



Leveraging Mobile Technology to Optimize Market Information Dissemination and Improve Productivity Among Poultry Farmers

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Abstract— *The increasing demand for effective communication tools in agriculture has made mobile technology crucial in enhancing poultry farmers' access to vital information and improving overall productivity. This study aimed to explore the use of mobile technology in optimizing information dissemination and increasing productivity among poultry farmers in Kwara State, Nigeria. Specifically, the study aimed to: (i) identify the mobile platforms and tools used by poultry farmers for information dissemination, (ii) assess their benefits on poultry farm productivity, (iii) examine the socioeconomic, production, institutional, and technological factors influencing mobile technology use in poultry farming, and (iv) identify the challenges faced by farmers in utilizing mobile technologies effectively. A survey design was employed, with a simple random sampling technique, and 130 poultry farmers participated. Data were analyzed using the Statistical Package for Social Sciences (SPSS). Results indicated that mobile phone technology is widely used in Kwara State and shows significant potential for economic impact. WhatsApp (92%) was the most commonly used platform for sharing poultry-related information. Most farmers viewed mobile phones as convenient, fast, and effective tools for communication. The analysis revealed that mobile technology improved management practices, disease control, and market access. Furthermore, factors such as age, education, and the high device cost significantly influenced mobile technology use in poultry farming at a level ≤ 0.05 . The study concludes with recommendations for the design of mobile solutions aligned with the specific needs of poultry farmers to support the sustainable development of the poultry farming.*

Keywords— Mobile technology, information dissemination, poultry farmers, poultry farming

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I. INTRODUCTION

Poultry farming is a critical component of agricultural economies across the globe, particularly in developing countries where it serves as a major source of income, food security, and employment for millions of small-scale farmers [1]. In poultry farming, as in many other agricultural sectors, information has become a critical input for success [2]. Despite its importance, many poultry farmers continue to face challenges related to access to appropriate, accurate, and practical information on best practices, disease management, feed efficiency, and market trends. These challenges are often exacerbated by obstructing the use of modern poultry farming techniques, reduce productivity, and ultimately stalling rural development.

Historically, poultry farmers in Nigeria have depended on conventional methods such as face-to-face interactions, workshops, and print media to get information [3]. These traditional approaches have proven inadequate due to factors such as limited resources, geographic isolation, and poor infrastructure, which hinder timely access to vital knowledge on disease control, feed management, and the market [4]. In the modern poultry industry, access to timely and accurate information is as crucial as other key inputs such as feed, vaccines, and infrastructure [5]. Farmers rely heavily on up-to-date knowledge to make informed decisions regarding poultry health, feeding practices, market access, and disease management. In this context, the rise of mobile technology brings an opportunity to bridge these gaps by providing poultry farmers with real-time information, virtual training, and market linkages, especially in remote and underserved areas [6].

Mobile phones as part of Information and Communication Technologies (ICTs) have emerged as vital tools in enhancing the flow of poultry-related information, especially among small-scale farmers in developing countries [7]. Mobile phones offer a convenient, fast, and cost-effective means of communication that enables poultry farmers to access essential information, connect with veterinary experts, coordinate with suppliers, and reach out to potential buyers [8]. These devices facilitate real-time interaction within poultry value chains, improving farm productivity and profitability. Moreover, mobile technology empowers farmers to overcome geographical and infrastructural barriers, allowing them to engage in broader agricultural networks and markets [9]. The use of mobile phones in poultry farming has also been linked to increased efficiency in decision-making, reduced losses from diseases, and better access to market prices and input suppliers [10]. As a result, mobile phones are playing a growing role in transforming traditional poultry practices into more knowledge-driven enterprises.

Leveraging mobile technology in poultry farming systems can significantly optimize information dissemination and improve productivity by integrating IoT and smart devices. These technologies enable real-time monitoring, automation, and data-driven decision-making, which are crucial for enhancing operational efficiency and animal welfare. The use of mobile apps and dashboards allows farmers to remotely oversee farm operations, ensuring timely interventions and efficient resource management. This approach not only reduces labor costs but also enhances the overall productivity and sustainability of poultry farming systems. This paper investigates the mobile technology to optimize information dissemination and improve productivity in poultry farming systems. It specifically seeks to identify the mobile platforms and tools utilized for poultry information dissemination, assess the impact of mobile-based information access on productivity and profitability in poultry farming and identify the challenges faced by poultry farmers in utilizing mobile communication technologies effectively.

