DEVELOPMENT OF FARM PRODUCE MARKETING WEBSITE

BY

NNAMANI NNAEMEKA KENNETH

(PSC2105495)

SUPERVISED BY:

DR.MAXWELL OSAGIE

DEPARTMENT OF COMPUTER SCIENCE,

FACULTY OF COMPUTING,

UNIVERSITY OF BENIN, BENIN CITY,

EDO STATE

NOVEMBER 2025

DEVELOPMENT OF FARM PRODUCE MARKETING WEBSITE

BY

NNAMANI NNAEMEKA KENNETH

(PSC2105495)

A PROJECT REPORT SUBMITTED TO THE DEPARTMENT OF COMPUTER SCIENCE, FACULTY OF COMPUTING, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE (B.SC.) IN COMPUTER SCIENCE

SUPERVISED BY:

DR.MAXWELL OSAGIE

NOVEMBER 2025

CERTIFICATION

This is to certify that this project titled "Development of farm produce marketing website" was carried out by NNAMANI NNAEMEKA KENNETH (PSC2105495) in the Department of computer science,under my supervision and the work has not been submitted elsewhere for any other award

_____ _____

DR. MAXWELL S.U. OSAGIE **DATE**

PROJECT SUPERVISOR

_____ _____

Dr. (Mrs.) A.R. USIOBAIFO DATE

APPROVAL

This project work is hereby approved in partial fulfilment of the requirements for the award of Bachelor of Science (B.Sc.) Degree in Computer Science from the University of Benin.

_____ _____

Dr. (Mrs.) A.R. USIOBAIFO DATE

Head of Department

DEDICATION

This work is dedicated to God Almighty whose infinite grace and mercy made this work possible.

ACKNOWLEDGEMENTS

My sincere appreciation goes to my supervisor, Dr. Maxwell Osagie, for his valuable time , profssional guidance and constructive criticism that shaped this work.

Special appreciation also goes to Dr. (Mrs.) Usiobaifo, the Head of Department, for her outstanding leadership and support.

I sincerely appreciate other lecturers and staff of the Department of Computer Science,

University of Benin, who I have been opportune to cross paths with, and have impacted me immensely these past few years: Dr. (Mrs.) L.O.Usiosefe, Dr. (Mrs.) Aziken, Mr J. Okhuoya, Mr. I.E. obayagbonna ,Prof. G.O. Ekuobase, Dr. F.O. Oliha, Prof. (Mrs.) V.V.N. Akwukwuma, Prof. F.I. Amadin, Prof. (Mrs.) V.I. Osubor, Dr. F.O. Chete, Dr. (Mrs) R.O. Osaseri, Mr. I.E. Obasohan, Mr. S.O.P. Oliomogbe, Mrs. Ophorie, Mrs. Chukwuma, Mr. Odetayo,Mr. K.O. Otokiti, Dr. E.C. Igodan, Dr. E. Nweli and Mr. D.N. Idehen.

My unreserved gratitude goes to my family (The Family of Mr.and Mrs. BASIL NNAMANI) and to my trailblazer (ONAH ODINAK HENRY)for their love, encouragement and support during the course of this sojourn

Finally, I want to appreciate all and sundry that in one way or the other ensure that my academic journey was successful .

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Farm produce marketing is the process of moving agricultural products from the farm gate to the final consumer through activities. The aim of this study is to develop an online platform for farm produce marketing that enhances efficiency, accessibility, and transparency in agricultural transactions. The motivation that led to the implementation of the proposed system is that there is lack of direct access to profitable markets for smallholder farmers. Also, farm produce consumers face challenges in accessing fresh farm produce directly from farmers without relying heavily on intermediaries. The research identified major challenges in farm produce marketing, including poor access to market information reported by 30% of farmers, high dependence on middlemen (20%), and poor transportation and logistics (15%). The methodology adopted in this study is the object oriented analysis and design methodology (OOADM) which is a technical approach for analyzing and designing an application or system by applying object throughout the software development process. The web programming languages (HTML, CSS, JAVASCRIPT, and PHP) was used in the software development process because, it is platform independent and it is a web based application. The proposed farm produce marketing system will enhance agricultural commercialization by linking farmers directly with consumers and wholesalers. The expected result is an online platform for farm produce marketing that will establish training and support programs within the platform to improve digital literacy and encourage adoption among farmers.

CHAPTER ONE

INTRODUCTION

1.0 Background of the study

Agriculture, often considered as the backbone of civilization, is pivotal in sustaining the world's growing population by providing food, fibre, and fuel. This age-old practice has evolved from simple manual techniques to highly mechanized and technologically advanced methods, increasing productivity and efficiency. One of the primary objectives of agriculture is to address the ever-growing challenge of food security. A steady and sufficient food supply becomes paramount as the global Population expands. Sustainable agricultural practices, incorporating precision farming, agro-ecology, and advanced technologies, are essential to maximize crop yields while minimizing environmental impact. (Qui et al., 2020).

The agriculture sector in Nigeria is considered as a major contributor to economic growth and development. This sector not Only meets the population's food demands but also provides raw materials for industry and a surplus for exports. Even though the agricultural sector has witnessed many high and low points in recent years, overall growth has remained satisfactory. Umar and Khadijah Gosta (2020) confirm that this sector has significant potential to bolster the nation's economy both presently and, in the future, provided there is adequate attention given to resolving emerging issues. Sustainable agricultural growth and advancement hinge on addressing the concerns of various stakeholders, particularly farmers who face numerous risks in production and marketing of their crops. Farmers often experience reduced value in their produce due to inadequate infrastructure and post-harvest practices. Additionally, addressing the frequent

fluctuations between food surpluses and shortages underscores the necessity to modernize the marketing system framework to effectively manage such scenarios. Agriculture is not only about cultivating crops but also about sustaining livelihoods and communities. In numerous regions worldwide, particularly in developing nations, agriculture serves as the main Source of income for millions of individuals. Empowering Smallholder farmers with access to education, technology, and markets can lift them out of poverty, fostering economic development and social stability. Additionally, supporting gender equality in agriculture ensures that women, who often play a significant role in farming, have equal access to resources and opportunities.

Agricultural product marketing plays a crucial role in the success of farmers and agribusiness. Effectively bringing agricultural products to the market requires a comprehensive understanding of the industry, consumer demands, and strategic marketing technique. Warlina et al. (2020) highlights the agricultural marketing central role in assembling rural agricultural produce from scattered and vast production areas and distributing these commodities further to consumers and other stakeholders in urban and peri-urban areas. Agricultural marketing most times encompasses activities which may be picking/harvesting, drying, cleaning, Sorting, grading, processing, packaging, labeling, transporting, storage, promotion, and sale of agricultural products. All these major activities add value to agricultural products as these products flow from farm producers to consumers. While some major activities are performed on farmers' farms, others are carried out off-farm by other market intermediaries such as traders and agro-processors. In common understanding, the conventional market can be defined as a place to trade goods and services, between sellers and buyers, from producers to consumers, to fulfill their individual needs. There seems to be a problem that arises in the conventional market: market

distance, limited time, differences in commodities between markets, and other problems that have an impact on sellers and buyers. It has a limited time for transactions and marketing by producers or sellers. Therefore, it needs a way out as a problem that arises in the conventional market: market distance, limited time, differences in commodities between markets, and other problems that have an impact on sellers and buyers. It has a limited time for transactions and marketing by producers or sellers. Therefore, it needs a way out as the solution to the conventional market's change in the sales system.

Bafadhl and Ahmad (2020) state that marketing for agriculture not only increases production and consumption but also quickens the pace of economic development. Al-Khatan et al. (2007) have detailed a few issues pertaining to the challenges the kingdom's agriculture sector is facing. They also addressed the Kingdom's requirement for an agricultural marketing Information system. The government has taken several actions to defend and preserve farmers' interests. In the absence of accurate and timely market information and advice about arrivals, pricing, market trends, etc., farmers are unable to plan their strategy for selling their produce at competitive rates; therefore, the advantages are still not trickling down to them.

Al-shayaa et al. (2012) highlights that one way to deliver extension services is through MIS. Lower yields and profit margins, crop diseases, insect and pest attacks, inadequate marketing facilities, limited water availability, and unfavorable soil conditions are just a few of the farming problems that extension may assist in addressing. Extension can undoubtedly provide practical answers and support farmers in their efforts to practice sustainable agriculture.

Boll et al. (2021) States that the advent of modern technology has revolutionized agriculture, introducing innovations such as precision farming, genetically modified organisms (GMOs), and

drone-assisted crop monitoring. These technologies enable farmers to optimize resource utilization, keep track of crop health and make well-informed decisions for enhanced productivity. Furthermore, integrating artificial intelligence and data analytics is transforming traditional farming into a data-driven, precision-based industry, fostering sustainable practices and resource efficiency. Another vital application of technology in agriculture is implementing an e-marketplace. Based on the previous explanation, the e-marketplace makes a new style of transaction form that has a more dynamic side, where customers can search and purchase goods from many sellers and make payment transactions easily. Also, there are features to facilitate users and their implementation with the internet, where buyers and sellers do not need to interact face-to-face. Moreover, traditional agricultural supply chains often involve multiple intermediaries, leading to increased costs and reduced profits for farmers. The advent of technology offers an opportunity to create a platform that directly connects farmers with buyers, streamlining the Process and benefiting both parties. In the modern era, digital marketing is pivotal in reaching a wider audience.

Yuliano et al. (2018) States that utilizing online platforms, social media, and e-commerce websites, farmers can improve the visibility of their agricultural products. Studies demonstrate that those who embrace digital marketing tools often see higher sales and improved interaction with consumers. In today's world, marked by significant challenges such as climate change, population growth, and resource scarcity, the agricultural sector must continue to adapt and innovate. Sustainable farming practices, precision agriculture, and biotechnological advancements hold promise for meeting future demands. However, addressing issues such as equitable access to resources, fair trade practices, and ethical considerations in technology adoption are crucial for building a resilient and inclusive agricultural future.

1.1 RESEARCH PROBLEM

Agricultural farm products differ from industrial products due to their perishable nature and special requirements during various harvesting process and transportation operations. There is a need to design a farm product marketing system to aid in displaying farm produce from farmers across the country to meet major stakeholders in need of this farm products. This will assist in growing the economy of the country when international investors invest in the farm produce seen on the marketing system. Furthermore, agricultural marketing includes all business activities designed to plan, price, promote and distribute want satisfying goods and services to household consumers and industrial users.

1.2 AIM AND OBJECTIVE OF THE STUDY

The aim of this study is to develop a website for farm produce marketing that enhances efficiency accessibility and transparency in agricultural transactions. In achieving this aim, the following specific objectives were laid out as follows;

1. Design a website that links farmers directly with consumers to reduce dependence on intermediaries.
2. Develop a functional and user-friendly farm produce marketing website to aid farmers in rural areas to have a proper platform to promote farm produce.
3. Implement features for real-time produce listings, market price information and customer feedback to enhance transparency and informed decision making.

1.3 SIGNIFICANCE OF THE STUDY

The outcome from the findings of this research will hold significant relevance in the following ways.

1. The proposed farm produce marketing system will enhance agricultural commercialization by linking farmers directly with consumers and wholesalers.
2. Government agencies will benefit from agricultural data generated by the platform for effective policy formulation.
3. Farmers will benefit from increased profitability, fair pricing, and wider market access.
4. Consumers will enjoy direct access to fresh farm produce at competitive prices.
5. Technology developers and entrepreneurs will benefit from new opportunities in agricultural e-commerce and logistics.

1.4 RESEARCH METHODOLOGY

This research will adopt a structured system analysis and design methodology (such as SSADM or an equivalent) to analyze requirements and design the application. Data gathering will involve stakeholder interviews, survey with farmers and potential users and market analysis to identify key features and user needs. The development will use web programming languages like HTML, CSS, JavaScript, PHP, and SQL for a platform -independent web application. The methodology includes iterative design with prototyping, where wireframes and mockups will be created and reviewed by stakeholders.

1.5 RESEARCH SCOPE

This research focuses on the development of a user-friendly and accessible marketing website for farm produce. It will cater primarily to farmers, agricultural product suppliers and buyers providing a platform for showcasing and selling farm produce online. The website will include features such as user registration and log in, product catalog, order placement and payment options. It aims to enhance market accessibility for farmers by linking them directly with buyers, including consumers and distributors.

The scope covers web and mobile accessibility to ensure convenience for users on different devices. The study will involve the analysis of current agricultural marketing challenges and the integration of solutions through Web technology.

1.6 DEFINITION OF TERMS

Farm Produce: Farm produce refers to raw or processed agricultural products such as grains, fruits, vegetables, and livestock meant for consumption or sale.

E-commerce: E-commerce is the buying and selling of goods and services over the internet, ften facilitated through digital platforms.

Online Platform: An online platform is a digital space, often a website or mobile application, designed to connect buyers and sellers for transaction.

Market- a regular gathering of people for the purchase and sale of provisions, livestock, and ther commodities.

Agriculture – a regular gathering of people for the purchase and sale of provisions, livestock, and other commodities.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter focuses on the review of related literature. A literature review includes the current knowledge as well as theoretical and methodological contributions to a particular topic. It documents the state of the art with respect to the topic you are writing. It surveys the literature in the topic selected. In this research work the literature review includes the Conceptual Review of Farm Produce Marketing, Online Platforms and Digital Marketplaces, Role of ICT in Agricultural Marketing, Benefits of Online Platforms to Farmers and Consumers, Challenges of Online Agricultural Market Platforms, E-commerce and Agricultural Value Chains, Theoretical Framework, and Empirical Review of Related Studies.

