



Transforming Cocoa Farming Through Digital Innovation: Social Media Adoption among Farmers in Osun State, Nigeria

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ABSTRACT

Agriculture in sub-Saharan Africa is undergoing digital transformation, with social media emerging as a key driver of innovation and knowledge exchange. This study examined the adoption of social media platforms among cocoa farmers in Osun State, Nigeria. Primary data were collected from 300 cocoa farmers across five purposively selected Local Government Areas using a structured questionnaire complemented by key informant interviews. Descriptive statistics were used to summarize farmer profiles and usage patterns, while a binary logit regression model was employed to identify determinants of adoption. Results revealed that cocoa farming in the study area is dominated by middle-aged, married men with moderate education levels and nearly universal access to mobile phones. WhatsApp (80%) and Facebook (60%) were the most widely used platforms, primarily for accessing market information, learning improved farming practices, and communicating with extension agents. Regression analysis showed that education, income, farm size, cooperative membership, extension contact, smartphone ownership, internet access, and credit availability significantly increased the likelihood of adoption, while older age and longer farming experience negatively influenced adoption. Key constraints included poor internet connectivity, high data costs, limited digital literacy, and inadequate extension support. The study concludes that social media has considerable potential to transform cocoa farming by bridging information gaps, enhancing market access, and supporting innovation diffusion.

INTRODUCTION

Agriculture remains the cornerstone of economic development across sub-Saharan Africa, where it contributes approximately 35% of gross domestic product and employs over 60% of the labour force (Ibidunni et al., 2020; Sakho-Jimbira & Hathie, 2020; Jayne & Sanchez, 2021). In Nigeria, agriculture provides livelihoods for about 70% of the population, with cocoa emerging as a vital cash crop that accounts for nearly 30% of the country's agricultural exports by value (Abdullahi et al., 2022; Ukpe & Onuigbo, 2024). According to recent estimates, Nigeria remains the fourth-largest cocoa producer in the world, contributing approximately 287,000 metric tons annually, with most of the production cultivated by smallholder farmers in the southwestern region, including Osun State (Degila et al., 2023; Aladenika, 2022). However, despite its economic importance, cocoa production in Nigeria has been hampered by persistent structural constraints, including ageing trees, limited access to extension services, fluctuating market prices, and inadequate dissemination of innovative farming techniques (Oseni et al., 2018; Olutumise et al., 2020; Akinrotimi, 2024).

As global agriculture continues to evolve in response to digital transformation, social media platforms have emerged as powerful tools for knowledge sharing, market access, and community engagement in rural areas. Platforms such as WhatsApp, Facebook, YouTube, and Telegram now serve not only as social networks but also as digital extension channels, especially where conventional agricultural outreach systems remain under-resourced or inaccessible (Orisamika & Akintonde, 2024; Ogunjobi et al., 2023). In countries like Nigeria, the mobile phone penetration rate has surpassed 80%, and over 109 million people now have internet access, making digital technologies increasingly viable for rural development interventions (Nigerian Communications Commission, NCC, 2023; Agbeyangi et al., 2024; Taiwo et al., 2024). Yet, despite the ubiquity of these tools, their structured adoption as instruments of agricultural innovation among cocoa farmers remains limited and understudied. Recent literature highlights the transformative potential of social media in facilitating information exchange, encouraging innovation adoption, and enhancing climate-smart agriculture (Degila, Tognisse, & Honfoga, 2023).

In Ghana and Côte d'Ivoire, social media networks have been shown to improve yield outcomes by enabling real-time communication among farmers, researchers, and marketers (Dadzie et al., 2022; Asante et al., 2025). Similarly, among cocoa farmers in Ondo State, Nigeria, social media use significantly improved access to climate change adaptation strategies and agronomic updates, with nearly 60% of users reporting changes in farming practices due to information accessed online (Orisamika & Akintonde, 2024). However, these outcomes are neither uniform nor universal. Studies indicate that digital adoption in West Africa is often shaped by socio-cultural norms, education levels, digital literacy, income, and gender disparities, which collectively affect both access and utility (Oyebamiji, 2024; Oladele & Olaniyi, 2024). In Nigeria, particularly in Osun State, evidence on the systematic adoption of social media platforms for agricultural purposes among cocoa farmers remains fragmented.

