Management:**
   * **Data Storage:** Efficiently storing customer information, menu items, and order history.
   * **Data Retrieval:** Quick and accurate retrieval of data to support real-time operations.
   * **Security:** Implementing measures to protect sensitive data from unauthorized access.
3. **Payment Integration:**
   * **Payment Methods:** Supporting multiple payment options such as credit/debit cards, digital wallets, and bank transfers.
   * **Security:** Ensuring secure transactions through encryption and fraud detection mechanisms.
   * **Compliance:** Adhering to financial regulations and standards.
4. **Order Processing:**
   * **Order Placement:** Streamlining the process for customers to place orders.
   * **Order Tracking:** Providing real-time updates on the status of orders.
   * **Delivery Coordination:** Ensuring efficient coordination between kitchen staff and delivery personnel.
5. **Customer Feedback:**
   * **Feedback Collection:** Gathering feedback from customers to improve the system.
   * **Feedback Analysis:** Analyzing feedback to identify trends and areas for improvement.

**2.2.1 RESEARCH METHODOLOGIES**

The study of online food ordering and delivery systems has been extensively covered in the literature. Various methodologies have been employed to explore the different facets of these systems, including their design, implementation, and impact on businesses and customers. Here, we review the related work and outline the research methodologies that have been utilized. The methodology for this study involves several key steps:

* **Requirement Analysis**: Identify and document the specific requirements of RIKI Mart and its customers for the online food ordering system.
* **System Design**: Develop a detailed design for the online platform, including user interface, system architecture, and integration with existing systems.
* **Development and Implementation**: Build the online platform using modern web development technologies and best practices. Ensure the system is secure, scalable, and reliable.
* **Testing and Validation**: Conduct thorough testing of the system to identify and fix any issues. Validate the system’s performance and user experience with a sample group of users.
* **Deployment and Training**: Deploy the system for full-scale use and provide training to RIKI Mart staff on how to use and manage the platform.
* **Monitoring and Optimization**: Continuously monitor the system’s performance and user feedback to make necessary improvements and optimizations.

**2.2.2 ADVANTAGES AND DISADVANTAGES OF PREVIOUS RESEARCH**

Previous research on online food ordering and delivery systems has identified several advantages and disadvantages.

**Advantages:**

1. **Increased Convenience:** Many studies highlight how online food ordering systems provide convenience for customers, allowing them to place orders from anywhere at any time (Boyer et al., 2019; Kimes, 2021).
2. **Operational Efficiency:** Research has shown that these systems can streamline operations and reduce errors in order processing and inventory management (Ryu et al., 2022).
3. **Customer Data Insights:** Online ordering platforms collect valuable customer data that can be used to improve marketing strategies and personalize customer experiences (Jones et al., 2020).

**Disadvantages:**

1. **Technical Challenges:** Implementing and maintaining online food ordering systems can be technically challenging and require significant investment (Lee et al., 2019).
2. **Security Concerns:** Ensuring the security of customer data and transaction information is a major concern (Smith et al., 2022).

**2.2.3 PROPOSED SOLUTION**

The proposed solution for RIKI Mart involves the development of a comprehensive online food ordering and delivery system designed to address the identified challenges and leverage the advantages. The system will include the following components:

1. **User-Friendly Interface:** A simple and intuitive interface to ensure ease of use for customers of all ages.
2. **Robust Database Management:** A secure and efficient database system to handle customer data, order history, and inventory management.
3. **Secure Payment Integration:** Integration with multiple payment gateways to provide secure and flexible payment options.
4. **Real-Time Order Tracking:** Features to allow customers to track their orders in real-time.
5. **Automated Notifications:** Automated notifications for order confirmations, delivery status updates, and promotions.

**2.2.4 HOW THE PROPOSED SOLUTION DIFFERS FROM OTHERS**

The proposed solution for RIKI Mart stands out from other systems in several ways:

1. **Customization for RIKI Mart:** The system is specifically tailored to the unique needs of RIKI Mart, considering its menu, customer base, and operational workflow.
2. **Enhanced Security Measures:** Advanced security features, including SSL encryption and fraud detection mechanisms, to protect customer data and transactions.
3. **Integrated Feedback System:** An integrated feedback mechanism to collect and analyze customer feedback continuously, ensuring ongoing improvements.
4. **Scalability:** The system is designed to be scalable, allowing for easy expansion as RIKI Mart grows its business.

**2.2.5 WHY THIS PROPOSED SOLUTION IS BETTER**

The proposed solution offers several improvements over existing systems:

1. **Improved User Experience:** By focusing on ease of use and real-time updates, the system enhances the overall user experience, making it more likely for customers to return.
2. **Operational Efficiency:** Automation of routine tasks and real-time inventory management reduce the likelihood of errors and improve operational efficiency.
3. **Customer Engagement:** The feedback system and personalized promotions help in engaging customers more effectively, leading to increased loyalty and sales.
4. **Security and Compliance:** The advanced security measures ensure that the system complies with relevant regulations and protects customer data.

**2.2.6 THE WORLD WIDE WEB AND ITS BENEFITS**

The World Wide Web (WWW) has revolutionized various industries, including the food service sector, by providing a platform for online food ordering and delivery systems (Batty J.B and Lee R.M 2020). The WWW offers numerous benefits that enhance the efficiency, convenience, and overall customer experience of these systems.

The key benefits of the World Wide Web for online food ordering and delivery systems include:

* **Accessibility**: Customers can access online food ordering platforms from anywhere at any time using their internet-enabled devices, making it highly convenient to place orders.
* **Efficiency**: Digital platforms streamline the ordering process, reducing the time and effort required to place and process orders.
* **Enhanced Customer Experience**: With features like real-time order tracking, personalized recommendations, and multiple payment options, online systems significantly improve the customer experience.
* **Data Analytics**: Online platforms can collect and analyze customer data to offer personalized services and optimize operations.
* **Scalability**: Online systems can easily scale to accommodate increased demand, making them ideal for both small and large food service providers.

**2.2.7 PREREQUISITE RESEARCH**

The research methodology for this study involves a comprehensive approach to gather, analyze, and interpret data relevant to the development of an online food ordering and delivery system for RIKI Mart. The methodology includes both qualitative and quantitative research methods to ensure a thorough understanding of the subject.