2.2 Conceptual Review of Farm Produce Marketing

Farm produce marketing is an essential component of agricultural development because it determines how agricultural goods move from the point of production to the point of consumption. According to Olukosi and Isitor (2018), agricultural marketing refers to the performance of all activities involved in the flow of farm produce from producers to consumers, including assembling, storage, transportation, processing, grading, and distribution. This concept goes beyond mere buying and selling, as it encompasses a series of interconnected activities that ensure efficiency, value addition, and sustainability in the agricultural value chain.

Farm produce marketing plays a central role in addressing the challenges of food security and rural development. Ogunleye and Oladejo (2020) stated that when farmers have access to efficient markets, they are more motivated to increase production, which leads to improved

household income and reduced poverty. However, in many developing countries like Nigeria, farm produce marketing has been constrained by the dominance of intermediaries, poor infrastructure, lack of price transparency, and limited access to wider markets. This has led to situations where farmers are compelled to sell their produce at low prices while consumers pay high prices for the same products.

The concept of farm produce marketing also highlights the importance of market information. Kotler and Keller (2016) affirmed that access to timely and accurate information is crucial for both producers and consumers because it enhances decision-making, improves bargaining power, and promotes efficiency in resource allocation. In the absence of market information, farmers often sell at disadvantageous terms, thereby perpetuating cycles of low productivity and poverty.

The modern perspective of farm produce marketing integrates the role of technology. Ezeh and Uzochukwu (2021) reported that digital platforms and e-commerce solutions have revolutionized marketing practices by bridging the gap between farmers and consumers, reducing post-harvest losses, and fostering transparency. Online farm produce marketing ensures that agricultural products reach a wider audience without geographical limitations. On the other hand, Nwankwo and Adebayo (2022) contended that while these innovations provide opportunities, barriers such as poor internet connectivity, low digital literacy among farmers, and inadequate logistics systems still hinder full adoption in Nigeria.

2.3 Online Platforms and Digital Marketplaces

Online platforms and digital marketplaces have emerged as transformative tools in global commerce, enabling producers and consumers to interact seamlessly in virtual spaces. According to Laudon and Traver (2020), an online platform is a digital environment that facilitates

interactions, exchanges, and transactions between different user groups. In the context of agriculture, these platforms function as intermediaries that connect farmers with consumers, wholesalers, retailers, and even exporters in a more transparent and efficient manner.

Digital marketplaces are more than just websites or applications; they integrate critical features such as product listing, secure payment systems, logistics coordination, and customer feedback mechanisms. Kotler and Keller (2016) affirmed that digital marketplaces reduce the costs of transactions by minimizing the need for physical infrastructure while expanding the reach of sellers to geographically dispersed buyers. For farmers, this implies the opportunity to showcase their produce beyond local markets and to negotiate better prices. For consumers, it ensures access to fresh products, convenience, and competitive pricing.

The success of online platforms in other sectors provides strong evidence of their potential in agriculture. Ezeh and Uzochukwu (2021) reported that e-commerce solutions have been successfully applied in retail, transport, and banking, and are now being adapted to suit agricultural needs. Platforms such as Jumia in Nigeria and Alibaba in China have demonstrated how digital spaces can connect millions of buyers and sellers in real time. On the other hand, Nwankwo and Adebayo (2022) contended that agricultural e-commerce platforms in developing countries still face barriers such as low digital literacy among farmers, unreliable internet access, and lack of efficient delivery systems, which reduce their effectiveness.

The value of online platforms for farm produce marketing also lies in data generation and transparency. According to Adeniyi and Adeyemo (2019), digital marketplaces create opportunities for real-time data collection on supply, demand, pricing, and consumer preferences. Such data is crucial for farmers to make informed production decisions and for

policymakers to design better agricultural policies. Transparency in pricing further reduces the exploitation of farmers by middlemen and builds trust among buyers and sellers.

Globally, digital agricultural platforms have already shown measurable impact. For example, in Kenya, the platform M-Farm has enabled farmers to access daily market prices and connect with buyers, while in India, platforms such as AgriBazaar have provided digital trading systems for millions of farmers. These examples affirm the potential of online platforms to revolutionize agricultural marketing in Nigeria. Ogunleye and Oladejo (2020) stated that adopting similar platforms will reduce post-harvest losses, increase farmer profitability, and improve food distribution networks across the country.

Therefore, online platforms and digital marketplaces are not just technological innovations but enablers of agricultural transformation. They address long-standing marketing inefficiencies, provide farmers with access to larger markets, ensure fair pricing mechanisms, and contribute to the broader goals of food security and economic development.

2.4 Role of ICT in Agricultural Marketing

The role of Information and Communication Technology (ICT) in agricultural marketing has become increasingly important in bridging the gap between farmers, buyers, and other stakeholders in the agricultural value chain. ICT is the use of digital tools, systems, and communication technologies to facilitate the creation, storage, exchange, and utilization of information. According to Adegboye (2019), ICT has transformed agricultural marketing by providing platforms for the efficient exchange of information on prices, demand, supply, and quality of farm produce. This shift from traditional methods of marketing, such as face-to-face

bargaining and reliance on middlemen, to digital platforms offers farmers wider market access and opportunities for increased profitability.

ICT provides solutions to some of the persistent challenges in agricultural marketing such as limited access to timely market information, poor infrastructure, and the exploitation of farmers by intermediaries. As reported by Aker (2010), ICT tools like mobile phones, online platforms, and digital applications improve farmers' ability to negotiate better prices and connect directly with end consumers or wholesalers. This has contributed to reducing information asymmetry, where farmers were previously disadvantaged by not knowing prevailing market conditions.

The adoption of ICT in agricultural marketing also enhances efficiency in the distribution of farm produce. For instance, Owuor et al. (2016) asserted that mobile applications and e-commerce systems support logistics coordination by linking transporters, aggregators, and buyers, thereby reducing post-harvest losses. ICT-based innovations like electronic payment systems further ensure transparency and trust between farmers and buyers, thereby reducing risks of fraud and delayed payments (Olaniyi, 2021).

In addition, ICT has enabled the creation of digital marketplaces specifically designed for agriculture. These platforms allow farmers to showcase their products online, giving buyers from different locations the opportunity to access fresh farm produce. As stated by Aulakh and Goel (2020), digital platforms enhance competition among buyers, leading to better pricing and creating an enabling environment for smallholder farmers to thrive. Moreover, the integration of ICT into marketing ensures that farmers are not limited by geographical barriers since they can reach urban consumers and even international markets.

The role of ICT also extends to capacity building and knowledge dissemination. Through mobile advisory services, farmers are educated on best agricultural practices, quality standards, and

storage methods to meet market requirements. This enhances the competitiveness of their products and improves the overall value chain. ICT-based solutions such as market information systems (MIS) have been affirmed to empower farmers with real-time information that supports decision-making, thereby reducing risks associated with farming and marketing (Bolarinwa & Oyeyinka, 2011). However, despite its numerous benefits, challenges such as poor internet connectivity in rural areas, low literacy levels among farmers, and inadequate access to smartphones still hinder the full potential of ICT in agricultural marketing. On the other hand, with continuous investment in ICT infrastructure and capacity building, these challenges are being gradually overcome, creating more inclusive and efficient agricultural markets.

2.5 Benefits of Online Platforms to Farmers and Consumers

The benefits of online platforms to farmers and consumers are becoming increasingly evident with the growing adoption of digital technologies in agricultural marketing. Online platforms serve as a bridge between producers and buyers by providing access to wider markets, reducing the dominance of intermediaries, and ensuring fairer pricing structures. According to Aker (2010), digital platforms reduce information asymmetry by providing farmers with real-time market information, which helps them make informed decisions on pricing and sales. This ensures that farmers are not easily exploited by middlemen who often dictate prices in traditional market settings. For farmers, online platforms provide a direct channel to consumers, wholesalers, and retailers, thereby increasing profit margins by cutting out unnecessary intermediaries. As noted by Goyal (2010), such platforms enhance income opportunities and create market visibility for smallholder farmers who would otherwise struggle to access large-

scale markets. Farmers also benefit from features like secure payment systems, logistics support, and product traceability, which foster trust and efficiency in agricultural marketing.

On the other hand, consumers benefit from online platforms through access to fresh produce at competitive prices. Consumers can compare prices, product quality, and suppliers, thereby enjoying transparency in their purchasing decisions. According to Fafchamps and Minten (2012), digital agricultural marketplaces improve consumer welfare by reducing transaction costs and ensuring food affordability. Additionally, traceability and quality assurance features help consumers gain confidence in the safety and origin of farm produce, which is critical in an era where food safety is a major concern.

Beyond financial gains, online platforms also promote convenience and inclusivity. Farmers can list their products without geographical limitations, while consumers can purchase farm produce from the comfort of their homes. This convenience is further enhanced through mobile applications and e-payment systems that allow transactions to be completed seamlessly. As observed by Chikweche and Fletcher (2012), digital platforms open opportunities for rural farmers to integrate into the global value chain, which not only boosts rural economies but also promotes sustainable food systems.

Overall, the benefits of online platforms extend beyond economic outcomes to include social and developmental impacts. They enhance transparency, efficiency, and inclusiveness in the agricultural marketing system while empowering both farmers and consumers with better choices and opportunities.

2.6 Challenges of Online Agricultural Market Platforms

Despite the transformative potential of online agricultural market platforms, several challenges continue to hinder their effective adoption and operation. According to Nwankwo and Adebayo (2022), one of the major challenges is inadequate digital literacy among farmers, particularly smallholder farmers in rural areas. Many farmers lack the technical skills required to navigate online platforms, upload product listings, or engage with buyers, which limits the reach and effectiveness of digital marketplaces.

Another critical challenge is poor infrastructure, including unreliable internet connectivity and frequent power outages in rural communities. As reported by Adeniyi and Adeyemo (2019), inconsistent electricity supply and slow internet services affect the timeliness of transactions, reduce platform reliability, and discourage farmers from fully embracing digital solutions. In addition, limited access to smartphones or other digital devices further restricts participation in online agricultural markets.

Trust and security issues also present significant barriers. Olaniyi (2021) stated that many farmers and consumers remain skeptical of online transactions due to fears of fraud, delayed payments, or product misrepresentation. These concerns reduce the willingness of stakeholders to adopt digital platforms and can undermine the credibility of online agricultural markets. On the other hand, the absence of standardized procedures for logistics and delivery coordination often results in delays, spoilage, and post-harvest losses, which diminish the economic benefits of using digital platforms (Ezeh & Uzochukwu, 2021).

Financial constraints also affect the adoption of online platforms. As noted by Aker (2010), initial costs for registration, device acquisition, data subscription, and platform maintenance may be prohibitive for small-scale farmers. This is compounded by limited access to financing and

credit facilities that would enable farmers to fully leverage digital marketplaces. Furthermore, socio-cultural factors, such as resistance to change and attachment to traditional market systems, were reported by Goyal (2010) as additional challenges to the widespread adoption of online agricultural marketing.

Finally, regulatory and policy gaps in the digital agricultural sector in Nigeria create uncertainties. Nwankwo and Adebayo (2022) affirmed that the lack of clear legal frameworks for e-commerce, online payments, and dispute resolution may expose both farmers and buyers to risks, thereby reducing confidence in these platforms.

2.7 E-commerce and Agricultural Value Chains

E-commerce has become a critical component in modern agricultural value chains by facilitating the direct exchange of goods and services between farmers, buyers, and other stakeholders. According to Laudon and Traver (2020), e-commerce refers to the use of digital platforms to conduct commercial transactions, including buying, selling, and exchanging goods and information online. In agriculture, e-commerce platforms integrate various stages of the value chain—from production, processing, storage, and distribution—to connect farmers with consumers, wholesalers, retailers, and exporters efficiently.

The agricultural value chain is composed of a series of activities that add value to farm produce as it moves from the producer to the end consumer. Olukosi and Isitor (2018) stated that these activities include input supply, production, harvesting, processing, packaging, transportation, marketing, and consumption. The traditional agricultural value chain in Nigeria has faced challenges such as poor logistics, overreliance on intermediaries, lack of transparency, and limited market access for smallholder farmers. E-commerce has the potential to address these challenges by creating a more streamlined, transparent, and efficient system.

E-commerce platforms improve efficiency in the agricultural value chain by enabling direct interaction between farmers and buyers. According to Aker (2010), such platforms reduce transaction costs, shorten supply chains, and provide real-time market information that allows farmers to make informed decisions regarding pricing, production, and sales. On the other hand, the platforms also benefit buyers by providing a wider selection of produce, timely delivery, and transparent pricing, which enhances trust and reliability in transactions.

Furthermore, e-commerce contributes to the reduction of post-harvest losses, a persistent challenge in the agricultural sector. Ezeh and Uzochukwu (2021) reported that online marketplaces allow farmers to quickly identify buyers for their produce, thereby minimizing storage time and spoilage. In addition, digital platforms often integrate logistics support, payment systems, and tracking mechanisms, which improve coordination across the value chain and strengthen supply chain resilience.

E-commerce also supports the empowerment of smallholder farmers by improving their access to national and international markets. Adeniyi and Adeyemo (2019) contended that digital marketplaces enable farmers to expand their customer base beyond local boundaries, negotiate better prices, and increase income. Moreover, e-commerce platforms provide data analytics on market trends, demand patterns, and buyer preferences, which inform better production and marketing strategies. Despite these benefits, challenges such as poor internet connectivity, low digital literacy among farmers, and limited access to devices continue to restrict the full integration of e-commerce into agricultural value chains in Nigeria (Nwankwo & Adebayo, 2022). On the other hand, sustained investment in ICT infrastructure, training, and policy support has the potential to overcome these barriers and create inclusive, efficient, and profitable agricultural value chains.