A study by Ogunjobi et al. (2023) in Cross River State found that although awareness of digital tools is rising, actual use for agricultural innovation remains low, largely due to infrastructural constraints, limited digital training, and the absence of localized content. Similarly, Aladenika (2022) observed that while 46.7% of cocoa farmers reported using some form of digital communication to manage buyer-seller relationships, very few leveraged such tools for agronomic decision-making or climate risk mitigation. These findings suggest a widening gap between digital accessibility and functional adoption for transformative agricultural outcomes.

This gap is further exacerbated by the lack of structured policy frameworks to support digital agriculture in Nigeria. While national strategies acknowledge the importance of information and communication technologies (ICTs), practical implementation often lags, particularly at the grassroots level where most smallholder farmers operate. For example, despite the proliferation of mobile phones, only a minority of rural extension services are digitally enabled or integrated with social media platforms. Furthermore, socio-economic barriers such as poor education, gender inequality, and limited cooperative engagement continue to hinder the widespread uptake of these innovations (Degila et al., 2023; Oyebamiji, 2024). The urgent need for contextualized research that captures both enablers and constraints of social media adoption in agriculture is thus evident. Against this backdrop, the present study aims to assess how social media platforms are being adopted as tools for agricultural innovation among cocoa farmers in Osun State, Nigeria. Specifically, it investigates the socioeconomic profiles of adopters, the types of platforms utilized, the role of these tools in enhancing agricultural activities, the key factors driving adoption, and the constraints farmers face in leveraging digital innovations. By focusing on cocoa farmers, a strategic group in Nigeria's agricultural economy, the study provides a targeted lens through which digital transformation in rural agriculture can be better understood and optimized.

LITERATURE REVIEW

This study makes several contributions. First, it fills a critical knowledge gap by providing empirical data on social media use in a high-value crop sector within one of Nigeria's key cocoa-producing states. Second, it contributes to the growing body of literature on digital agriculture by focusing not only on technology access but also on actual usage patterns, perceived benefits, and structural limitations. Third, the study applies a logit model to identify significant predictors of adoption, thereby offering policy-relevant insights into how socio-demographic variables, digital literacy, and institutional support shape innovation behaviour. Finally, the findings hold practical significance for policymakers, development agencies, and agribusiness stakeholders seeking to design inclusive, tech-driven agricultural extension systems that cater to the evolving needs of smallholder farmers.

METHODOLOGY

The Study Area

The study was conducted in Osun State, one of the six states in Nigeria's Southwestern geopolitical zone. Bounded by Oyo, Ondo, Ekiti, and Kwara States, Osun covers an area of approximately 9,251 square kilometers and lies between latitudes 7°30'N and 8°10'N and longitudes 4°00'E and 5°05'E (Figure 1). The state is predominantly agrarian and is well-known for the cultivation of cash crops such as cocoa, kola nut, oil palm, and cashew, with cocoa being the dominant export-oriented crop. Osun State has a tropical climate, characterized by distinct wet and dry seasons, making it conducive for year-round agricultural activities. The average annual rainfall ranges from 1,000 to 1,500 mm, and temperatures typically vary between 21°C and 31°C. The population of the state, according to the National Population Commission (NPC, 2006), was approximately 3.4 million, with current estimates exceeding 4.5 million based on projected growth trends. Given its strategic role in Nigeria's cocoa belt and its expanding digital connectivity infrastructure, Osun State presents a suitable context for analyzing the dynamics of social media adoption in agricultural innovation among smallholder cocoa farmers.