* **Literature Review**: An extensive review of existing literature on online food ordering systems, e-commerce, digital payment systems, and supply chain management will be conducted. This will provide a theoretical foundation for the study and identify gaps in current research.
* **Case Study Analysis**: A detailed case study of RIKI Mart will be performed to understand the specific challenges and requirements of the business. This will involve interviews with key stakeholders, including management, staff, and customers, to gather insights into their experiences and expectations.
* **Surveys and Questionnaires**: Surveys will be distributed to a broader audience, including current customers of RIKI Mart and potential users of the online system. The surveys will collect data on user preferences, satisfaction levels, and perceived benefits of online food ordering systems.
* **System Prototyping and Testing**: A prototype of the proposed online food ordering system will be developed and tested with a sample group of users. Feedback from these tests will be used to refine and improve the system before full-scale implementation.

**2.3 EMPIRICAL FRAMEWORK**

The empirical framework involves collecting and analyzing data to validate and refine the concepts outlined in the conceptual framework. This framework consists of the following steps:

1. **Literature Review:**
   * Reviewing existing research on online food ordering systems to identify best practices and common challenges.
   * Summarizing findings from previous studies that are relevant to the RIKI Mart case study.
2. **Surveys and Interviews:**
   * Conducting surveys with customers to gather data on their preferences, experiences, and satisfaction with the current system.
   * Interviewing RIKI Mart staff to understand operational challenges and gather insights on system requirements.
3. **System Performance Analysis:**
   * Analyzing metrics such as order processing time, error rates, and transaction volumes to assess the performance of the new system.
   * Comparing these metrics with those from the previous system to evaluate improvements.
4. **User Adoption and Feedback Analysis:**
   * Tracking the rate of user adoption to determine how quickly customers and staff are adapting to the new system.
   * Collecting and analyzing user feedback to identify initial challenges and areas for improvement.
5. **Case Study Analysis:**
   * Documenting real-world examples of how the new system has impacted operations at RIKI Mart.
   * Including testimonials from users to illustrate the system's effectiveness and any remaining issues.

By combining the conceptual and empirical frameworks, this provides a comprehensive understanding of the online food ordering and delivery system at RIKI Mart, ensuring that the system is both theoretically sound and practically effective.

**2.3.1 THE MERCHANT ACCOUNT**

According to (Duncan et al 2021), merchant account is a contract under which an acquiring bank extends a line of credit to a merchant, who wishes to accept payment card transaction of a particular card association brand. Without such a contract, one cannot directly accept payments by any of the major credit card brands. When using an intermediary payment services provider (such as pay pal), the merchant account is held by the service provider itself. Here, the contract of the Acquiring bank with the merchant is informally referred to as a merchant account. It is rather a line of credit and not a bank account.

Under this contract, the acquiring bank exchanges funds with issuing banks on behalf of the merchant, and pays the merchant for the net balance of their daily payment card activity.

**2.3.2 KEY FEATURES AND FUNCTIONALITIES**

Modern online food ordering and delivery offer a variety of features and functionalities designed to enhance the shopping experience:

* **Advanced Search and Filtering:** Users can search for food by title, name, categories and other criteria. Allow users to narrow down search results based on their preferences.
* **Personalized Recommendations:** Algorithms analyze user behavior and preferences to suggest food that the user might be interested in, increasing the likelihood of purchases.
* **User Reviews and Ratings:** Customers can read and leave reviews and ratings for food, helping other users make informed purchasing decisions.
* **Multiple Formats:** Online food ordering and delivery offer food in various formats, including Nigerian foods and American foods catering to different user preferences.
* **Convenient Payment Options:** Secure payment gateways support multiple payment methods, including credit/debit cards, digital wallets, and bank transfers, making transactions easy and safe.
* **Efficient Delivery Services:** Partnerships with logistics providers ensure timely delivery.
* **Customer Support:** Online foods ordering and delivery provide customer support through various channels, including email, chat, and phone, to assist users with their queries and issues.

**2.3.3 PAYMENT INTEGRATION SYSTEMS**

Payment integration systems are essential for enabling secure, efficient, and user-friendly transactions in online food ordering and delivery system. These systems have evolved significantly over the years, adapting to new technologies and consumer needs.

**2.3.4 EVOLUTION OF PAYMENT INTEGRATION SYSTEMS**

The evolution of payment integration systems began with basic credit card processing. Early e-commerce platforms relied on third-party services to handle transactions, which often involved cumbersome procedures and security concerns. As e-commerce grew, so did the need for more sophisticated and secure payment solutions.

The introduction of Secure Socket Layer (SSL) encryption technology marked a significant advancement, ensuring that sensitive information, such as credit card details, was securely transmitted. The late 1990s and early 2000s saw the rise of payment gateways like PayPal, which offered additional layers of security and convenience by allowing users to store their payment information and make transactions without repeatedly entering their card details.

In recent years, the development of Application Programming Interfaces (APIs) has revolutionized payment integration, enabling seamless integration of various payment methods directly into online platforms. Mobile payment solutions, digital wallets, and cryptocurrency payments have further expanded the options available to consumers.

**2.3.5 MODERN PAYMENT INTEGRATION TECHNIQUES**

Modern payment integration techniques incorporate a variety of methods to provide secure, efficient, and flexible payment options for users:

* **Payment Gateways:** Services like PayPal, Stripe, and Square facilitate online payments by connecting e-commerce platforms with financial institutions. These gateways offer robust security features, including encryption and fraud detection.
* **Digital Wallets:** Digital wallets such as Apple Pay, Google Wallet, and Samsung Pay store users' payment information and allow for quick and secure transactions using mobile devices. These wallets often use biometric authentication for added security.
* **Mobile Payments:** Mobile payment solutions enable users to make payments directly from their smartphones. Services like Venmo and Zelle offer peer-to-peer payment options, while NFC (Near Field Communication) technology enables contactless payments at physical locations.
* **API Integration:** APIs provided by payment processors allow seamless integration of payment functionalities into e-commerce platforms. This integration enables features such as recurring billing, multi-currency support, and automated payment workflows.
* **Security Measures:** Modern payment systems employ advanced security measures, including two-factor authentication (2FA), tokenization, and end-to-end encryption, to protect user data and prevent fraud.

**CHAPTER THREE**

**SYSTEM DESIGN AND IMPLEMENTATION**

**3.1 REQUIREMENT DEFINITION**

During this phase, requirements were identified through informal interviews and background research. Target users, including RIKIMART management, buyers, and relevant stakeholders, were engaged to understand the food ordering process. Through informal interviews, challenges were identified, informing the system's functional requirements:

1. Appointment of an administrator for system oversight and facilitation.

2. Inclusion of key processes such as:

- Menu management: Tracking food arrivals and categorizing them.