2.8 Theoretical Framework

The theoretical foundation of the development of an online platform for farm produce marketing is anchored on several key theories that explain technology adoption, agricultural marketing, and e-commerce integration. These theories provide a lens through which the interactions between farmers, consumers, and digital platforms can be understood.

One central theory is the Diffusion of Innovations Theory proposed by Rogers (2003). This theory asserts that the adoption of new technologies is influenced by factors such as perceived advantages, compatibility with existing practices, complexity, trialability, and observability. In the context of online agricultural platforms, this theory explains how farmers decide whether to adopt digital marketing tools based on perceived benefits such as improved market access, higher income, and reduced post-harvest losses. The theory also highlights the role of social influence and communication channels in accelerating adoption, which is crucial for ensuring that smallholder farmers embrace online marketing platforms effectively.

Another relevant theory is the Technology Acceptance Model (TAM) developed by Davis (1989). TAM posits that perceived usefulness and perceived ease of use are critical determinants of technology adoption. Applied to agricultural marketing, this model helps explain how farmers' willingness to engage with an online platform depends on their belief that the platform will enhance their marketing efficiency and that it is user-friendly. Perceived usefulness addresses the economic and practical benefits, such as better pricing and access to a broader market, while perceived ease of use addresses the simplicity and convenience of navigating the platform.

The Value Chain Theory also informs the theoretical framework of this study. Kaplinsky and Morris (2001) assert that value chains encompass all activities that add value to a product from

production to consumption. Integrating e-commerce into the agricultural value chain allows for efficient movement of farm produce, reduction of transaction costs, and increased transparency in pricing. This theory helps explain how the development of an online platform strengthens different stages of the agricultural value chain, benefiting both producers and consumers.

Furthermore, the Socio-Technical Systems Theory supports the study by emphasizing that technological systems, such as online platforms, must be designed considering social, organizational, and human factors (Trist & Bamforth, 1951). This theory is particularly important for smallholder farmers in Nigeria, who may face challenges related to digital literacy, infrastructural limitations, and cultural resistance. Designing the platform with the socio-technical perspective ensures that technology adoption aligns with farmers' capabilities and contextual realities.

2.9 Empirical Review of Related Studies

Empirical studies provide valuable insights into the role and effectiveness of online platforms in agricultural marketing and the broader application of digital technologies in the agricultural sector. In Nigeria, Adeniyi and Adeyemo (2019) conducted a study on the challenges and prospects of e-marketing in agriculture. The study reported that online platforms enhance farmers' market reach, reduce dependence on middlemen, and promote fair pricing. However, it also highlighted constraints such as poor internet connectivity, limited digital literacy among farmers, and high costs of platform adoption. The study concluded that with proper training and infrastructural support, digital platforms have the potential to transform agricultural marketing in Nigeria.

Globally, Aker (2010) investigated the impact of mobile phone technology on agricultural markets in Niger. The study revealed that farmers who accessed real-time market information via mobile phones were able to negotiate better prices, reduce wastage, and optimize production decisions. On the other hand, farmers without access to these technologies were disadvantaged, often selling their produce at lower rates. This research underscores the importance of timely market information and digital tools in improving farmers' economic outcomes.

In Kenya, Owuor, Mbeche, and Omondi (2016) studied the use of ICT in agricultural marketing and reported that online platforms and mobile applications significantly reduce post-harvest losses and enhance supply chain efficiency. The research emphasized that integration of digital marketplaces with logistics and payment systems is crucial for maximizing the benefits of technology adoption. Similarly, Fafchamps and Minten (2012) examined the impact of SMS-based market information services on farmers in India. Their findings showed that farmers receiving digital market updates were able to make informed decisions, achieve better prices for their produce, and reduce reliance on local intermediaries.

Ezeh and Uzochukwu (2021) investigated the adoption of digital platforms for farm produce marketing in Nigeria. The study affirmed that platforms offering features such as product listing, online payment, and delivery coordination improved transaction efficiency and market transparency. On the other hand, the study highlighted challenges such as limited digital skills among farmers, resistance to change from traditional market systems, and inadequate infrastructure in rural areas. The authors contended that overcoming these barriers requires training programs, policy support, and infrastructural development.

Furthermore, global examples demonstrate the effectiveness of online platforms in agriculture. For instance, the M-Farm platform in Kenya allows farmers to post their produce online, access

current market prices, and connect directly with buyers. Similarly, India's AgriBazaar platform facilitates e-trading of farm produce, providing farmers with opportunities to reach both national and international markets. These studies collectively affirm that online platforms have the potential to enhance market access, improve income, and reduce inefficiencies in agricultural value chains.

2.10 Gap in the Literature

Despite the growing body of research on digital technologies and e-commerce in agricultural marketing, several gaps remain that justify the development of an online platform for farm produce marketing in Nigeria. Adeniyi and Adeyemo (2019) reported that while online platforms improve market access and reduce reliance on intermediaries, their studies were largely descriptive and did not provide a comprehensive framework for the development of an integrated digital platform tailored to Nigerian smallholder farmers. This suggests a need for research that focuses on the practical design, implementation, and usability of such platforms.

Aker (2010) highlighted the role of mobile technology in providing market information, but the study primarily focused on Niger and rural contexts with mobile phones rather than comprehensive online platforms. Similarly, Fafchamps and Minten (2012) emphasized SMS-based interventions for market information but did not consider interactive digital marketplaces that integrate e-commerce, logistics, and payment systems. These limitations point to a gap in studies that combine ICT, e-commerce, and agricultural value chains into a cohesive platform suitable for contemporary Nigerian markets.

Furthermore, Ezeh and Uzochukwu (2021) affirmed that digital platforms increase efficiency and transparency but noted persistent challenges such as low digital literacy, inadequate

infrastructure, and financial constraints. While these challenges have been identified, there is limited empirical evidence on strategies to overcome them through context-specific platform design, training modules, and policy support. On the other hand, most studies focus on either the technological or economic dimensions of digital agriculture, with few examining the social, organizational, and cultural factors influencing adoption and sustainability (Nwankwo & Adebayo, 2022).

Additionally, there is a scarcity of research that evaluates the impact of online agricultural platforms on both farmers and consumers in Nigeria. While platforms like M-Farm in Kenya and AgriBazaar in India have been studied extensively, there is limited empirical evidence on the effectiveness, challenges, and outcomes of similar platforms within the Nigerian context. This gap is critical because adoption and benefits of online platforms are highly influenced by local socioeconomic, infrastructural, and cultural factors.

2.11 Summary of Literature Review

The literature reviewed on the development of online platforms for farm produce marketing reveals the growing significance of ICT, e-commerce, and digital marketplaces in modern agricultural systems. Farm produce marketing is a critical component of agricultural development, as it facilitates the movement of agricultural products from producers to consumers while adding value along the chain (Olukosi & Isitor, 2018). Studies have shown that traditional marketing systems in Nigeria are often inefficient, characterized by limited market access, overreliance on intermediaries, price exploitation, and post-harvest losses (Ogunleye & Oladejo, 2020). The concept of online platforms and digital marketplaces has been widely acknowledged as a transformative tool in agricultural marketing. Laudon and Traver (2020) emphasized that

digital platforms enable farmers to connect directly with buyers, improve pricing transparency, and expand market reach. Empirical studies support this assertion. For example, Aker (2010) found that mobile phone technology in Niger improved farmers' access to market information, reduced information asymmetry, and increased profitability. Similarly, Owuor, Mbeche, and Omondi (2016) reported that ICT and online platforms in Kenya enhanced supply chain efficiency and minimized post-harvest losses.

The literature also highlights the role of ICT in agricultural marketing. ICT tools, such as mobile applications, online marketplaces, and digital payment systems, improve efficiency, transparency, and trust between stakeholders (Adegboye, 2019; Olaniyi, 2021). On the other hand, challenges such as low digital literacy, poor internet connectivity, inadequate infrastructure, and financial constraints limit the adoption and effectiveness of these technologies (Nwankwo & Adebayo, 2022; Ezeh & Uzochukwu, 2021).

E-commerce has been recognized as a mechanism for strengthening agricultural value chains by integrating production, distribution, marketing, and consumption. Laudon and Traver (2020) and Kaplinsky and Morris (2001) affirmed that digital marketplaces reduce transaction costs, enhance efficiency, and improve market access for farmers while providing consumers with convenient access to fresh produce. Empirical evidence from platforms such as M-Farm in Kenya and AgriBazaar in India further supports the benefits of online marketplaces in enhancing farmer income and market efficiency (Fafchamps & Minten, 2012). However, a critical gap exists in the literature regarding the development and implementation of comprehensive online platforms tailored to the Nigerian context. While studies have addressed ICT adoption, mobile technology, or digital marketplaces separately, few have examined integrated platforms that combine e-commerce, logistics, payment systems, and socio-technical considerations.

Additionally, empirical evidence on the impact of such platforms on both farmers and consumers in Nigeria remains limited (Adeniyi & Adeyemo, 2019; Nwankwo & Adebayo, 2022).

2.1 Literature summary Table

S/N	Authors (Year)	Article Title	Contributions/ Findings	Limitations
1	Adedapo, O. A., Adio, M. O., Saliu, Y. M., Bello, J., & Owolabi, A. A. (2024).	Development of an online farm produce marketing system (A case study of Yusroh Farms). International Journal of Sustainability Management and Information Technologies, 10(2),	Developed a web-based marketing system that links farmers directly with consumers to eliminate middlemen and price exploitation. The system features secure user registration, product listing, and online transaction management.	Prior agricultural markets relied on manual sales and face-to-face transactions, leading to inefficiencies and post-harvest losses. The study noted that lack of ICT adoption and poor data sharing were major hindrances that inspired the system's design.
2	Logaiyan, P. R., & Pavani, O. (2025).	Farm E-Market: A web-based agricultural commerce system for farmers and consumers. International Journal of Research Publication and Reviews, 6(6), 5048–5055.	Designed an e-commerce web platform that enables farmers to upload produce information, receive orders online, and track sales metrics.	Existing agricultural marketing models had limited reach and poor price transparency. The authors identified lack of trust and middleman dependency as motivating problems that their system aimed to solve.
3	Nwanmuoh, E. E., Okolo-Obasi, N. V. E., Anene, J. N., Uwakwe, I. V., Udu, F. T.,	Agricultural marketing and sustainable household food security in Sub-	Explored the link between agricultural marketing structures and	Found that traditional marketing channels and lack of digital

	Amuka, I., & Emeter, P. O. (2024).	Saharan Africa: Evidence from Nigeria. African Journal of Agricultural Science and Food Research, 17(1), 68–97.	household food security using regression analysis from field data in Nigeria.	platforms reduce farmers' profit margins and information access — suggesting the need for online marketing systems to close this gap.
4	Akinwale, J. A., Wole-Alo, F. I., & Oluwole, B. O. (2023).	Digital platforms for linking agriculture investors with smallholder farmers in Nigeria. Journal of Agricultural Extension, 27(2), 65–72.	Proposed a digital platform model connecting farmers and investors for better funding, produce sales, and logistics management.	Identified fragmented digital ecosystems and low digital literacy as barriers to scalability — which guided their research focus on user-friendly web solutions.
5	Magakwe, N., & Olorunfemi, O. (2024).	A systematic review of the trends, effects, and deterrents of collective marketing participation among smallholder farmers in Sub-Saharan Africa. Sustainability, 16(21), 9578	Synthesized recent research on collective marketing strategies and identified patterns in digital and cooperative approaches.	Most collective marketing programs suffer from weak ICT infrastructure and poor market integration, motivating the recommendation of digitally-enabled cooperative marketing systems.

CHAPTER THREE

METHODOLOGY

INTRODUCTION

A methodology can be described as a structured framework that guides the planning, organization, and control of activities involved in developing an information system. It outlines a specific sequence of steps, techniques, and procedures that direct how information is collected, analyzed, and transformed into a working design. In today's fast-changing digital world, methodologies in system analysis and design mainly focus on supporting software development activities (Uba, 2011).

A design methodology is essentially a systematic approach that provides well-defined procedures for carrying out a design project. It can also be seen as the study of the rules, principles, and methods applied within a particular discipline. Using a suitable methodology ensures that the design process is not only detailed but also based on a clear understanding of the existing system. This allows the designer to identify how the current system operates, the problems it faces, and the improvements needed. From this knowledge, the new system can be structured with the right features to address existing challenges. Depending on the findings, the designer may recommend either perfective maintenance (enhancing the functionality of the current system) or preventive maintenance (making improvements to avoid future problems without altering the core system).

3.1 Methodology Adopted

The object oriented analysis and design methodology (OOADM) was adopted for the analysis, design and implementation of this system. Object-oriented analysis and design (OOAD) is a technical approach for analyzing and designing a web based application, system, or business by applying object-oriented as well as using visual modeling throughout the software development process to guide stakeholder communication and product quality.

OOAD in modern software engineering is typically conducted in an iterative and incremental way. The outputs of OOAD activities are analysis models and design models respectively. The intention is for these to be continuously refined and evolved, driven by key factors like risks and business value.

Object-Oriented Analysis: The purpose of any analysis activity in the software life-cycle is to create a model of the system's functional requirements that is independent of implementation constraints. The main difference between object-oriented analysis and other forms of analysis is that by the object-oriented approach we organize requirements around objects, which integrate both behaviors (processes) and states (data) modeled after real world objects that the system interacts with.

Object-Oriented Design: During object-oriented design (OOD), a developer applies implementation constraints to the conceptual model produced in object-oriented analysis. Such constraints could include the hardware and software platforms, the performance requirements,

persistent storage and transaction, usability of the system, and limitations imposed by budgets and time.