A. Hypothesis of the Study

H0₁: There is no significant relationship between socioeconomic characteristics and the use of mobile technology among poultry farmers

II. LITERATURE REVIEW

Mobile technology has become a transformative tool in modern agriculture, particularly in enhancing productivity and disseminating timely information. In poultry farming where operations are sensitive to disease outbreaks, feed efficiency, and market access mobile solutions offer a low-cost, scalable intervention for improving livelihoods, especially in developing countries. Numerous studies have underscored the utility of ICTs, particularly mobile phones, in disseminating agricultural information. According to [11], mobile phones reduce information asymmetry, improve decision-making, and lower transaction costs for farmers. The application of mobile technology in agriculture has traditionally focused on crops, but recent shifts indicate growing interest in the livestock sector, including poultry farming. Mobile apps systems have been utilized to report and track poultry diseases. A study by [12] developed a mobile-based early warning system that enables real-time reporting of avian

influenza outbreaks, helping farmers take preventive actions promptly.

Mobile advisory services offer real-time access to veterinary guidance, feeding schedules, and vaccination reminders. In Kenya, platforms like iCow and USSD Poultry Guide have significantly improved farmers' access to expert advice. According to [13], poultry farmers using mobile extension services had a 25% higher productivity than those relying on traditional methods. Mobile applications enable poultry farmers to access real-time market prices, connect with buyers, and optimize logistics [14]. The FarmCrowdy platform in Nigeria helps poultry farmers source quality inputs and access premium markets, reducing exploitation by middlemen [15]. Recent innovations include AI-powered chatbots and IoT integration for real-time monitoring of poultry environments (temperature, feed levels). Pilots in India and Rwanda show that combining mobile apps with smart sensors leads to better mortality management and feed conversion ratios [16].

[17] discussed how mobile technology, through remote monitoring and control via apps or dashboards, empowers poultry farmers to oversee farm operations from anywhere. This capability enhances information dissemination, allowing for real-time monitoring of environmental conditions and livestock health. By integrating mobile technology with IoT systems, farmers can make informed decisions quickly, optimize feeding processes, and ensure clean water access, ultimately improving productivity and operational efficiency in poultry farming systems. The integration of IoT technologies in poultry farming enhances operational efficiency by enabling real-time monitoring of environmental conditions such as temperature, humidity, and air quality, which are crucial for maintaining optimal living conditions for the poultry. This leads to improved health and productivity of the livestock.

[18] highlighted the use of smartphone technology within an IoT-based smart poultry management system to enhance productivity. By enabling real-time environmental monitoring and control of parameters such as feeding, water supply, and climate regulation, the system optimizes information dissemination. This approach reduces reliance on manual labor, addresses labor challenges, and introduces semi-automation, ultimately improving efficiency and productivity in poultry farming. The integration of mobile technology plays a crucial role in facilitating these advancements.

[19] discusses the integration of IoT technology in poultry farming, which includes leveraging mobile technology for real-time monitoring and data-driven decision-making. By utilizing IoT-enabled devices, farmers can optimize information dissemination, enhancing operational efficiency and improving productivity. These innovations facilitate better management of resources and animal welfare, ultimately leading to increased productivity in poultry farming systems. The focus on automation and monitoring through mobile technology represents a significant advancement in the industry. The paper highlights the integration of IoT technology in poultry farming, which has led to significant advancements in automation, allowing for more efficient management of farming operations and reducing manual labor requirements. It discusses the benefits of real-time monitoring enabled by IoT devices, which enhances animal welfare by

providing data-driven insights that help in making informed decisions to improve the health and productivity of poultry.

The integration of mobile applications into poultry farming practices has gained significant momentum globally, especially as small- and medium-scale farmers seek innovative solutions to enhance productivity, market access, and overall farm management. Mobile applications (apps) are increasingly recognized as critical tools in modern agriculture, offering a wide range of services from record-keeping and disease management to marketing and extension services. Several studies have highlighted the role of mobile apps in improving farm management efficiency. According to [20], mobile-based agricultural solutions assist farmers in planning, monitoring, and evaluating production activities, thereby reducing risks associated with traditional practices. In poultry farming specifically, apps provide features such as feed formulation calculators, vaccination schedules, disease diagnosis, and inventory tracking, which streamline operations and improve productivity [21].

Access to appropriate and relevant information is critical for decision-making in poultry production. Mobile applications serve as alternative channels for delivering extension services, especially in areas where traditional extension systems are weak. According to [22], mobile apps facilitate the rapid dissemination of knowledge on best practices in poultry nutrition, health management, and biosecurity measures. They also enable farmers to receive alerts on emerging diseases and government advisories, thereby reducing losses and enhancing biosecurity compliance. Mobile apps not only support production but also open up market opportunities for poultry farmers. Apps like FarmCrowdy, AgroMall, and iCow have integrated marketplaces that link farmers directly with buyers, bypassing middlemen and ensuring better profit margins [23].