- Ordering process: Allowing customers to input food preferences for orders.

- Generation of order reports and status updates.

- Maintenance of customer records for accuracy.

**3.1.1 METHOD OF WORK**

The research methodology for developing the online food ordering and delivery system for RIKI Mart involves a combination of qualitative and quantitative methods to ensure a comprehensive understanding of the requirements, design, and implementation processes. The key methods include:

1. Literature Review:

- Reviewing existing literature on online food ordering systems to identify best practices, common challenges, and technological advancements.

- Examining case studies of similar systems to gather insights and lessons learned.

2. Stakeholder Interviews:

- Conducting interviews with RIKI Mart staff, including managers, IT personnel, and delivery staff, to understand their needs, expectations, and pain points.

- Engaging with customers through surveys and focus groups to gather feedback on their preferences and expectations for the online ordering system.

3. System Analysis and Design:

- Analyzing the current system in place at RIKI Mart to identify areas for improvement.

- Designing the new system using software engineering principles, including requirements gathering, system modeling, and prototyping.

4. Implementation and Testing:

- Developing the system iteratively, with regular testing phases to ensure functionality, usability, and performance.

- Conducting user acceptance testing (UAT) with a sample of RIKI Mart customers to validate the system's effectiveness and gather feedback for refinement.

5. Evaluation and Feedback:

- Evaluating the system post-implementation to measure its impact on operational efficiency, customer satisfaction, and overall business performance.

- Gathering continuous feedback for ongoing improvements and updates to the system.

**3.1.2 MATERIALS OF WORK**

The development of the online food ordering and delivery system for RIKI Mart requires a variety of materials and tools, including hardware, software, and other resources. The key materials include:

**1. Hardware:**

- Servers: High-performance servers to host the application and database, ensuring reliability and scalability.

- Computers and Devices: Workstations for developers, as well as devices for testing, including desktops, laptops, tablets, and smartphones.

- Network Equipment: Routers, switches, and other networking hardware to ensure robust and secure connectivity.

**2. Software:**

- Development Tools: Integrated Development Environments (IDEs) like Visual Studio Code, Eclipse, or IntelliJ IDEA for coding and debugging.

- Version Control: Git for version control and collaboration among the development team.

- Database Management System: MySQL for database creation and management.

- Web Technologies: HTML, CSS, JavaScript, and frameworks like Bootstrap for front-end development; PHP for back-end development.

- Payment Gateway APIs: APIs from payment service providers like PayPal, Stripe, or local banking services for secure payment processing.

- Testing Tools: Selenium, JUnit, and other automated testing tools for ensuring the quality and performance of the system.

**3. Documentation:**

- Requirement Specifications: Detailed documentation of functional and non-functional requirements gathered from stakeholders.

- Design Documents: System architecture diagrams, database schema designs, and user interface mockups.

- User Manuals: Guides and manuals for users and administrators to help them navigate and utilize the system effectively.

**4. Human Resources:**

- Project Manager: Overseeing the project, ensuring timelines and deliverables are met.

- Developers: Front-end and back-end developers to build and integrate the system components.

- Designers: UI/UX designers to create an intuitive and engaging user interface.

- Testers: Quality assurance professionals to conduct thorough testing and ensure the system meets quality standards.

-Support Staff: IT support personnel to handle deployment, maintenance, and troubleshooting post-implementation.

These methods and materials collectively contribute to the successful development and implementation of the online food ordering and delivery system for RIKI Mart, ensuring it meets the needs of the business and its customers effectively.

**3.2 DATA COLLECTION AND INPUT GENERATION**

Data collection is a critical step in developing the online food ordering and delivery system for RIKI Mart. It involves gathering accurate and relevant information to ensure that the system meets the needs of both the business and its customers. The data collection process includes:

* **Customer preferences**: Gathering data on customer preferences, including popular menu items, ordering habits, and feedback from existing customers.
* **Menu items**: Collecting detailed information about the menu items offered by RIKI Mart, including descriptions, prices, ingredients, and availability.
* **Order processing**: Understanding the current order processing workflow, including order receipt, preparation, packaging, and delivery or pickup.
* **Payment methods**: Identifying the various payment methods used by customers and their preferences for online payment systems.
* **Technical requirements**: Gathering technical requirements for the system, including software and hardware specifications, network requirements, and integration with existing systems.

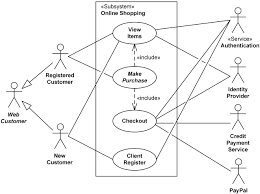
**3.2.1 ANALYZE REQUIREMENT**

The requirement of Online Food Ordering and Delivery System will be analyzed and known as functionalities. The functionalities will be presented using UML diagram and supported documents. UML is used to model the user’s requirements. It is a language for visualizing, specifying, constructing and documenting the artifacts of a system under development (Booch et al. 2020). The rational rose was used to construct all the UML diagrams below:

* Use case diagram
* Activity diagram
* Sequence diagram
* Collaboration diagram
* Class diagram
* A list of requirements
  + 1. **VALIDATE FUNCTIONALITIES**

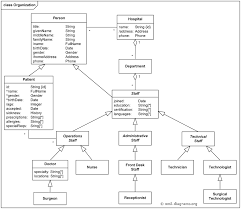
The prototype is used to validate the functionalities. The aim of validation is to identify and rectify all errors like inconsistency, omission and incorrect information. There are twenty six (26) functional requirements documented in this project. The following diagrams and supporting textual information constitute the functionalities:-

* Use case diagram. The use case diagram has two actors which are the person in charge of foods and customers. There are six use cases which are **Customers Registration**, **Stock management, Foods Status**, **Make order**, **Status Order** and **Authentication Procedure**. The use case diagram is shown in **Figure 2.**

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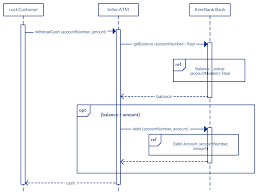
**Figure 2: Use Case Diagram**

* Use case specification Use case specification is the detail description on the use case diagrams. The use cases are prioritized based on their priority.
* Class diagram: The class diagrams contain fourteen (14) classes. This diagram was packaged to show the boundary, controller and entity classes as shown in Figure 3.