Object-oriented modeling: Object-oriented modeling (OOM) is a common approach to modeling applications, systems, and business domains by using the object-oriented paradigm throughout the entire development life cycles. OOM is a main technique heavily used by both OOD and OOA activities in modern software engineering. Object-oriented modeling typically divides into two aspects of work: the modeling of dynamic behaviors like business processes and use cases, and the modeling of static structures like classes and components. OOA and OOD are the two distinct abstract levels (i.e. the analysis level and the design level) during OOM.

3.1.1 Problem Identification Using OOADM

The OOADM was used to discover some problems;

a) Feasibility Study: This assumes that the proposed project has been identified as a result of an exercise such as strategic planning and sets out to evaluate the various technical, organizational, financial and business options available. The aim is to establish the whether the direction and requirements of the project are feasible. The aim is to evaluate the feasibility of the proposal, involving an analysis of the problem and determination of the best solution; usually a range of potential solutions are presented.

b) Investigation of the Environment: The process of identifying, modeling and documenting the data requirements of the system being designed. The result is a data model containing entities (things about which a business needs to record information), attributes (facts about the entities) and relationships (associations between the entities).

c) Business System Option (BSO): A BSO defines the functional scope of a proposed solution. At its most basic level it consists of textual descriptions of those requirements satisfied by the solution. All BSOs must satisfy the minimum requirement as identified by user representatives.

d) Requirement Certification: Requirement Certificate aims to equip the learner or end user (client) with the advanced knowledge of project management and will enable the learner to understand the system requirement to uphold the project management required parameters.

e) Technical System Option (Implementation): There is availability of software, hardware and technical man power for the development and running of the new system. Hence the system is technically feasible as the requirement can be met without stress and much financial input. The software and hardware requirements include an Integrated Development Environment for web based applications, a standard PC for running this application, a local server and an up to date web browser for testing. As a programmer, the researcher can provide these requirements with ease and as such, this project is technically feasible.

f) Logical Design: Technical system options are production and logical design updates and query processing and system dialogue.

g) Physical Design: physical database design and a set of program specifications Program specifications are using the logical system specification and the technical system specification.

3.2 Analysis of the Existing System

The current system of farm produce marketing in Nigeria largely relies on traditional methods, which include direct selling in local markets, intermediaries, and informal networks. Farmers depend heavily on middlemen to reach consumers, which often leads to exploitation through unfair pricing and reduced profit margins. The system is characterized by limited access to real-time market information, making it difficult for farmers to make informed decisions about what to produce, when to sell, and at what price (Ogunleye & Oladejo, 2020).

Transportation and logistics inefficiencies further exacerbate the challenges, contributing to post-harvest losses and delays in delivering produce to markets. Storage facilities are inadequate or poorly managed, resulting in spoilage, especially for perishable products. On the other hand, consumers face difficulties accessing fresh produce at fair prices due to the fragmented nature of the supply chain. Price volatility is a common issue because of lack of transparency and the influence of multiple intermediaries (Adeniyi & Adeyemo, 2019).

Existing efforts to integrate technology into agricultural marketing, such as mobile phone notifications or social media groups, have provided some benefits, including improved communication and basic market information. However, these solutions are often fragmented, lack standardization, and do not provide integrated features such as secure online payments, logistics support, or analytics for decision-making. Limited digital literacy among farmers and inadequate infrastructure, including internet connectivity and power supply, restrict the effectiveness of these technology-based interventions.

Overall, the existing system is inefficient, prone to losses, and offers limited opportunities for farmers to increase income and access wider markets. It is against this backdrop that an integrated online platform is proposed, combining real-time product listings, direct buyer

connections, secure payments, logistics management, and user-friendly interfaces to streamline farm produce marketing and improve outcomes for both farmers and consumers.

3.2.1 Dataflow of the Existing System

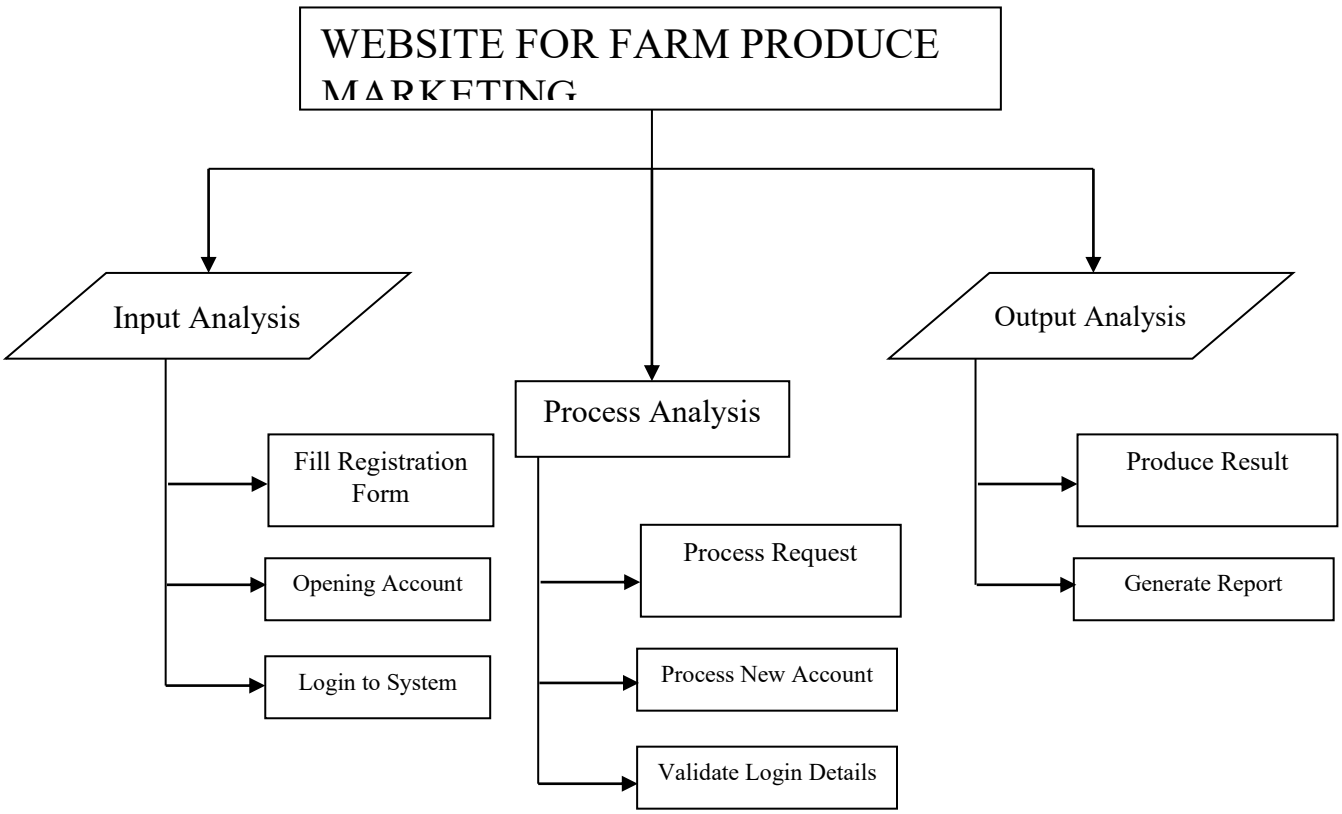

Figure 3.2.1: Dataflow of the Existing System

Figure 3.2.1 provides a high-level, process-centric view of the current website for farm produce marketing. It organizes the system's functions into three primary phases: Input Analysis, Process Analysis, and Output Analysis.

a) Input Analysis

This section focuses on the steps required for a user to gain entry and be recognized by the system. It covers the initial interaction with the website:

i. Fill Registration Form: The initial step for a new user to provide their details.

ii. Opening Account: The action of the system formally establishing the user's profile based on the registration data.

iii. Login to System: The process for existing users to authenticate themselves.

b) Process Analysis

This is the core functional area where the system processes user interactions and manages account logistics. It appears to focus heavily on system validation and account management:

i. Process Request: This is a general step that would encompass handling user inquiries or actions once logged in (e.g., searching for produce, placing an order).

ii. Process New Account: This step handles the backend operations necessary to finalize and activate a user's account after registration.

iii. Validate Login Details: The crucial step of checking the provided login credentials (username/password) against the system's database to grant access.

c) Output Analysis

This final section outlines what the system produces for the user or administrator based on the data and processes:

i. Produce Result: This is the generic display of information requested by the user, which could be a search result, a confirmation message, or a transaction summary.

ii. Generate Report: This suggests the system is capable of aggregating data into formal reports, likely for system administrators or users tracking their sales/purchases.

3.2.2 Weakness of the Existing System

The current system of farm produce marketing in Nigeria exhibits several weaknesses that limit efficiency, profitability, and market accessibility for farmers. One major weakness is the heavy reliance on middlemen, which often results in reduced earnings for farmers due to unfair pricing and lack of direct negotiation with buyers (Adeniyi & Adeyemo, 2019). Farmers have limited access to real-time market information, making it difficult to determine competitive prices or respond to fluctuations in demand.

Poor transportation and logistics constitute another significant weakness, contributing to delays in delivering produce to markets and increasing post-harvest losses, especially for perishable goods (Ogunleye & Oladejo, 2020). Inadequate storage facilities exacerbate these losses, causing spoilage and reducing the overall quality of products available to consumers.

The system is also constrained by financial barriers, as limited access to credit prevents farmers from investing in better farming techniques or technologies that could improve production and marketing efficiency. Additionally, existing technology interventions, such as mobile phone alerts or social media marketplaces, are fragmented, lack integration, and do not provide secure payment options or comprehensive logistics support.

Another weakness is low transparency in pricing and transactions. Farmers are often unaware of prevailing market prices and are vulnerable to exploitation by intermediaries, while buyers have limited information about product quality and availability. On the social side, resistance to change from traditional marketing methods slows the adoption of modern solutions, further perpetuating inefficiencies.

Overall, these weaknesses highlight the need for a fully integrated, user-friendly online platform that addresses information gaps, improves transaction transparency, streamlines logistics, and enhances the income and market access of farmers.

3.3 Feasibility Study

This assumes that the proposed project has been identified as a result of an exercise such as strategic planning and sets out to evaluate the various technical, organizational, financial and business options available. The aim is to establish the whether the direction and requirements of the project are feasible. The aim is to evaluate the feasibility of the proposal, involving an analysis of the problem and determination of the best solution; usually a range of potential solutions are presented.

3.3.1 Technical Feasibility

There is availability of software, hardware and technical man power for the development and running of the new system. Hence the system is technically feasible as the requirement can be met without stress and much financial input. The software and hardware requirements include an Integrated Development Environment for web based applications, a standard PC for running this application, a local server and an up to date web browser for testing. As a programmer, the researcher can provide these requirements with ease and as such, this project is technically feasible.

3.3.2 Operational Feasibility

The new system is operationally feasible as it will be used and managed by users who are at least intermediate computer operators and it doesn't require an expert knowledge of the system before it can be implemented. Also, the system is designed to be user friendly and efficient; therefore the project is operationally feasible.

3.3.3 Economic Feasibility

The proposed system is cheap to implement and less expensive to maintain, the economic challenge might emerge in the purchase of some hardware (such as, a computer system) and software (such web browser and WAMP Server) requirements which can be easily taken care of, no much requirements are needed for this system and such the system is economically feasible. Besides, the proposed could be marketed for other financial gains to similar drug information services.

3.4 Analysis of the Proposed System

The proposed system for farm produce marketing is an integrated online platform designed to link farmers directly with consumers, traders, and other buyers, thereby addressing the inefficiencies of the existing system. The platform provides real-time product listings, allowing farmers to display available produce, specify quantities, and indicate prices. This feature reduces dependence on intermediaries, ensures price transparency, and enables farmers to make informed decisions about when and where to sell their produce (Olukosi & Isitor, 2018).

Secure online payment systems are incorporated into the platform to facilitate safe and efficient transactions, reducing financial risks for both farmers and buyers. Integrated logistics and

delivery support are also included to streamline the movement of produce from farms to consumers, minimizing post-harvest losses and improving supply chain efficiency. Access to market price information and trend analytics further empowers farmers by providing insights into demand patterns, enabling them to plan production and pricing strategically.

The proposed system also considers usability and accessibility, with a mobile-friendly interface that allows smallholder farmers with limited digital experience to navigate the platform easily. Training and support modules are incorporated to improve digital literacy and enhance adoption. Features such as customer feedback and rating systems foster trust between buyers and sellers, encouraging repeated transactions and creating a transparent marketplace.

On the other hand, the proposed system addresses broader socio-economic objectives, including income improvement, rural economic development, and food security. By linking farmers directly to a wider network of buyers, the platform reduces transaction costs, enhances market reach, and ensures fair pricing. Overall, the proposed system is a comprehensive solution that integrates technology, logistics, and market information to overcome the limitations of traditional farm produce marketing in Nigeria and promote sustainable agricultural development.

3.4.1 Data Flow Diagram of the Proposed System

This is a data flowchart of the proposed system as shown in figure 3.2.