Additionally, mobile apps offer financial services such as microcredit access, digital payment systems, and insurance products tailored for poultry farmers, which improve their financial resilience [24]. Despite the benefits, several challenges hinder widespread adoption of mobile applications in poultry farming. High costs of smartphones and data plans, poor network coverage in rural areas, and a lack of digital literacy among farmers are significant barriers [25]. Furthermore, language barriers and the limited local content of some mobile applications reduce their effectiveness. Addressing these challenges requires collaborative efforts from developers, policymakers, and agricultural stakeholders to design affordable, user-friendly, and context-specific solutions. Mobile technology use is directly correlated with the expansion and improvement of Information Dissemination and improved productivity in Poultry Farming Systems [26].

Mobile technology use is anticipated to influence poultry farming in the form of decreased costs, fewer issues with distance marketing, and improved marketing channels. Information is arguably the most significant variable in improving poultry productivity, and mobile technology is among the most helpful instruments for giving poultry farmers access to information at an extremely affordable price. However, farmers can decide whether or not to use mobile technology [2]. As a result, several characteristics, including age, level of education, years of education, marketing channels, the cost of marketing activities in the markets, and having access to mobile technologies, can influence how it

used in information dissemination and improve productivity in poultry farming systems. The use of mobile technology has consistently had a favorable influence on farmers' accessibility to improve poultry farming and, ultimately, their ability to support themselves. This is illustrated in Figure 1.

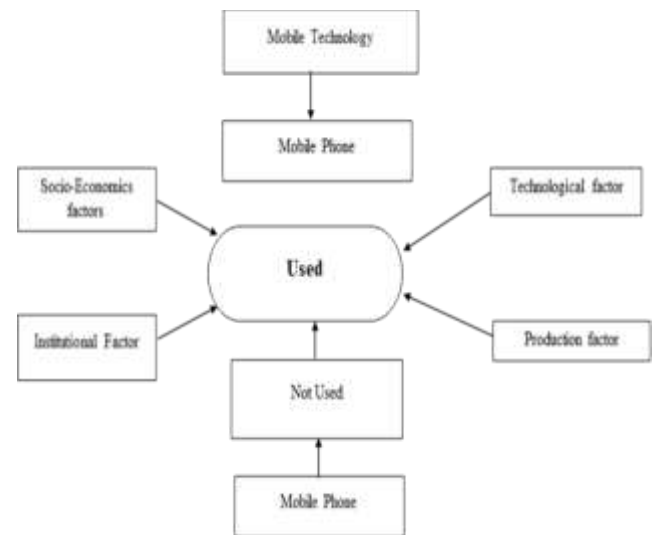


Figure 1: Conceptual Framework of leveraging mobile technology to optimize information dissemination and improve productivity in poultry farming systems.

III. METHODOLOGY

A. Description of the study area

This study was conducted in Kwara State, located in the North-Central region of Nigeria. Kwara shares boundaries with Niger State to the north, Kogi State to the east, Osun and Ekiti States to the south, and Oyo State to the southwest [28]. It also shares an international border with the Republic of Benin to the west. The state has a land area of approximately 36,825 square kilometers and is characterized by a mix of savannah vegetation and tropical forest, making it suitable for both crop and livestock farming, including poultry production. Kwara State comprises 16 Local Government Areas (LGAs), and the study was specifically carried out in selected LGAs within the state, where poultry farming is widely practiced and reliable mobile network coverage.

B. Study Design

A survey research design was employed, with data collected at a single point in time. The target population included poultry farmers across selected LGAs in the state. A multistage sampling technique was used for selecting respondents. First, LGAs with relatively better mobile network coverage and a high concentration of poultry farmers were purposively selected. Then, within those LGAs, specific wards and communities were randomly selected. Four LGAs were chosen in the study area. From each LGAs, 130 respondents were randomly selected using a table of random numbers. Farmers were selected based on their involvement in poultry farming, either as a primary or secondary source of livelihood. The study utilized an interview schedule to collect the data. Data was analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics such as percentages, means, and frequencies were generated, while

factor and regression analyses were used to determine the relationships between key variables.

4. RESULTS AND DISCUSSION

A. Socio-Economic Characteristics of the respondents

Table 1: The socio-economic characteristics of the respondents.