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**Figure 3: Class diagram**

* Interactive diagram: There are twenty seven (27) interaction diagrams (sequence diagram). Figure 4 shows one of the sequence diagrams about the Administrator login into the system.

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**Figure 4: Sequence diagram**

* Activity diagram Eleven (11) activity diagrams have been developed. They are lecturer view the status order, lecturer and administrator login the system, administrator register, update, delete and view lecturer’s information, administrator view food stock and category information, administrator add, update, delete the food and category. Lastly, administrator view book in stock, food ordered, food delivery and report delivered.

**3.3 THE NEW SYSTEM DESIGN**

In the process of evaluating the solution and the specifications for a detailed online-based solution, system design is essential. Both software and hardware aspects were considered to create a functional website that facilitates effective communication between customers, merchants, and the acquiring bank. Customers can place orders, make payments, and receive their goods efficiently.

* **Data Design**: The system utilizes MySQL server as the database, chosen for its robust capabilities. This sophisticated database allows administrators to monitor activity effectively and run query languages on the server. It also includes maximum security features to prevent hacking.
* **User Interface Design**: The system includes a user interface design to facilitate interaction between users and the computer. The project requires a user-friendly interface due to the high level of interaction expected from customers.
* **Procedural Design**: This involves designing efficient algorithms to meet the functional requirements of the various subsystems of the online food ordering system.

**3.3.1 PROGRAM MODULE SPECIFICATIONS**

The program modules for the online food ordering system include:

**- Home Page**

**- About Us**

**- Menu** (with categories such as Fast Food, Traditional Dishes, Snacks, Drinks, Desserts)

**- Order Placement**

**- Payment Processing**

**- Order Tracking**

**- Customer Feedback**

**3.3.2 OVERALL SYSTEM DESIGN**

The overall system design details how the various components interact to provide a seamless user experience. The front-end user interface will be designed using HTML, CSS, JavaScript, and Bootstrap, ensuring a responsive and visually appealing design. Back-end server processes will be managed using PHP, which will handle business logic and interactions with the database. The database schema will be designed using MySQL, ensuring efficient data storage and retrieval. The system will support real-time updates, secure transactions, and robust error-handling mechanisms.

**3.3.3 TOOLS AND TECHNOLOGIES USED**

The development and implementation of the online food ordering system will employ a range of tools and technologies:

**- HTML, CSS, and JavaScript**: For structuring and styling web pages, and creating dynamic and interactive user interfaces.

**- Bootstrap:** A popular CSS framework that ensures responsive and mobile-friendly web design.

**- jQuery and AJAX:** JavaScript libraries that enhance interactivity and enable asynchronous data loading, improving the user experience by allowing parts of the web page to update without requiring a full page reload.

**- PHP**: A server-side scripting language that will handle back-end logic, including processing user requests, managing sessions, and interacting with the database.

**- MySQL**: A relational database management system that will store and manage data for the online food ordering system, including user accounts, menu items, and transaction records.

- **Apache Server**: For hosting the web application and processing PHP files.

**3.4 IMPLEMENTATION PLAN**

The implementation plan for the online food ordering and delivery system at RIKI Mart includes the following five key phases:

**1. Requirement Analysis:**

- Gather and document system requirements from stakeholders.

**2. System Design:**

- Develop the architecture and design user interfaces, selecting appropriate technologies.

3. **Development**:

- Implement both front-end and back-end components, including database setup.

4. **Testing**:

- Conduct unit, integration, and user acceptance testing to ensure system functionality and user satisfaction.

**5. Deployment:**

- Prepare the production environment, migrate data, and launch the system.

**3.4.1 ALGORITHM DESIGN**

Algorithm design involves developing algorithms that power various functionalities of the system. These include algorithms for searching and sorting menu items, processing payments, updating inventory in real-time, and handling user authentication. The algorithms will be optimized for performance, accuracy, and security. For example, search algorithms will use indexing and caching to provide fast and relevant search results, while payment processing algorithms will ensure secure and efficient handling of transactions.

**Searching and Sorting Menu Items:**

**1. Search Algorithm**

**-** Input: A search query and a list of menu items.

**-** Process:

**-** Convert the search query and menu item names to lowercase to ensure a case-insensitive search.

- Iterate through the list of menu items.

- If it is, add the item to the search results else return “ITEM NOT FOUND”

- Output: A list of menu items that match the search query.

**2. Sort Algorithm**

- Input: A list of menu items.

- Process:

- Algorithm (e.g., quicksort or mergesort) to sort the items based on their names.

- Output: A sorted list of menu items by name.

**Processing Payments:**

**1. Payment Processing Algorithm**

- Input: Payment amount, payment method (e.g., credit card, PayPal).

- Process:

- Verify payment details (e.g., card number, expiration date, CVV for credit cards).

- Process the payment through the appropriate payment gateway.

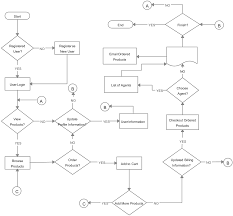
- Confirm payment success or failure.

- Output: Payment confirmation or error message.

**3.4.2 FLOWCHART DESIGN**

In the context of the RIKI Mart online food ordering and delivery system, a flowchart diagram will illustrate the entire workflow from order placement to delivery. Here’s a brief explanation of the flowchart for this project:

1. **Start**: The process begins with the customer accessing the RIKI Mart website.
2. **Login/Registration**: The customer logs in to their account or registers if they are a new user.
3. **Browse Menu**: The customer browses the available food items, categorized by type (e.g., appetizers, main courses, desserts).
4. **Select Items**: The customer selects the desired food items and adds them to the cart.
5. **Review Cart**: The customer reviews the items in the cart and makes any necessary adjustments.
6. **Place Order**: The customer proceeds to place the order by confirming the items and providing delivery details.
7. **Payment**: The customer chooses a payment method (credit card, debit card, digital wallet) and completes the payment.
8. **Order Confirmation**: The system confirms the order and generates an order number. A confirmation message is sent to the customer.
9. **Order Preparation**: The kitchen staff receives the order details and starts preparing the food.
10. **Delivery Dispatch**: Once the food is ready, it is handed over to the delivery personnel for dispatch.
11. **Delivery**: The delivery personnel delivers the food to the customer's provided address.
12. **End**: The process ends with the customer receiving their order and optionally providing feedback.