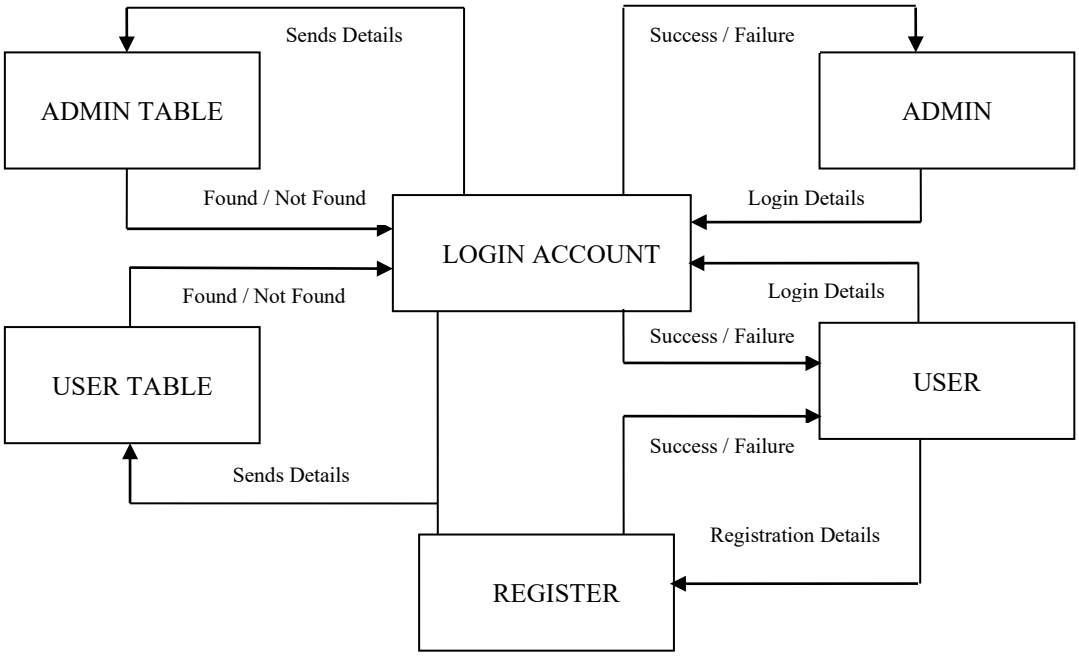

Figure 3.2: Data Flow Diagram of the Proposed System

Figure 3.2 provides the implementation detail for parts of the Input Analysis and Process Analysis categories shown in the high-level Existing System dataflow (Figure 3.2.1).

Registration and Account Opening: The REGISTER process in Figure 3.2 directly maps to the functions of Fill Registration Form and Opening Account under the Input Analysis of the Existing System (Figure 3.2.1). Figure 3.2 shows how the registration details are stored in the USER TABLE.

Login: The LOGIN ACCOUNT process in Figure 3.2 is a detailed breakdown of the Login to System (Input Analysis) and Validate Login Details (Process Analysis) steps from the Existing System (Figure 3.2.1). Figure 3.2 clarifies the validation mechanism, explicitly showing:

The different types of users (ADMIN and USER).

The explicit data stores (ADMIN TABLE, USER TABLE) used for validation.

The different outcomes of the login attempt (Success / Failure).

3.4.2 Advantages of the Proposed System

The development of an online platform for farm produce marketing offers several advantages that improve efficiency, market access, and profitability for farmers. One major advantage is the direct linkage between farmers and consumers or buyers, which reduces dependence on middlemen and ensures fair pricing (Aker, 2010).

Real-time product listings and access to market information enable farmers to make informed decisions, enhancing productivity and reducing post-harvest losses. The integration of secure online payment systems provides a safe and efficient way to complete transactions, minimizing financial risks for both sellers and buyers (Ezeh & Uzochukwu, 2021).

Mobile-friendly interfaces and training modules enhance usability and adoption, particularly for smallholder farmers, while logistics and delivery support improve supply chain efficiency and product accessibility. Furthermore, the platform promotes transparency through customer feedback and rating systems, building trust between parties and encouraging repeated transactions (Kaplinsky & Morris, 2001).

3.4.3 Justification of the Proposed System

The development of an online platform for farm produce marketing is justified by the need to address persistent challenges in the agricultural marketing system in Nigeria. Farmers face poor access to market information, overreliance on intermediaries, price volatility, post-harvest losses, and inefficient logistics, which limit profitability and reduce incentives for agricultural

production. An online platform provides a practical solution by linking farmers directly with consumers and other buyers, improving transparency, efficiency, and access to market data.

The platform is also justified by the increasing adoption of digital technologies and e-commerce in various sectors, demonstrating that ICT-based solutions improve efficiency, reduce transaction costs, and expand market reach. For smallholder farmers, the platform will provide tools for real-time product listings, secure payment systems, and integrated logistics, enabling them to sell produce more effectively and at competitive prices.

Furthermore, the platform will contribute to economic empowerment by increasing farmers' income and reducing losses, which has broader implications for food security and rural development. By providing training and support, the platform will improve digital literacy and encourage the adoption of technology in agriculture, ensuring that smallholder farmers are not excluded from emerging digital markets.

Overall, the justification for this study is grounded in the need to modernize agricultural marketing in Nigeria, create efficient and transparent systems, and enhance the livelihoods of farmers while improving access to quality produce for consumers.

3.5 Functional Requirements

The following figure 3.4 shows the various modules involved in the system and available to users who have limited access and to the Admin who have full access to the system.

3.5.1 Use Case Diagram of the Admin / User Privileges

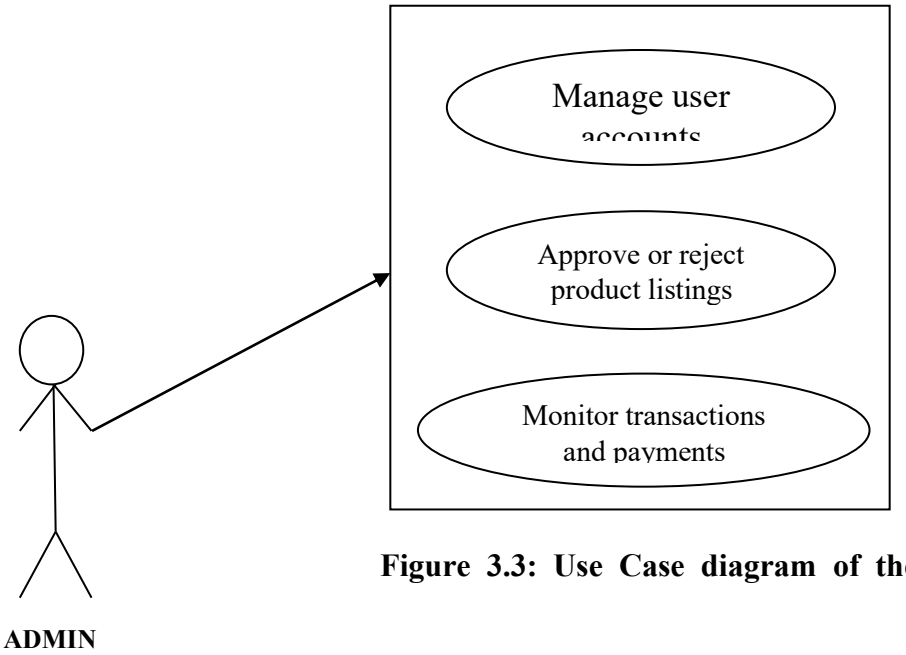

Figure 3.3: Use Case diagram of the

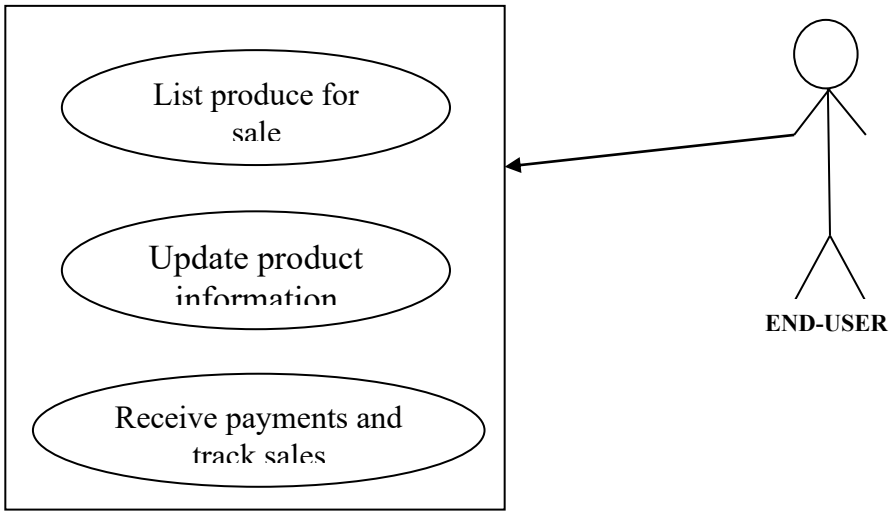

Figure 3.4: Use Case diagram of the User

Admin Privileges

Managing User Accounts: When the Admin is logged in, they can manage user accounts, which includes the ability to add, update, or delete user accounts.

Approving/Rejecting Listings: When the Admin receives a new product submission, they can approve or reject product listings. The outcome is that the product is either published on the platform or rejected.

Monitoring Transactions and Payments: While users are conducting transactions, the Admin can monitor transactions and payments. The Admin can then view and generate reports on all transactions.

Updating Prices and Analytics: Since the Admin has access to market data, they can update market prices and analytics, resulting in the platform displaying updated prices and trend analysis.

Managing Logistics and Deliveries: When delivery requests are submitted, the Admin can manage logistics and delivery schedules by assigning deliveries and tracking shipments.

User (Farmer) Privileges

Listing Produce: When a User's account is active, they can list produce for sale. The outcome is that the produce becomes visible to buyers on the platform.

Updating Product Information: Once a product has been listed, the farmer can update product information, ensuring product details such as price, quantity, or description are updated.

Receiving Payments and Tracking Sales: After a transaction is completed, the farmer can receive payments and track sales, allowing them to view their payment status and sales history.

Communicating with Buyers: When a Buyer initiates an inquiry, the farmer can communicate with buyers by responding and negotiating sales.

User (Buyer) Privileges

Searching and Purchasing: When a User's account is active, they can search for and purchase farm produce. The outcome is that the Buyer completes the purchase and receives a confirmation.

Providing Feedback and Rating: After a transaction is completed, the Buyer can provide feedback and a rating. This feedback is then submitted and visible to other users.

Tracking Order and Delivery Status: Once the purchase is confirmed, the Buyer can track their order and delivery status, receiving updates on the status of the delivery.

In Figure 3.3 above, actor 1 is assigned all governance and oversight responsibilities necessary to manage the platform and maintain its integrity. Their functions are supervisory and critical to security and quality control:

Manage user accounts: This covers all aspects of user lifecycle management, including account creation, modification, suspension, and deletion, along with managing user roles and permissions.

Approve or reject product listings: The Admin acts as a gatekeeper, reviewing products submitted by End-Users before they are officially published on the marketplace. This maintains content quality and adherence to platform policies.

Monitor transactions and payments: This ensures the Admin has full visibility into all financial activities, allowing for auditing, anomaly detection, and ensuring the smooth operation of the payment system.

In Figure 3.4 above, actor 2 represents the seller or merchant and is focused on core business and sales operations. Their functions directly contribute to the platform's marketplace activity:

List produce for sale: The fundamental action that allows the user to submit new products or services to be sold on the platform (subsequently requiring Admin approval).

Update product information: Users have the capability to modify existing listings, adjusting details such as pricing, inventory levels, descriptions, and images to keep their offerings current.

Receive payments and track sales: This combines the essential functions of concluding a sale, receiving the revenue generated, and accessing a historical log of all sales performance and financial transactions.

3.6 Data Requirements

The following are the data requirements of new and existing users in the system. New users are required to create an account by providing some necessary information such as:

a) Email Address: The user's email address is required during registration and subsequent login on the system.

b) Password: The user is required to enter a secured password or pin during registration and subsequent login on the system

c) User Name: The user is required to enter a nickname which he/she will be addressed as subsequently for security reasons.

d) Passport: This field contains the photograph or picture of the account holder or system user.

e) Address: This field contains the address of the system user.