Age	Means= 40		
Sex	Male(M) Female(F)	N=85 N=45	65% 35%
Poultry farmers	Irepodun Ilorin west Ilorin east Offa	N=25 N=33 N=44 N=28 Total =130	
Education	94%		

Table 1 presents the socio-economic characteristics of the respondents. The proportion of male respondents (65%) was higher than that of female participants (35%). The mean age of the poultry farmers was 40 years, suggesting that the respondents were within a productive age bracket. This demographic characteristic may contribute positively to their capacity to effectively utilize mobile phones in improving poultry production. Younger individuals are generally more open to technological innovations and more adept at using digital tools, which can enhance communication, access to information, and decision-making in poultry production [29]. Therefore, interventions aimed at promoting mobile technology-based solutions are likely to be well-received and effectively utilized by this demographic group, potentially leading to increased productivity and improved farm management practices. In terms of education, most respondents (94%) had formal education. This implies a relatively basic educational background among the majority, which may influence the use of mobile technology for information exchange among poultry farmers. This supporting findings of [30] who noted that mobile technology usage tends to be higher among younger adults.

Table 2: Mobile platforms and tools employed by poultry farmers for information dissemination

Mobile platforms	Frequency (130)	Percentage
WhatsApp	120	92%
Facebook	111	85%
Specialized poultry apps	52	40%

Table 2 showed that WhatsApp (92%) was the most used platform for poultry-related discussions and information exchange. Facebook (85%) and specialized poultry apps (40%). The findings from Table 2 imply that mobile-based communication tools, especially WhatsApp, play a crucial role in facilitating poultry farmers' access to information and

peer support. The high usage of WhatsApp suggests that farmers prefer platforms that offer real-time communication, multimedia sharing, and group interactions, which are vital for timely decision-making in poultry management. The significant usage of Facebook and specialized poultry apps further indicates a growing trend towards digital literacy and the diversification of information sources among poultry farmers. This trend aligns with studies emphasizing the importance of mobile platforms in enhancing agricultural practices and bridging information gaps in developing economies [31]

Table 3: Types of information accessed using mobile technology among poultry farmers

Information Accessed	Frequency (130)	Percentage
Market prices	101	78%
Disease prevention/treatment	107	82%
Feed formulation	79	61%
Vaccination schedules	77	59%

Table 3 showed that market prices (78%) and disease prevention/treatment tips (82%) were the most frequently accessed categories. Feed formulation tutorials (61%) and vaccination schedules (59%) were also significant. The findings from Table 3 suggest that access to market prices and disease prevention/treatment tips is a top priority for poultry farmers, highlighting the need for timely and reliable information that directly impacts the profitability and health of their poultry operations. The high frequency of accessing market prices and disease prevention aligns with the importance of these factors in managing the financial stability and sustainability of poultry farming. Feed formulation and vaccination schedules are also significant, indicating that farmers recognize the importance of nutrition and health management in optimizing productivity. These trends emphasize the role of mobile technology in providing essential information, as well as the increasing reliance on such tools to improve overall poultry farm management and productivity [32].

Table 4: Benefits on Farm Productivity

Benefits	Frequency	Percentage
Improved decision-making due to real-time access to an expert advice	105	81%
Cost reduction in areas like feed sourcing and transportation through improved planning	91	70%
recorded increased sales through mobile-facilitated market linkages.	85	65%

Table 4 also revealed that 81% of farmers reported improved decision-making due to real-time access to expert advice. This implies that mobile technology helps bridge the information gap, allowing farmers to react quickly to changes in their environment, market conditions, or production practices, ultimately improving farm management, while 68%

observed a reduction in costs related to feed sourcing and transportation through improved planning. This implies that mobile platforms facilitate better resource management. By providing farmers with better planning tools and access to alternative resources, mobile technology helps reduce inefficiencies and lowers the cost of production, which is critical for small-scale poultry farmers who are often constrained by limited resources and 65% of farmers who recorded increased sales through mobile-facilitated market linkages highlight the importance of technology in improving market access. This finding aligns with the "network theory" in economics, where access to wider and more diverse networks enabled by mobile technology, can enhance market opportunities and improve bargaining power. For poultry farmers, direct access to buyers via mobile platforms can lead to better prices, increased demand, and more stable sales channels, contributing to their overall profitability. The findings imply that mobile technology improves decision making, reduces operational costs, and strengthens market linkages, making it a key tool in optimizing productivity in poultry farming systems.

Table 5: Factor Loadings for Socioeconomic, Production, Institutional, and Technological Variables Influencing the use of Mobile Technology to Optimize Information Dissemination and Improve Productivity in Poultry Farming Systems.