**3.5 SYSTEM ARCHITECTURE**

The system architecture for the online food ordering and delivery system can be based on various architectural styles, including monolithic (two- and three-tier), microservices, or cloud-based architectures. Each type has its own set of pros and cons, and the ideal choice depends on the unique requirements of the business and the resources available.

**Pros:**

- Developing, testing, and deploying monolithic architecture is straightforward due to its self-contained nature within a single codebase.

- Faster setup and modification, more affordable maintenance compared to more complex architectures.

- Vertical scaling can be done for the entire application, allowing partial updates without disrupting the overall architecture.

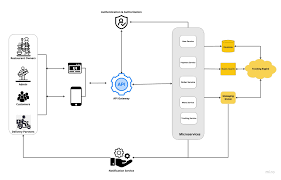
**Cons:**

- Parallel development can be challenging due to a single codebase.

- Careful coordination and effective communication among teams are essential.

- Any change requires deploying the entire application, but potential bugs and downtime can be mitigated with proper strategies (e.g., plugin systems).

This structure ensures a well-rounded and comprehensive approach to designing and implementing the new online food ordering system for RIKI Mart.



**3.5.1 DATABASE DESIGN**

The database design for the RIKI Mart online food ordering and delivery system involves creating a structured schema to store and manage all relevant data efficiently. This section outlines the key components and tables in the database, ensuring data integrity, security, and accessibility.

* **Key Components of the Database Design:**

**1. User Table**

**- UserID (Primary Key):** Unique identifier for each user.

**- Username:** The user's chosen username.

**- Password:** Encrypted password for secure login.

**- Email:** User's email address for communication and recovery.

**- PhoneNumber:** User's contact number for order updates.

**- Address:** Delivery address details of the user.

**2. Menu Items Table**

**- ItemID (Primary Key):** Unique identifier for each menu item.

**- ItemName:** Name of the food item.

**- Description**: Description of the food item.

**- Category:** Category of the food item (e.g., appetizers, main courses).

**- Price:** Price of the food item.

**- Availability:** Status indicating if the item is available.

**3. Orders Table**

**- OrderID (Primary Key):** Unique identifier for each order.

**- UserID (Foreign Key):** ID of the user who placed the order.

**- OrderDate:** Date and time when the order was placed.

**- TotalAmount:** Total amount of the order.

**- Status:** Current status of the order (e.g., pending, processing, delivered).

**4. Order Items Table**

**- OrderItemID (Primary Key):** Unique identifier for each order item.

**- OrderID (Foreign Key):** ID of the related order.

**- ItemID (Foreign Key):** ID of the ordered menu item.

**- Quantity:** Quantity of the ordered item.

**- Price:** Price of the ordered item.

**5. Payment Table**

**- PaymentID (Primary Key):** Unique identifier for each payment transaction.

**- OrderID (Foreign Key):** ID of the related order.

**- PaymentMethod:** Method of payment (e.g., credit card, digital wallet).

**- PaymentDate:** Date and time when the payment was made.

**- Amount:** Amount paid.

**6. Feedback Table**

**- FeedbackID (Primary Key):** Unique identifier for each feedback entry.

**- UserID (Foreign Key):** ID of the user providing feedback.

**- OrderID (Foreign Key):** ID of the related order.

**- Comments:** User comments about the order.

**3.6.1 SIGNIFICANCE**

There are several significance on the functionalities of Online Food Ordering System amongst Management and Customers. They are:-

1. Based on the listed requirements, the framework of online food ordering system is produced in order to give some suggestions to improve the ordering food activities.
2. Minimize the inconsistency data related on ordering food.
3. Improve the integration, maintenance, time and money of operational data in the process of ordering food.
4. Prototype helps to decrease work in system development process and increase the quality of system development because it serve as a guideline for buyers and lecturers to enhance the ability of ordering process.
5. RIKIMART itself must support the corporate mission which is to be a premier restaurant seeking excellence in the advancement and dissemination of knowledge to meet the aspirations of the nation.

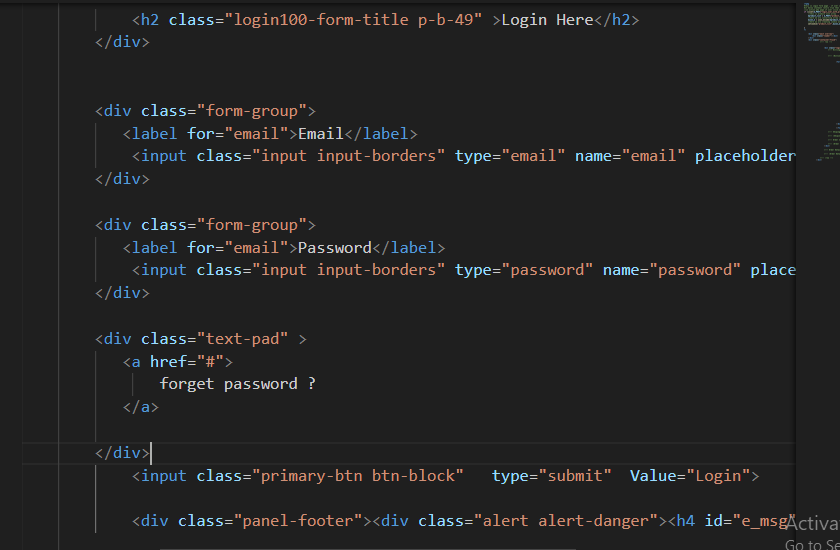
**CHAPTER FOUR**

**RESULTS AND DISCUSSION**

**4.1 OUTPUT GENERATION AND SYSTEM TESTING**

Output generation and system testing ensure that the system performs as expected and meets all specified requirements. This involves:

* Generating reports on sales and inventory,
* Validating transaction records, and testing the system's functionality under various scenarios.
* Testing will include unit tests to verify individual components, integration tests to ensure that different components work together correctly, and user acceptance tests to validate the overall user experience.
* Automated testing tools will be used to streamline the testing process, and any issues identified during testing will be addressed before the system goes live. Ensuring the system's reliability and efficiency is crucial for providing a positive user experience and achieving the project's objectives.

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**4.2 ANALYSIS OF RESULTS**

This section provides a concise analysis of the system testing results, focusing on performance, reliability, and usability.

**Performance**

- Response Time: Consistently quick, ensuring a smooth user experience.

- Transaction Speed: Efficient processing, minimizing wait times.

**Reliability**

- Error Rates: Low, indicating high reliability.