3.7 High Level Model of the Proposed System

The high level model of the proposed system is illustrated below;

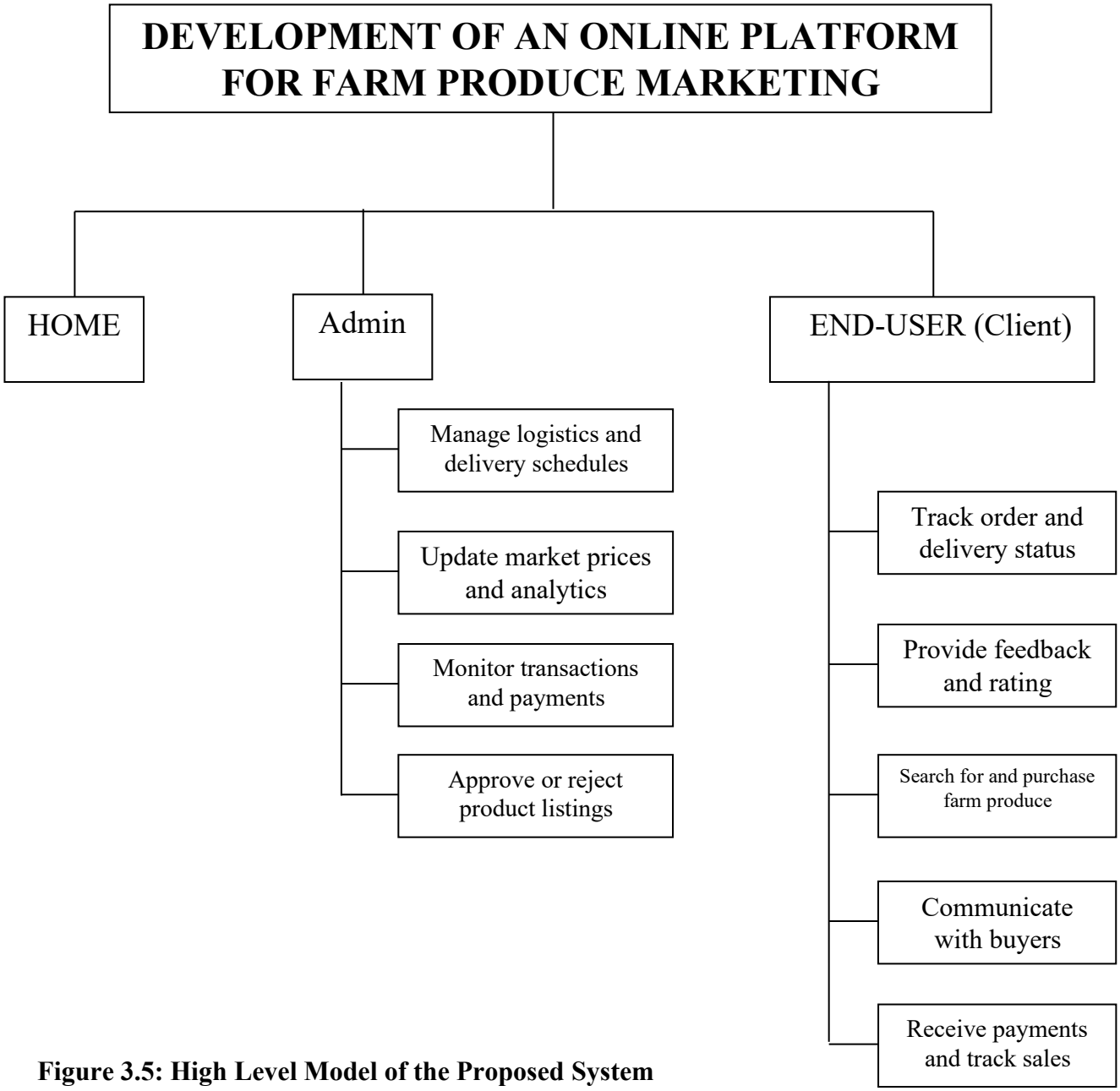

Figure 3.5: High Level Model of the Proposed System

Figure 3.5 is a typical web application architecture with a public landing/information page (HOME), a control panel for site administrators (Admin), and a module for external users to interact with the system (END-USER).

1. HOME: The HOME module likely serves as the public-facing entry point of the website.

Implied Functionality: While no specific sub-functions are listed, it would typically include general information, a brief about the service, navigation links, and potentially features like registration/login access to the Admin and END-USER modules.

2. Admin: The Admin component represents the system administrators or backend management team responsible for overseeing the platform's operations. Their core functions are focused on logistics, data management, monitoring, and quality control:

i. Manage logistics and delivery schedules: This function is crucial for an e-commerce platform dealing with physical goods (farm produce). It involves coordinating the movement of products from farms/sellers to clients, scheduling deliveries, and optimizing routes.

ii. Update market prices and analytics: This function indicates the Admin's role in maintaining data integrity and business intelligence. They are responsible for setting and adjusting product prices and analyzing key performance indicators (KPIs) and sales data.

iii. Monitor transactions and payments: This involves tracking all financial activities on the platform, ensuring payments are processed correctly, monitoring for fraud, and reconciling accounts.

iv. Approve or reject farm product listings: This serves as a quality control gate. The Admin reviews new product listings submitted by sellers/farmers to ensure they meet platform standards, are categorized correctly, and are suitable for marketing, thereby maintaining the platform's credibility.

3. END-USER (Client): The END-USER (Client) component represents the module for the platform's users, who could be buyers (B2C or B2B clients) or sellers (farmers/producers),

depending on the specific function. Based on the listed sub-functions, this user base appears to include both buyers and sellers, or perhaps the term "Client" is used broadly.

i. Track order and delivery status: A primary function for buyers, allowing them to monitor the progress of their purchases from placement through to delivery.

ii. Provide feedback and rating: Essential for building trust and quality control. Buyers can rate products and sellers, and potentially sellers can rate buyers (e.g., on payment promptness).

ii. Search for and purchase farm produce: The core e-commerce functionality for buyers. This involves browsing the product catalog, filtering, adding items to a cart, and completing the checkout process.

iii.Communicate with buyers: This function suggests the platform facilitates direct or mediated communication between sellers (who list the produce) and buyers, which is often needed for negotiation or clarifying product details.

iv. Receive payments and track sales: This function specifically targets sellers (farmers/producers). It involves receiving the funds from their sold produce (after any platform commission) and monitoring their sales performance and history.

CHAPTER FOUR

IMPLEMENTATION

INTRODUCTION

The implementation phase of the Farm Produce Marketing Website represents the culmination of the design and planning efforts, transforming conceptual architectures into a functional, user-centric platform. This system aims to bridge the gap between farmers and consumers by providing an efficient online marketplace for agricultural produce, enabling seamless listing, browsing, purchasing, and management of farm products. In an era where digital transformation is pivotal for agricultural sustainability, this website addresses key challenges such as market access for small-scale farmers, supply chain inefficiencies, and consumer demand for fresh, traceable produce.

This section details the practical realization of the system, encompassing the frontend and backend development, database integration, security measures, and deployment strategies. It was built using a modern tech stack including React.js for the interactive user interface, Node.js with Express for the robust backend, and PostgreSQL for data persistence ,the implementation ensures scalability, responsiveness, and security. Key features such as user authentication, product cataloging, real-time order tracking, and payment gateways have been developed to create a reliable ecosystem that supports multiple user roles (farmers, buyers, and administrators).

4.2 Cohesion and Decomposition High-Level Model

Description: This is a cohesion and Decomposition High level Model

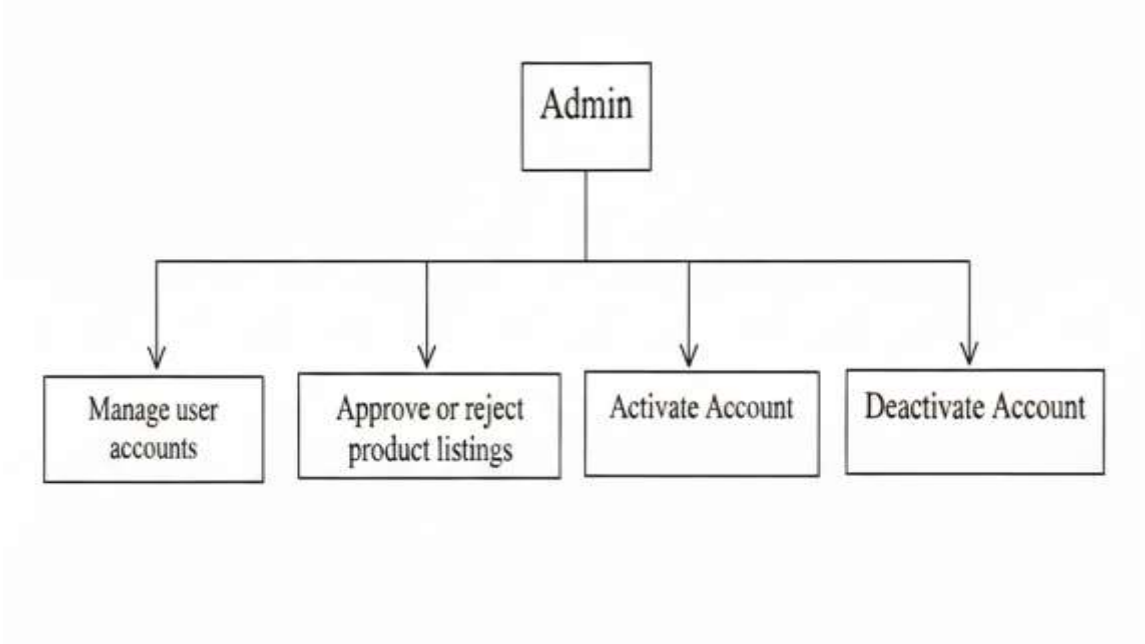

Figure 4.1: Admin User Privileges

Figure 4.1 details the specific privileges and functions reserved for the Admin role within the proposed system. It shows the decomposition of the Admin's overall responsibilities into distinct, manageable tasks.

The Admin is responsible for:

1. Manage user accounts:

Function: This core administrative function involves the lifecycle management of all user accounts (both clients/buyers and sellers) on the platform.

Implied Tasks: Creating, editing, viewing, and potentially suspending user profiles, handling password resets, and managing user roles and permissions.

2. Approve or reject product listings:

Function: This acts as a quality control and compliance mechanism for the content posted by sellers.

Implied Tasks: Reviewing submissions for farm produce to ensure they adhere to platform rules, have accurate pricing/descriptions, and are correctly categorized before they go live on the site.

3. Activate Account:

Function: This is a crucial step in the user registration or account recovery process.

Implied Tasks: Manually or semi-automatically enabling a user's account after registration, verification, or resolution of an issue, making the account fully operational.

Deactivate Account:

4. Function: The inverse of activation, this is used to suspend or permanently close an account.

Implied Tasks: Removing access for users who violate terms and conditions, requested account closure, or are involved in suspicious activity

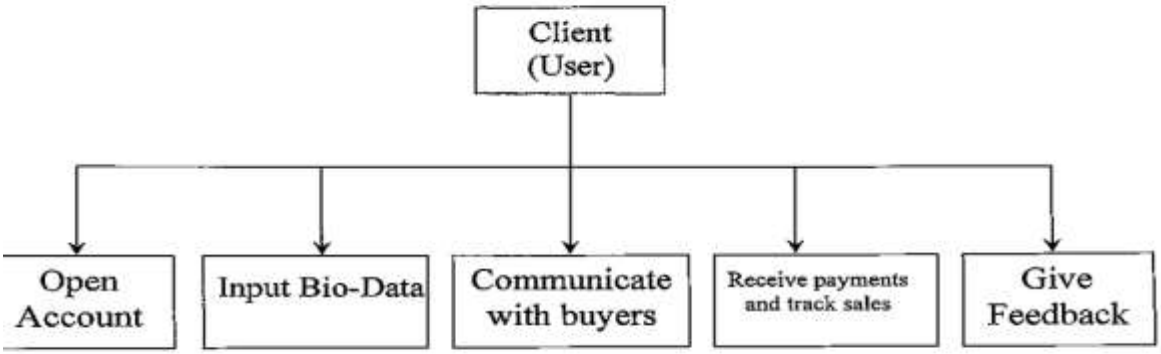

Figure 4.2: Client (User) Privileges

4.3 System Specification and Design

4.3.1 Input and Output Specification

Description: The snapshots below entails the Input and Output Specification of the proposed system.

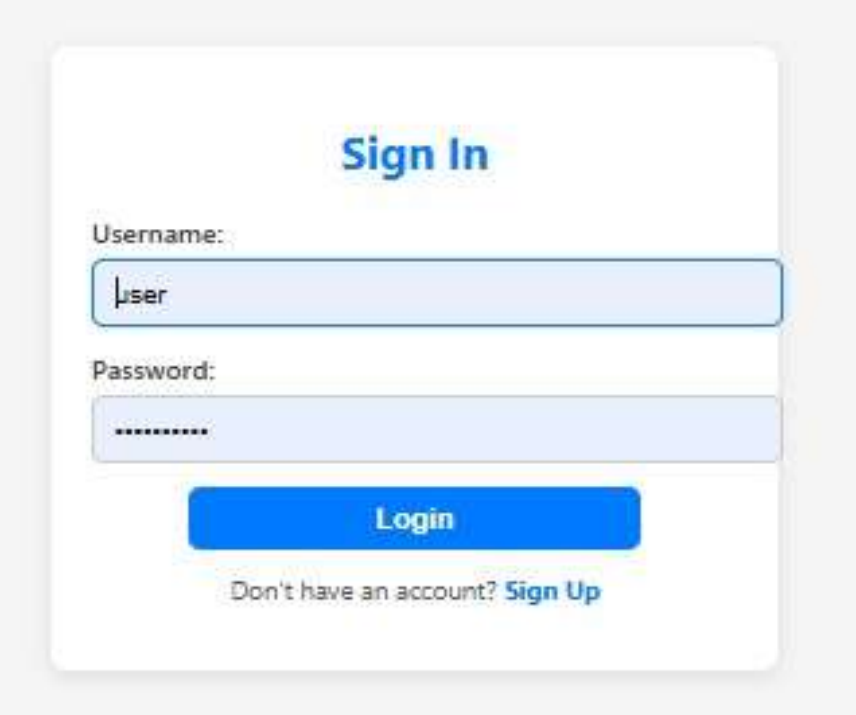

Figure 4.3: Input Specification for Login System

Figure 4.3 shows a sign in interface with the following input elements:

i. Username field: Where users enter their unique identification name.

ii. Password field: Where the user enters their secret authentication code.

iii. Login button:To submit the entered data for validation

iv. Sign up link: To redirect new users to create an account

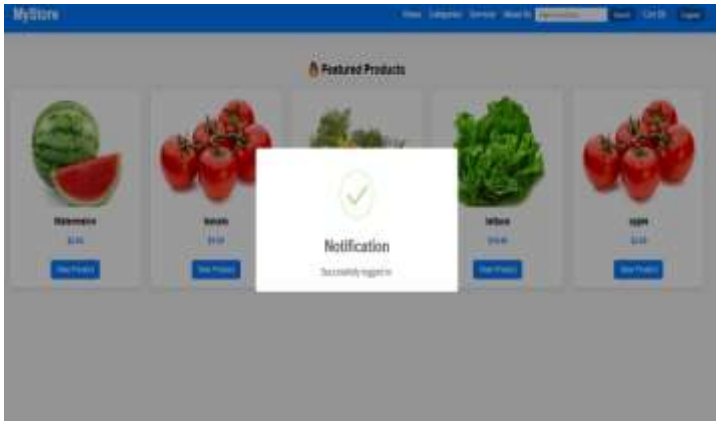

Figure 4.4: Output Specification for login system

Figure 4.4 shows the output specification for login system after a successful login operation. The system displays a notification message: “successfully logged in”. This message confirms that the user’s credentials have been verified and that access to the system has been granted

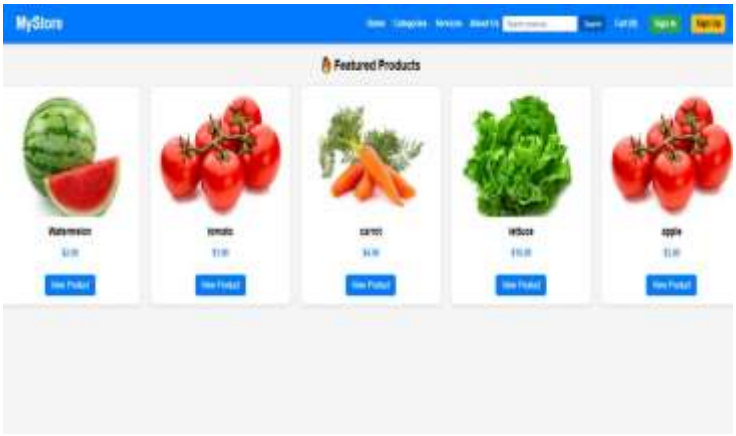

Fig 4.5: screenshot of the running system

Fig 4.5 is the home or product catalog page of the running website, helping farmers showcase their produce and allowing customers to browse, select and buy farm produce online.