Factor Category	Variables	Factor 1	Factor 2	Factor 3	Factor 4
Socioeconomic Factors	Age	0.012	0.723	-0.100	0.264
	Level of education	0.043	0.672	0.183	-0.032
	Years of schooling	0.047	0.664	0.145	-0.289
Production Factors	Poultry type	0.034	0.040	0.522	0.109
Institutional Factors	Extension service	0.672	-0.059	0.127	-0.149
Technological Factors	High cost of technology devices	0.005	-0.023	0.077	0.746

The factor analysis revealed four underlying components influencing the use of Mobile Technology to Optimize Information Dissemination and Improve Productivity in Poultry Farming Systems. Factor 1, predominantly loaded by extension service (0.672), represents Institutional Support, highlighting the crucial role of advisory services in promoting technology use. Factor 2 was characterized by strong loadings from age (0.723), level of education (0.672), and years of schooling (0.664), suggesting a Socioeconomic Status factor, where demographic characteristics significantly affect farmers' capacity to embrace innovations. Factor 3 was mainly associated with poultry type (0.522), indicating a production Characteristics factor, implying that the kind of poultry farming influences technological engagement. Lastly, Factor 4 showed high loadings for high cost of technology devices" (0.746), representing technological Barriers. These findings imply that interventions aiming to improve mobile technology

usage among poultry farmers should focus not only on improving infrastructure and training but also on addressing socioeconomic inequalities and production-specific needs.

Table 6: Challenges Identified

Constraints	Frequency	Percentage
Network reliability	98	75%
Data costs	94	72%
Digital literacy and language	59	45%

Table 7 showed that Network reliability (75%) Poor network reliability can disrupt access to real-time expert advice, market information, and other essential services, thereby limiting the effectiveness of mobile technology. This aligns with studies highlighting how unreliable internet connectivity in rural areas can impede the adoption of digital tools in agriculture [33]. Data costs (72%) High data costs may discourage farmers from regularly accessing agricultural platforms or limit the amount of information they can consume. Recent research by [34] emphasizes that the affordability of mobile internet is a significant factor influencing the adoption and effective use of mobile agricultural platforms, particularly in low-income regions. barriers. Digital literacy and language limitations also hindered effective use of some platforms, especially poultry apps. This can be particularly problematic for older farmers or those who are less familiar with technology. According to a study by [35] low levels of digital literacy among farmers in developing countries often prevent them from fully benefiting from mobile agricultural tools. Recent research by [36] highlights that language barriers hinder the effective use of agricultural platforms, as farmers may struggle to understand instructions, navigate the app, or engage with content.

Hypotheses testing

H0₁: There is no significant relationship between respondents' socioeconomic characteristics and the use of mobile technology among poultry farmers.

Table 7: Regression Analysis of the Relationship Between Socioeconomic Characteristics and the Use of Mobile Technology Among Poultry Farmers.

Factor	Regression Coefficient	p-value
Age	0.45	0.01
Education	0.35	0.03
High Cost of Devices	-0.30	0.02

Table 8 shows that age ($r=0.45$), education ($r=0.35$), and high cost of devices ($r=-0.03$) positively influence the dependent variable (mobile technology use or farming productivity), meaning that as these factors increase, the dependent variable tends to increase as well. High cost of devices negatively affects the dependent variable, indicating that as the cost of mobile technology devices increases, the use of such technology or productivity tends to decrease. In this case, age, and education, are associated with more effective use of mobile technology or greater productivity, while the high cost of devices serves as a barrier. This supports the

report of [37] which says age, education, and high cost of devices significantly influence mobile technology use or farming productivity.

5. Conclusion

This study highlights the transformative role of mobile communication technology in modern poultry farming, particularly in enhancing access to appropriate and relevant information. The widespread usage of mobile phones, especially smartphones, among poultry farmers has significantly improved their ability to make informed decisions, reduce operational costs, and increase productivity. Platforms such as WhatsApp and Facebook have proven effective in bridging the information gap, providing farmers with real-time updates on disease management, feed formulation, market opportunities, and more. However, challenges such as poor network coverage, digital literacy, and high data costs continue to limit the full potential of mobile technology in rural areas. Based on the findings of this study, the following recommendations are proposed to enhance the effective use of mobile technology in poultry farming:

1. Telecommunication companies should partner with government agencies to expand mobile network coverage and internet connectivity in rural and peri-urban areas, where many poultry farmers operate

2. Introduce support programs or public-private partnerships to make smartphones and data plans more affordable, especially for smallholder poultry farmers.

3. Agricultural extension workers should leverage mobile platforms to maintain regular and responsive communication with farmers.

4. Support the creation of mobile-based farmer communities where poultry farmers can share experiences, ask questions, and collectively solve problems.

5. Government should develop platforms with multi-language support or localizing content to suit the linguistic preferences of farmers could increase adoption and usage.

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