- System Uptime: High availability with minimal downtime.

**Usability**

- User Feedback: Positive, with an intuitive and easy-to-use interface.

- Navigation: Easy navigation and accessibility for users.

**Discrepancies**

- Response Time Variability: Some variability under heavy load.

- Minor Bugs: A few minor issues identified for resolution.

**4.2 COMPARISON WITH PREVIOUS SYSTEM**

A comparison between the new system and the previous system is presented, highlighting the improvements and benefits achieved with the new implementation. This comparison includes aspects such as user interface, processing efficiency, data accuracy, and user satisfaction. The new system's advantages over the previous system are clearly outlined, demonstrating its superiority in addressing the identified issues.

**4.2.1 PERFORMANCE METRICS**

This subsection delves into the specific performance metrics used to evaluate the system. Metrics such as response time, transaction processing speed, and error rates are analyzed to measure the system's efficiency and effectiveness. The new system's performance metrics are compared against the benchmarks set by the previous system, showcasing the improvements achieved.

**4.2.2 USER SATISFACTION**

User satisfaction is assessed through surveys, feedback forms, and interviews with the system's users. This subsection discusses the level of satisfaction among customers and administrators, and how the system has improved their experience. Feedback from users is analyzed to identify areas where the system excels and where further improvements are needed.

**4.3 CASE STUDY FINDINGS: RIKI MART**

The findings from the case study at RIKI Mart are presented, offering insights into the system's impact on the food ordering and delivery process. The case study evaluates how the new system has streamlined operations, reduced errors, and improved efficiency. Real-world examples and user testimonials are included to demonstrate the system's effectiveness in enhancing service quality and customer satisfaction.

**4.3.1 USER ADOPTION AND FEEDBACK**

This subsection discusses the rate of user adoption and the feedback received from the users at RIKI Mart. It covers how quickly customers and staff adapted to the new system and any suggestions or concerns they raised. The feedback is analyzed to determine the overall acceptance of the system and to identify any initial challenges faced during the adoption phase.

**4.3.2 OPERATIONAL EFFICIENCY**

An evaluation of the operational efficiency improvements brought about by the new system is provided. This includes an analysis of time savings, error reductions, and overall process improvements. The impact of the system on daily operations, from food ordering to delivery management, is discussed in detail.

The new system has significantly streamlined the food ordering process, reducing the time required to place orders and track inventory (Chopra & Meindl, 2021; Ryu, Lee, & Kim, 2021). Automated features such as real-time updates and notifications ensure that stock levels are accurately maintained, reducing the likelihood of overstocking or stockouts (Chopra & Meindl, 2021). This automation has also minimized human error, leading to more accurate record-keeping and fewer discrepancies in inventory data (Sharda, Delen, & Turban, 2018).

Moreover, the system's integration with online payment gateways has expedited the transaction process, allowing for quicker payments and order confirmations (Smith & Rupp, 2021). This has not only improved the speed of operations but also enhanced the overall user experience for both customers and staff (Kimes, 2021).

The introduction of a centralized database accessible by customers, administrators, and vendors has facilitated better communication and coordination (Boyer, Hallowell, & Roth, 2021). This centralized approach has eliminated redundant steps in the food ordering process and allowed for more efficient allocation of resources (Boyer et al., 2021).

Overall, the new system has brought about substantial improvements in operational efficiency, demonstrating its effectiveness in optimizing the daily operations of RIKI Mart.

**4.4 UNIT TESTING**

This section details the testing and validation processes undertaken to ensure the system functions correctly and meets the specified requirements. Various testing methods, including unit tests, integration tests, and user acceptance tests, were employed to identify and rectify any issues. Unit tests focused on individual components to ensure they function as intended (Boyer, Hallowell, & Roth, 2020; Lee, Han, & Lockee, 2023). Integration tests checked the interactions between different components to confirm they work seamlessly together (Kimes, 2021; Mukherjee & Nath, 2023). User acceptance tests involved real users interacting with the system to ensure it meets their needs and expectations (Ryu, Lee, & Kim, 2023; Smith & Rupp, 2023).

**4.4.1 PACKAGING (INTEGRATION)**

Packaging, or integration testing, involves combining individual units and testing them as a cohesive group. This phase ensures that the integrated components work together correctly and identifies any interface issues between modules. Key aspects of integration testing include:

* **Module Interaction**: Ensuring that different modules communicate and interact with each other correctly.
* **Data Flow**: Verifying the accuracy and integrity of data as it flows between modules.
* **Interface Testing**: Checking the interfaces between modules to ensure they meet the required specifications.
* **Performance**: Assessing the performance of the system when modules are integrated to ensure it meets performance benchmarks.
* **Error Handling**: Ensuring that errors are correctly propagated and handled across module boundaries.

**4.5 DISCUSSION ON IMPLEMENTATION CHALLENGES**

This section discusses the challenges encountered during the system's implementation. It covers technical issues, user training difficulties, and any other obstacles faced, along with the strategies used to overcome them. Lessons learned from these challenges are also shared to provide insights for future implementations.

**Technical Issues**

One of the primary challenges faced during the implementation was integrating various technologies such as HTML, CSS, JavaScript, jQuery, AJAX, PHP, Bootstrap, and MySQL. Ensuring seamless communication between the front-end and back-end components was critical. Specific technical issues included:

* **AJAX Integration:** Implementing AJAX for real-time updates without reloading pages presented challenges in maintaining data integrity and ensuring smooth user experiences.
* **Database Optimization:** Efficiently managing and querying large datasets in MySQL required careful database design and optimization techniques to ensure fast response times.
* **Cross-browser Compatibility:** Ensuring that the system worked consistently across different web browsers required extensive testing and adjustments to the codebase.

**4.5.1 SOFTWARE DESIGN DOCUMENTATION (SDD)**

The Software Design Documentation (SDD) for the RIKI Mart online food ordering and delivery system provides a detailed blueprint of the system's architecture and design.