.4.2 Database Specification and Design

The Online Platform for Farm Produce Marketing database contains two (2) tables which are country table and register table:

Table 4.1: Country table structure

S/N	Field Name	Data type	Size
1.	id	Integer	30
2.	Country	Varchar	100
3.	Location	Varchar	100

1. id (Integer, Size 30): This serves as a unique identifier for each country entry, probably the primary key. The "size" of 30 is unusual for an integer data type (which typically doesn't specify length in the same way as strings), but it might refer to a display width, maximum digit count, or a custom constraint in the database management system being used.

2. Country (Varchar, Size 100): A variable-length character field to store the country name (e.g., "United States" or "India"). The 100-character limit provides ample space for full names, including those with diacritics or longer official titles, reducing the risk of truncation.

3. Location (Varchar, Size 100): This field likely holds additional positional or categorical information, such as a continent, region, or even coordinates. The matching size to the "Country" field suggests consistency in design, but it could be vague without further context

Table 4.2: Register table structure

S/N	Field Name	Data type	Size
1.	id	Integer	30
2.	Fname	Varchar	100
3.	Gender	Varchar	10
4.	address	Varchar	1000
5.	photo	Varchar	255
6.	pn	Varchar	30
7.	pass	Varchar	100
8.	datereg	timestamp	

1. id (Integer, Size 30): Like the Country table, this is likely the primary key for unique user identification. The large size allowance ensures scalability for high-volume user bases.

2. Fname (Varchar, Size 100): Stores the user's first name (or full name, based on the abbreviation). The 100-character limit handles most names comfortably, including those with multiple parts or special characters.

3. Gender (Varchar, Size 10): A short text field for gender information (e.g., "Male", "Female", "Non-binary"). The small size is efficient, but in modern designs, this could be an enum or integer reference to a lookup table for better normalization and inclusivity.

4. address (Varchar, Size 1000): Holds the user's address, with a generous length to accommodate detailed entries like full street addresses, cities, and postal codes. This is useful for international users but could benefit from splitting into separate fields (e.g., street, city, country) for easier querying and validation.

5. photo (Varchar, Size 255): Probably stores a file path or URL to a user's profile photo. The 255-character limit is standard for URLs or paths, assuming external storage rather than embedding binary data (which would use a BLOB type instead).

6. pn (Varchar, Size 30): This seems to abbreviate "phone number," storing contact details like mobile or landline numbers. The size allows for international formats, including country codes and extensions, but validation (e.g., via regex) would be needed to ensure data quality.

7. pass (Varchar, Size 100): Intended for passwords but storing them as plain text varchar is a significant security flaw—exposing users to risks if the database is breached. Best practices recommend hashing (e.g., with bcrypt) and using a longer field for salted hashes or even outsourcing auth to secure services.

8. datereg (Timestamp, No Size Specified): Records the registration date and time automatically. Timestamps are ideal for this, as they handle time zones and sorting efficiently. The lack of a size might imply default behavior in the DBMS

4.4.3 Data Dictionary

The data dictionary table contains the list of field and their description used in the database table structure designation.

Table 4.5: Proposed System Data Dictionary

S/N	Field Name	Description
1.	Id	This field signifies the unique identification of the table and it's a primary key.
2.	Bank	It consist of the list of banks in Nigeria
3.	Pn	It contains the phone number of the End-user
4.	Country	It consist of the list of countries
5.	Location	It consist of the list of states within a specific country
6.	Fname	It signifies the full name of the End-user
7.	Gender	It signifies the gender of the End-user
8.	Address	It signifies the address of the End-user
9.	Pass	It contains the end-user's password / pin
10.	Datereg	Date of registration

1. Id: Serves as the unique primary key that identifies each record. It is usually auto-incremented to maintain database integrity and ensure that every entry is distinct.

2. Bank: Represents the selected Nigerian bank. It is stored as a string or enumeration, though it is advisable to link it to a separate “Banks” table through a foreign key to avoid redundancy and enhance normalization.

3. Pn (Phone Number): Stores the user’s phone number. It should be properly validated to ensure compliance with the Nigerian numbering format and could be renamed for clarity.

4. Country: Captures the user’s country information, often stored as a string or ISO code. Ideally, it should reference a “Countries” table for dynamic management, with Nigeria as the default option.

5. Location: Indicates the user’s geographical area or state, typically tied to the selected country. It should be validated at the client side to maintain data consistency.

6. Fname (Full Name): Records the user’s full name. For better organization and search efficiency, it can be split into first name and last name fields, which also supports cultural naming differences.

7. Gender: Specifies the user’s gender, often stored as an enumerated value. To promote inclusivity, options like “Other” or “Prefer not to say” can be added.

8. Address: A free-text field that captures the user’s full residential address. To improve data accuracy and ease of analysis, it is recommended to divide this field into smaller components such as street, city, and postal code.

9. Pass (Password/PIN): Stores sensitive login credentials. For security reasons, passwords should never be stored in plain text but encrypted or hashed using a secure algorithm such as bcrypt.

10. Datereg (Date of Registration): Records the date and time the user registered. It should auto-populate upon record creation and can be useful for auditing and tracking user activity.

4.5 Choice and Justification of Programming Language

For the proposed system implementation, using a stack that includes HTML, CSS, JavaScript, MySQL, and PHP is a robust and pragmatic choice. Each component in this stack serves a specific purpose and collectively ensures a well-rounded, efficient, and scalable web application. Here's the justification for choosing each technology:

HTML (HyperText Markup Language)

HTML is the standard markup language for creating web pages. It provides the basic structure of the website, which is essential for any web application. HTML allows for the inclusion of multimedia, links, and other content types that form the foundation of web pages (Freeman & Robson, 2009). For the proposed system, HTML is used to structure the user interface elements such as forms for room allocation, fee payment, and maintenance requests.

CSS (Cascading Style Sheets)

CSS is used for styling the HTML elements on the web page. It controls the layout, colors, fonts, and overall visual presentation, ensuring that the web application is aesthetically pleasing and user-friendly (Cederholm, 2011). In the context of proposed system, CSS helps in creating a visually appealing interface that enhances the user experience for both students and administrators.

JavaScript

JavaScript is a powerful scripting language that enables interactive and dynamic content on web pages. It is essential for creating responsive user interfaces, handling client-side validation, and enhancing the overall user experience (Flanagan, 2011). For proposed system, JavaScript can be used to validate forms, provide instant feedback, and dynamically update the content without requiring a full page reload, thus improving the efficiency and responsiveness of the system.

MySQL

MySQL is a widely-used open-source relational database management system. It is known for its reliability, robustness, and ease of use (DuBois, 2013). MySQL is ideal for storing and managing the vast amounts of data required by proposed system, such as student records, room assignments, fee transactions, and maintenance logs. Its support for SQL (Structured Query Language) allows for efficient querying and data manipulation, which is crucial for generating reports and analytics.

PHP (Hypertext Preprocessor)

PHP is a server-side scripting language designed for web development. It is highly compatible with MySQL and provides a powerful tool for creating dynamic web pages (Tatroe, MacIntyre, & Lerdorf, 2013). PHP is known for its ease of integration with HTML, CSS, and JavaScript, making it a seamless choice for developing the back-end logic of proposed system. It handles tasks such as data processing, session management, and interaction with the database, enabling a smooth and functional web application.

Integration and Compatibility

The combination of HTML, CSS, JavaScript, MySQL, and PHP is often referred to as the LAMP stack (Linux, Apache, MySQL, PHP). This stack is well-known for its integration capabilities

and overall compatibility. Each technology in the stack is designed to work together seamlessly, providing a coherent and efficient environment for web development (Sams, 2012). For proposed system, this means that the front-end and back-end components can communicate effectively, ensuring smooth data flow and user interactions.

Cost-Effectiveness and Community Support

All the technologies in this stack are open-source, which makes them cost-effective choices for educational institutions that may have limited budgets. Additionally, each technology has a large and active community, offering extensive documentation, tutorials, and support. This community support is invaluable for troubleshooting, learning, and keeping the system up-to-date with the latest best practices and security measures (Welling & Thomson, 2008).

Conclusively, choosing HTML, CSS, JavaScript, MySQL, and PHP for the proposed system is justified by their ability to provide a comprehensive, scalable, and efficient web application. These technologies offer a well-integrated solution that covers all aspects of web development, from front-end design to back-end data management, ensuring a robust and user-friendly proposed system.

4.6 Program Documentation

The main purpose of program documentation is to describe the design of your program. The documentation also provides the framework in which to place the code. As coding progresses, the code is inserted into the framework already created by the program documentation. The following was documented for the successful implementation of the software;

a) README file which contains a brief description of the project, installation instructions, a short example/tutorial,

b) Document your code which comprises application of coding conventions, such as file organization, comments, naming conventions, programming practices, etc.

c) Version of the files along with the major edits you did in each version

4.7 Implementation Techniques

The software Implementation is a process carried out to make changes on the tested programs developed in the system. The software will be installed successfully if the hardware requirement and the software requirement are available. The following phase contains how the software was implemented successfully;

1) Coding: The coding system has been developed to meet the following main objectives;

i. Create an online platform that links farmers directly with consumers and other buyers to reduce dependence on intermediaries.

ii. Develop a secure payment system and integrated logistics module to facilitate efficient and reliable transactions.

iii. Design a user-friendly and mobile-compatible interface that ensures accessibility for smallholder farmers.

iv. Implement features for real-time product listings, market price information, and customer feedback to enhance transparency and informed decision-making.

v. Establish training and support programs within the platform to improve digital literacy and encourage adoption among farmers.

2) File conversion: During file setup it is necessary to convert the existing master file to a new page. This new form is the responsibility of the newly designed, which undergoes the process of converting the old system master file to a new one.

System Conversion is a transformation process stage in system implementation at which the newly designed system is put in place of the old system by the organization after been tested and documented to prove that it is working. It is a significant milestone after which the ownership of the system if been officially transferred from the researcher (analyst) and the programmer to the end user. The under listed are various system conversion briefly described to enable the implementation process.

a) Parallel System of Conversion: This takes place simultaneously at the same time, runs between the old and new system until probably the new system is completely put in place and the old system discarded.
b) Direct System of Conversion: This takes place automatically at a time over a short period of time. It saves cost, manages time and enhances fast operation but finds to a high risk of failure without new system comparability.

3) Changeover Procedure:

This is the process of changing from the former or previous system to the new system. In a changeover procedure, the organization change from the existing system to new system. This can be done in one of the following ways:

a) Parallel Changeover: This is the process of running the two systems simultaneously and comparing their results until the new system proves satisfactory; after which the use of the new system would be commenced.
b) Direct Changeover: This is the case whereby the new system replaced the old system immediately after development and when it must have proved successful. This procedure may be drastic if the new system fails.

c) Phased Changeover: In phased changeover method, the system usually starts with one unit or department of the organization. The advantage is that the organization would avoid losses in case it (the new system) fails.

4) Commissioning: This is the process of ensuring that installed systems are functionally tested and capable of being operated and conform to the design intention.

4.7.1 System Testing

The system was tested with a computer system in my laboratory and it was tested by registering male and female to run the durability of the software and my database was queried to search a specified detail with the aid of an assigned ID number, it was working perfectly well to the specification of the designer.

4.8 Programming Module Specification

Programming module specification follows successful implementation and incorporates also evaluation of the system in order to give the desired or necessary improvement. It includes monitoring the process of the other stages of system development to ensure that the development plan and objective are being accomplished. There are three types of system maintenance which include;

a) Corrective Maintenance: This covers maintenance, which is needed to put right coding errors and other faults, which may be introduced into the software. It include, the routine “debugging” of newly produced or recently amended code and emergency error correction in response to report faults.

b) Adaptive Maintenance: This covers the changes which are made to the software to meet new or changed circumstances, such as restructuring of a database, alternatives in operating procedures and changes to hardware or software versions.

c) Preventive Maintenance: This covers attempts to make the software perform more effectively. It includes user requests for enhancement, improvement due to experience, changes to make the software more easy to use and rewrite the code to make the maintenance that is specifically used for the new system to reduce its chances of breakages.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

The study on the development of an online platform for farm produce marketing revealed several key insights. The demographic analysis showed that most respondents were working-age adults with secondary or tertiary education, indicating that they have the literacy and capability to engage with digital platforms. Gender distribution showed a higher proportion of male respondents, while occupational data indicated that farmers formed the majority, followed by traders and other stakeholders.