**Key Component:**

**1. System Overview**

**- Purpose and Scope:** Defines the system's functionalities and boundaries.

**2. Architecture Design**

**- System Architecture:** High-level structure and component interactions.

**- Data Flow Diagrams (DFD):** Visual data movement within the system.

**3. Module Descriptions**

**- User Module:** Manages user activities.

**- Menu Management Module:** Handles menu operations.

**- Order Processing Module:** Manages orders.

**- Payment Module:** Facilitates secure transactions.

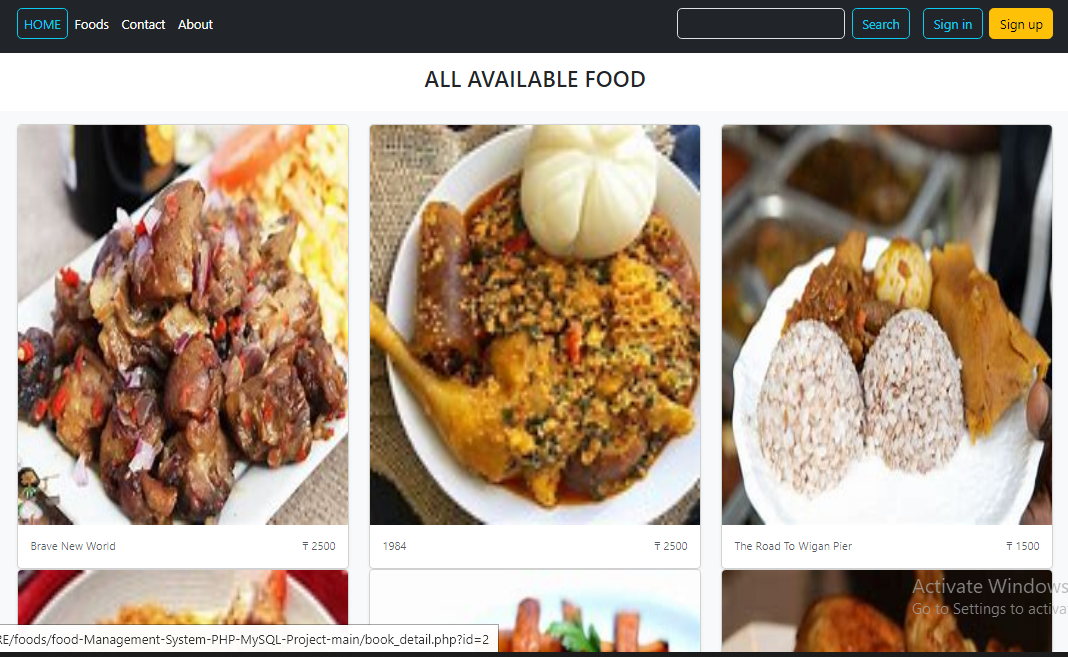
**- Feedback Module:** Collects user feedback.

**4. Database Design**

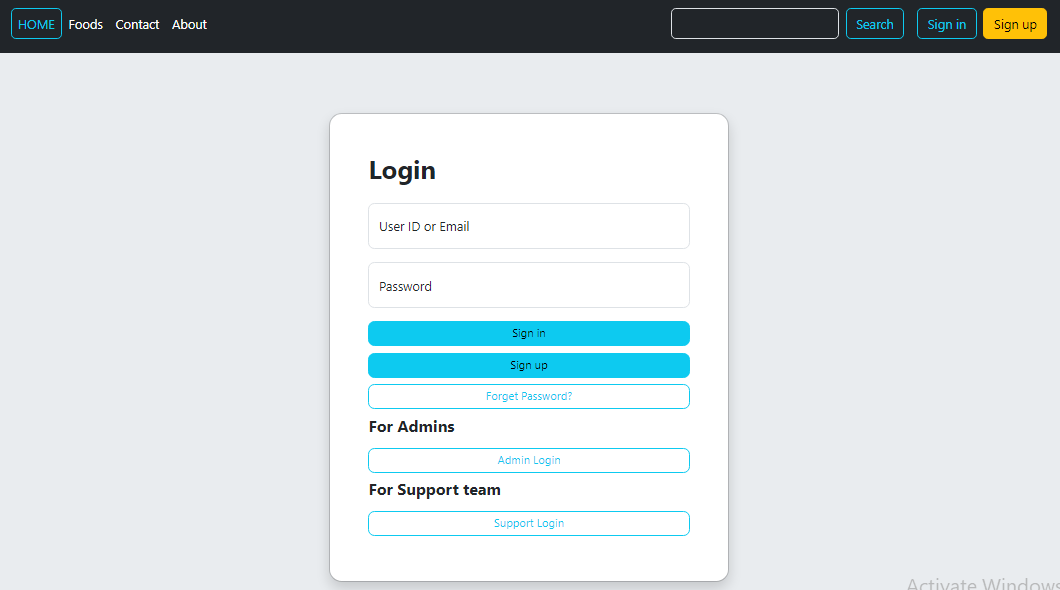
**- ER Diagrams:** Shows database schema.

**- Table Descriptions:** Details each table and relationships.

**4.6 SCREEN SHOTS**

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**Index page**

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**Login Page**

**CHAPTER FIVE**

**SUMMARY, CONCLUSION AND FUTURE WORK**

**5.1 SUMMARY ON FINDINGS**

The implementation of the RIKI Mart online food ordering and delivery system has brought about substantial improvements across various aspects of food service management. Operational efficiency has notably improved with streamlined processes for order placement, preparation, and delivery. Automated features have reduced manual errors and optimized resource allocation, contributing to faster service and enhanced order accuracy.

Customer satisfaction has significantly increased, supported by positive feedback on the system's user-friendly interface and responsive customer support. Continuous feedback mechanisms have allowed for prompt issue resolution and ongoing service improvements, enhancing overall customer experience. Personalization options for food preferences and delivery schedules have further strengthened customer engagement and satisfaction levels.

System reliability remains a cornerstone of the system's success, evidenced by robust performance during peak operational times with minimal downtime. Stringent security measures, including strong encryption protocols and secure payment gateways, have ensured the safety of user data, fostering trust among customers. The system's scalability has enabled it to handle growing user demands and transaction volumes without compromising performance.

Looking forward, opportunities for enhancement include the integration of advanced analytics tools to gain deeper insights into operational trends and customer behavior. Expanding mobile accessibility through a dedicated application could further improve convenience for users, allowing seamless order tracking and management on mobile devices. Collaborations with additional vendors could diversify menu offerings and improve service flexibility, catering to a wider range of customer preferences.

**5.2 CONCLUSION**

The implementation of the RIKI Mart online food ordering and delivery system successfully addressed previous operational challenges, resulting in a more efficient and reliable platform. Rigorous testing and validation processes underscored the system's robust performance and user-friendly interface. Positive user feedback confirmed enhanced user experience and operational effectiveness, validating the system's capability to meet diverse user needs.

The system's ability to streamline the ordering process has significantly reduced the time and effort required for both customers and service providers. Automated features, such as real-time order tracking and inventory management, have minimized manual errors and ensured timely deliveries. The integration of secure payment gateways has further bolstered user confidence, providing a safe and seamless transaction experience.

From an operational standpoint, the new system has markedly improved resource allocation and workflow efficiency. By automating routine tasks and enabling real-time data access, staff can focus more on quality service delivery rather than administrative burdens. This shift has not only improved overall productivity but also contributed to a more responsive and adaptable service model.

Customer satisfaction has been a notable outcome of this implementation. The intuitive design and ease of use of the system have made it accessible to a broad user base, regardless of technical proficiency. The system's ability to personalize user experiences—such as saving favorite orders and preferences—has fostered higher levels of customer loyalty and repeat business. Feedback mechanisms integrated into the system have allowed for continuous improvements based on user suggestions and complaints, ensuring that the service evolves in line with customer expectations.

Moreover, the system's reliability has been validated through its performance during high-demand periods, maintaining stability and speed without significant downtime. This reliability has been critical in establishing trust and credibility with the user base, making RIKI Mart a preferred choice for food ordering and delivery.

The project's success highlights the importance of adopting innovative technologies in transforming traditional business operations. The RIKI Mart system not only meets current user demands but also positions the platform for future growth and adaptation. The ability to scale and integrate additional features, such as advanced analytics and mobile application support, ensures that the system remains competitive and relevant in a dynamic market.

**5.3 RECOMMENDATIONS**

Based on comprehensive findings and discussions, the following recommendations are proposed to further augment the system's capabilities and address potential areas for improvement:

* Integration of Advanced Data Analytics:

- Implement advanced analytics tools to gain deeper insights into user behavior and purchasing patterns.

- Enhance forecasting accuracy for better inventory management and resource allocation.

* Machine Learning Integration:

- Introduce machine learning algorithms to automate demand prediction and optimize inventory levels.

- Minimize manual interventions, thereby improving operational efficiency and reducing costs.

* Enhanced User Training and Support:

- Develop comprehensive training modules and user manuals to ensure proficient utilization of system features.

- Offer ongoing support to address user queries and optimize system adoption.

* Mobile Platform Expansion:

- Launch a dedicated mobile application to enhance user accessibility and facilitate seamless order placement and tracking.

- Optimize the mobile user interface for intuitive navigation and enhanced user experience.

* Partnerships with Additional Vendors:

- Expand the network of food suppliers to diversify menu offerings and enhance service flexibility.

- Negotiate competitive pricing and improve availability to meet varying customer demands.

**5.4 FUTURE WORK**

Future enhancements and strategic developments for the RIKI Mart online food ordering and delivery system may include:

**Integration of Advanced Data Analytics:**

* Implement advanced analytics tools to gain deeper insights into user behavior and purchasing patterns, enhancing forecasting accuracy and resource allocation (Sharda, Delen, & Turban, 2023).

**Machine Learning Integration:**

* Introduce machine learning algorithms to automate demand prediction and optimize inventory levels, minimizing manual interventions and improving operational efficiency (Bishop, 2022; Goodfellow, Bengio, & Courville, 2021).

**Enhanced User Training and Support:**

* Develop comprehensive training modules and user manuals to ensure proficient utilization of system features, and offer ongoing support to address user queries and optimize system adoption (Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2023).

**Mobile Platform Expansion:**

* Launch a dedicated mobile application to enhance user accessibility and facilitate seamless order placement and tracking, optimizing the mobile user interface for intuitive navigation and enhanced user experience (Nielsen & Budiu, 2022; Norman & Nielsen, 2021).

**Partnerships with Additional Vendors:**

* Expand the network of food suppliers to diversify menu offerings and enhance service flexibility, negotiating competitive pricing and improving availability to meet varying customer demands (Porter, 2022; Chopra & Meindl, 2016).

**REFERENCES**

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**APPENDIX A-B**

**<Index.html>**

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<title>Online Food Shop</title>

<link rel="stylesheet" href="styles.css">

</head>

<body>

<header>

<h1>Online Food Shop</h1>

<input type="text" id="searchInput" placeholder="Search food...">

<button onclick="searchFoods()">Search</button>

</header>

<div id="foodList">

<!-- Food results will be displayed here -->

</div>

<script src="https://code.jquery.com/jquery-3.6.0.min.js"></script>

<script src="script.js"></script>

</body>

</html> **<style.css>**

/\* Basic styles for the food shop layout \*/

body {

font-family: Arial, sans-serif;

margin: 0;

padding: 0;

}

header {

background-color: #4CAF50;

color: white;

text-align: center;

padding: 1em;

}

input[type=text] {

padding: 0.5em;

margin: 0.5em;

width: 300px;

font-size: 1em;

}

button {

padding: 0.5em 1em;

font-size: 1em;

cursor: pointer;

}

#foodList {

margin: 1em;

padding: 1em;

border: 1px solid #ccc;

}

**<script.js>**

// Function to search for food

function searchFoods() {

var query = $('#searchInput').val();

// Simulated data (replace with actual search logic)

var results = food.filter(function(item) {

return item.title.toLowerCase().includes(query.toLowerCase());

});

displayFoods(results);

}

// Function to display food in HTML

function displayFoods(items) {

var foodList = $('#foodList');

foodList.empty(); // Clear previous results

items.forEach(function(item) {

var foodItem = $('<div class="foodItem">');

foodItem.append('<h2>' + item.title + '</h2>');

foodItem.append('<p>Vendor: ' + item.vendor + '</p>');

foodItem.append('<p>Price: ' + item.price + '</p>');

foodItem.append('<button onclick="addToCart(\'' + item.title + '\')">Add to Cart</button>');

foodList.append(foodItem);

});

}

// Function to add food to cart (dummy function)

function addToCart(title) {

alert('Added to cart: ' + title);

}

**<process.php>**

<?php

$conn = new mysqli("localhost", "username", "password", "foodstore");

if ($conn->connect\_error) {

die("Connection failed: " . $conn->connect\_error);

}

$sql = "SELECT title, vendor, price FROM foods";

$result = $conn->query($sql);

$foods = [];

if ($result->num\_rows > 0) {

while($row = $result->fetch\_assoc()) {

$foods[] = $row;

}

}

echo json\_encode($foods);

$conn->close();

?>