The findings highlighted persistent challenges in farm produce marketing in Nigeria. Poor access to market information and high dependence on middlemen were the most significant issues, followed by poor transportation, post-harvest losses, and price volatility. Limited access to finance and inadequate storage facilities were also noted, confirming that the traditional marketing system is inefficient and often disadvantageous to farmers.

In terms of platform design, respondents emphasized the need for real-time product listing, secure online payment systems, integrated logistics support, and access to market price information. Additional features such as mobile-friendly interfaces, customer feedback systems, and training support were identified as essential for usability and adoption. These findings suggest that farmers are likely to adopt the platform if it is user-friendly, provides tangible benefits, and integrates solutions to logistical and informational challenges.

The extent of the platform's impact on post-harvest losses and income was also assessed. Most respondents believed that the platform would significantly reduce post-harvest losses and improve farmers' income, while also enhancing fair pricing and transparency through direct

transactions, real-time market updates, and transparent payment systems. The usability and accessibility of the platform for smallholder farmers were perceived to be moderate to high, especially when features such as mobile compatibility and training were incorporated.

Overall, the findings indicate that an online platform for farm produce marketing has the potential to transform agricultural marketing in Nigeria by improving market access, increasing efficiency, reducing wastage, enhancing profitability, and promoting transparency. On the other hand, challenges such as digital literacy, infrastructural limitations, and socio-economic barriers remain critical factors to address for successful adoption and sustainable use of the platform.

5.2. Conclusion

The study on the development of an online platform for farm produce marketing has demonstrated that digital technologies offer significant opportunities for enhancing agricultural marketing in Nigeria. Based on the aim and objectives of the study, it is evident that the platform has the potential to address the inefficiencies and challenges of traditional marketing systems, including poor access to market information, overreliance on middlemen, post-harvest losses, and price volatility. By providing features such as real-time product listings, secure payment systems, logistics integration, and access to market pricing, the platform is poised to improve market transparency, ensure fair pricing, and strengthen the linkage between farmers, consumers, and other buyers.

The findings also reveal that the platform is capable of improving farmers' income by reducing wastage, facilitating timely sales, and expanding market reach. Furthermore, with user-friendly interfaces, mobile accessibility, and adequate training support, smallholder farmers can actively engage with the platform, thereby enhancing usability and adoption. On the other hand, challenges such as limited digital literacy, infrastructural deficits, and socio-economic constraints must be addressed to ensure sustainable use and effectiveness.

In conclusion, the study affirms that the development of an online platform for farm produce marketing is a viable solution for improving efficiency, transparency, and profitability in the agricultural sector. The platform not only meets the objectives of linking farmers directly with consumers and buyers but also contributes to broader goals of agricultural development, digital inclusion, and rural economic empowerment in Nigeria.

5.4 Recommendation

Based on the findings, the following recommendations are hereby suggested that:

1. Online platform for farm produce marketing should be developed with features that provide real-time product listings, secure payment systems, and integrated logistics support to ensure efficient and transparent transactions between farmers, consumers, and other buyers.
2. The platform should also be designed to be mobile-friendly and user-friendly to accommodate smallholder farmers with limited technical experience.
3. Training and support programs should be provided to farmers to enhance digital literacy and ensure effective use of the platform.
4. Policymakers and agricultural stakeholders should collaborate to address infrastructural challenges such as internet connectivity, storage facilities, and transportation networks, which will facilitate the smooth operation and adoption of the platform.
5. The platform should incorporate mechanisms for fair pricing, such as access to current market information, transparent invoicing, and customer feedback systems, to reduce exploitation by intermediaries and promote trust among users.
6. Financial institutions should consider providing microfinance support or incentives to enable farmers to access and utilize the platform effectively.
7. Furthermore, continuous monitoring and evaluation of the platform should be conducted to assess its impact on reducing post-harvest losses, improving farmers' income, and enhancing market efficiency. This feedback should guide improvements and ensure the platform remains relevant to the evolving needs of farmers and consumers.

REFERENCES

Adegboye, M. A. (2019). ICT and Agricultural Development in Nigeria. Journal of Agricultural Economics and Development, 8(2), 45-53.

Adeniyi, A. A., & Adeyemo, O. J. (2019). Challenges and prospects of e-marketing in the Nigerian agricultural sector. Journal of Agricultural Economics and Development, 8(2), 45–53.

Aker, J. C. (2010). Information from Markets Near and Far: Mobile Phones and Agricultural Markets in Niger. American Economic Journal: Applied Economics, 2(3), 46–59.

Aulakh, J., & Goel, S. (2020). Digital Platforms and Agricultural Marketing: Emerging Opportunities for Smallholder Farmers. International Journal of E-Business Research, 16(1), 1–13.

Bolarinwa, K. K., & Oyeyinka, R. A. (2011). Use of Cell Phone by Farmers and its Implication for Rural Development in Nigeria. Journal of Rural Development, 30(2), 239–250.

Chikweche, T., & Fletcher, R. (2012). Undertaking research at the bottom of the pyramid using qualitative methods: From theoretical considerations to practical realities. Qualitative Market Research: An International Journal, 15(3), 242–267.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340.

Ezeh, C. I., & Uzochukwu, O. C. (2021). Digital transformation and food distribution challenges in Nigeria. African Journal of Sustainable Development, 14(1), 67–79.

Fafchamps, M., & Minten, B. (2012). Impact of SMS-based agricultural information on Indian farmers. World Bank Economic Review, 26(3), 383–414.

Goyal, A. (2010). Information, direct access to farmers, and rural market performance in central India. American Economic Journal: Applied Economics, 2(3), 22–45.

Kaplinsky, R., & Morris, M. (2001). A Handbook for Value Chain Research. IDRC.

Kotler, P., & Keller, K. L. (2016). Marketing Management (15th ed.). Pearson Education.

Laudon, K. C., & Traver, C. G. (2020). E-commerce 2020: Business, Technology, and Society. Pearson.

National Bureau of Statistics (NBS). (2022). Labour Force Statistics: Employment and Unemployment Report. Abuja: NBS.

Nwankwo, F. O., & Adebayo, A. M. (2022). ICT innovations in Nigerian agriculture: Opportunities for smallholder farmers. International Journal of Information Technology and Agriculture, 6(3), 112–124.

Ogunleye, A. S., & Oladejo, T. A. (2020). Agricultural marketing and rural development in Nigeria. Journal of Rural Economics and Development, 9(1), 22–36.

Olaniyi, O. A. (2021). ICT and agricultural transformation in Sub-Saharan Africa. African Journal of Science, Technology, Innovation and Development, 13(6), 151–160.

Olukosi, J. O., & Isitor, S. U. (2018). Introduction to Agricultural Marketing and Prices: Principles and Applications. Zaria: Living Books Series.

Owuor, J., Mbeche, R., & Omondi, D. (2016). ICT and Agricultural Marketing: A Case Study of Kenya. Journal of Agricultural Informatics, 7(2), 23–34.

Rogers, E. M. (2003). Diffusion of Innovations (5th ed.). New York: Free Press.

Trist, E. L., & Bamforth, K. W. (1951). Some social and psychological consequences of the longwall method of coal-getting. Human Relations, 4(1), 3–38.

APPENDIX

"SOURCE CODE"

```
from django.shortcuts import render, get_object_or_404, redirect
from django.contrib import messages
from django.contrib.auth import login
from django.contrib.auth.decorators import login_required
from django.contrib.auth.views import LoginView
from .models import Product
from .form import CustomUserCreationForm
import random, string


# ---------- PRODUCT VIEWS ----------
def product_list(request):
products = Product.objects.all()
return render(request, "store/product_list.html", {"products": products})


def product_detail(request, product_id):
product = get_object_or_404(Product, id=product_id)
return render(request, "store/product_detail.html", {"product": product})


# ---------- CART MANAGEMENT ----------
def cart_add(request, product_id):
cart = request.session.get("cart", {})
cart[str(product_id)] = cart.get(str(product_id), 0) + 1
request.session["cart"] = cart
messages.success(request, "☑ Product added to cart successfully.")
return redirect("cart_detail")


def cart_remove(request, product_id):
cart = request.session.get("cart", {})
if str(product_id) in cart:
del cart[str(product_id)]
request.session["cart"] = cart
messages.info(request, "ℹ Item removed from cart.")
return redirect("cart_detail")


def cart_detail(request):
cart = request.session.get("cart", {})
products = []
total = 0
```

```
for product_id, quantity in cart.items():
product = get_object_or_404(Product, id=product_id)
subtotal = float(product.price) * quantity
products.append({
"product": product,
"quantity": quantity,
"subtotal": subtotal,
})
total += subtotal

return render(request, "store/cart_detail.html", {
"cart_items": products,
"total": total,
})

def cart_update(request, product_id, action):
cart = request.session.get("cart", {})
if str(product_id) in cart:
if action == "increase":
cart[str(product_id)] += 1
elif action == "decrease":
cart[str(product_id)] -= 1
if cart[str(product_id)] <= 0:
del cart[str(product_id)]
request.session["cart"] = cart
return redirect("cart_detail")


# ---------- CHECKOUT & PAYMENT ----------
@login_required(login_url="/login/")
def checkout(request):
"""Collect shipping information and show order summary."""
cart = request.session.get("cart", {})
if not cart:
messages.warning(request, "⚠ Your cart is empty.")
return redirect("cart_detail")

products = []
total = 0
for product_id, quantity in cart.items():
product = get_object_or_404(Product, id=product_id)
subtotal = float(product.price) * quantity
products.append({
"product": product,
"quantity": quantity,
```

```
                "subtotal": subtotal,
                })
            total += subtotal

        if request.method == "POST":
            name = request.POST.get("name")
            address = request.POST.get("address")
            phone = request.POST.get("phone")

            request.session["shipping_info"] = {
                "name": name,
                "address": address,
                "phone": phone,
                "total": float(total),
                }
            return redirect("payment")

    context = {"cart_items": products, "total": total}
    return render(request, "store/checkout.html", context)

@login_required(login_url="/login/")
def payment(request):
    """Simulate payment selection and confirmation."""
    shipping_info = request.session.get("shipping_info")
    if not shipping_info:
        return redirect("checkout")

    if request.method == "POST":
        selected_payment = request.POST.get("payment_method")
        request.session["payment_method"] = selected_payment.lower()

        if selected_payment.lower() == "crypto":
            return redirect("crypto_payment")
        elif selected_payment.lower() == "card payment":
            return redirect("card_payment")
        elif selected_payment.lower() == "opay":
            return redirect("opay_payment")

        return redirect("order_success")

    return render(request, "store/payment.html", {"shipping_info": shipping_info})


@login_required(login_url="/login/")
def card_payment(request):
    """Dummy Card Payment Page."""
```

```
    shipping_info = request.session.get("shipping_info", {})
    total = shipping_info.get("total", 0)

    if request.method == "POST":
        request.session["payment_method"] = "Card Payment"
        messages.success(request, "💳 Card payment confirmed successfully!")
        return redirect("order_success")

    return render(request, "store/card_payment.html", {"total": total})

@login_required(login_url="/login/")
def opay_payment(request):
    """Dummy Opay Payment Page."""
    shipping_info = request.session.get("shipping_info", {})
    total = shipping_info.get("total", 0)

    if request.method == "POST":
        request.session["payment_method"] = "Opay"
        messages.success(request, "☑ Opay payment confirmed successfully!")
        return redirect("order_success")

    return render(request, "store/opay_payment.html", {"total": total})

@login_required(login_url="/login/")
def crypto_payment(request):
    """Generate a dummy crypto wallet address and display total."""
    shipping_info = request.session.get("shipping_info")

    if not shipping_info:
        return redirect("checkout")

    random_part = ''.join(random.choices(string.ascii_letters + string.digits, k=30))
    crypto_address = f"bc1q{random_part}"
    total = shipping_info.get("total", 0)

    if request.method == "POST":
        request.session["payment_method"] = "Crypto"
        messages.success(request, "💰 Crypto payment confirmed successfully!")
        return redirect("order_success")

    context = {"crypto_address": crypto_address, "total": total}
    return render(request, "store/crypto_payment.html", context)

@login_required(login_url="/login/")
def order_success(request):
    """Show order success page with random receipt number."""
```

```
shipping_info = request.session.get("shipping_info")
payment_method = request.session.get("payment_method", "Not selected")

if not shipping_info:
return redirect("product_list")

receipt_id = ''.join(random.choices(string.ascii_uppercase + string.digits, k=10))

# Clear session data
request.session["cart"] = {}
request.session.pop("shipping_info", None)
request.session.pop("payment_method", None)

context = {
"receipt_id": receipt_id,
"shipping_info": shipping_info,
"payment_method": payment_method,
}
return render(request, "store/order_success.html", context)

# ---------- USER SIGNUP ----------
def signup(request):
if request.method == "POST":
form = CustomUserCreationForm(request.POST)
if form.is_valid():
user = form.save()
login(request, user)
messages.success(request, f"🎉 Account created successfully! Welcome,
{user.username}!")
return redirect("product_list")
else:
form = CustomUserCreationForm()
return render(request, "store/signup.html", {"form": form})

# ---------- CUSTOM LOGIN VIEW ----------
class MyLoginView(LoginView):
template_name = "store/login.html"

def form_valid(self, form):
response = super().form_valid(form)
messages.success(self.request, "Successfully logged in.")
return response

def get_success_url(self):
"""Redirect to homepage after successful login."""
return "/"
```