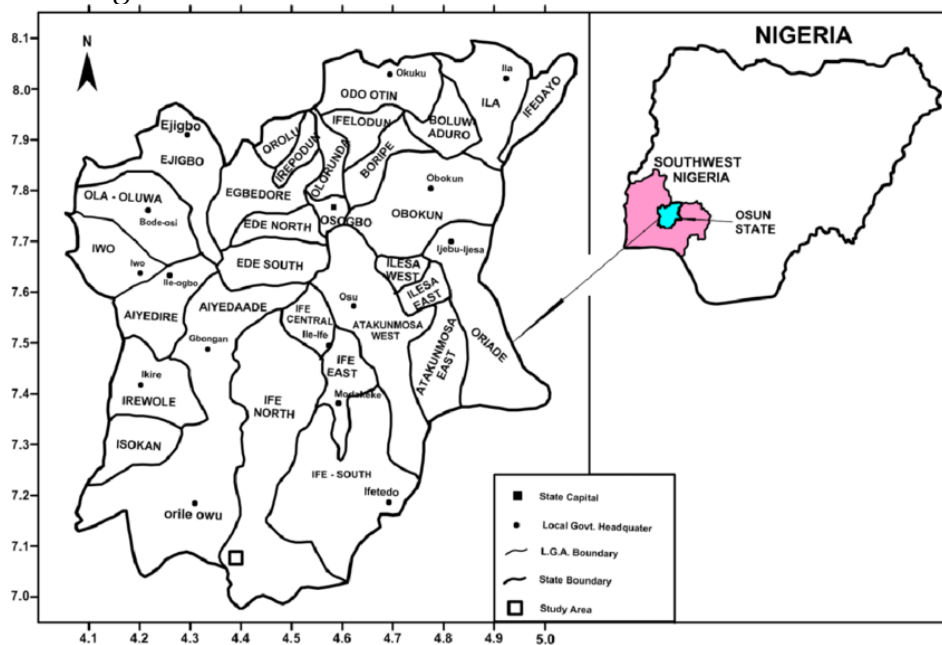


Figure 1. Osun State Map

Source: Adopted from www.osunstate.gov.ng

Data Source and Data Collection

This study employed primary data collected through a structured questionnaire administered to cocoa farmers in the area. The questionnaire was designed to elicit information on respondents' socioeconomic characteristics, their use of social media platforms for agricultural purposes, perceived benefits and constraints of adoption, and factors influencing their decision to use such platforms. To enhance the validity of responses, the instrument was pre-tested with a small group of farmers in a neighbouring community before the actual survey, and necessary adjustments were made to improve clarity and reliability.

Sampling Technique and Sample Size

A multi-stage sampling procedure was employed in selecting respondents for this study. In the first stage, five Local Government Areas (LGAs) were purposively selected based on their prominence in cocoa production. These LGAs (Iwo, Atakunmosa West, Ife South, Obokun, and Ilesa East) were identified in consultation with extension agents and cocoa farmer associations as the major hubs of cocoa cultivation in the state. In the second stage, farming communities were randomly selected from each of the chosen LGAs to ensure adequate coverage of cocoa-producing households across different socio-economic and geographical contexts. In the third stage, a list of cocoa farmers was obtained from farmer cooperatives and extension service records within the selected communities. From these lists, respondents were chosen using simple random sampling, which provided each farmer with an equal chance of being included in the study. A total sample size of 300 cocoa farmers was determined for the survey. The figure was considered adequate to achieve the objectives of the study and falls within the range recommended for regression-based studies involving multiple explanatory variables (Creswell, 2014).

Analytical Techniques

Data collected through the questionnaire were analyzed using both descriptive and inferential statistical methods. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were employed to summarize the socioeconomic characteristics of respondents, the types of social media platforms used, and the patterns of utilization for agricultural purposes. For inferential analysis, a binary logistic regression model was applied to examine the determinants of social media adoption among cocoa farmers. This model was chosen because the dependent variable, adoption of social media platforms for agricultural innovation, is dichotomous (1 = adopter, 0 = non-adopter). Logistic regression is particularly suitable in this context as it estimates the probability of adoption given a set of explanatory variables.

Model Specification

The binary logistic regression model was specified to estimate the probability of adoption of social media platforms as agricultural innovations among cocoa farmers. The general form of the logistic function is expressed as:

$$P(y = 1) = \frac{e^{(\beta_0 + \beta_1 X_1 + \dots + \beta_n X_n)}}{1 + e^{(\beta_0 + \beta_1 X_1 + \dots + \beta_n X_n)}} \quad (1)$$

$$P(y = 0) = 1 - P(y = 1) \quad (2)$$

where:

y = 1 represents the adoption of social media platforms,

y = 0 represents non-adoption,

P is the probability of adoption,

β_0 is the intercept, and

β_i are coefficients associated with the explanatory variables X_i .

The log-odds transformation of the probability of adoption is expressed as:

$$\ln \left[\frac{p}{1-p} \right] = \beta_0 + \beta_1 X_1 + \dots + \beta_n X_n \quad (3)$$

For this study, the empirical model was specified as:

$$\ln \left[\frac{Y_i}{1-Y_i} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \dots + \beta_{14} X_{14} + \varepsilon_i \quad (4)$$

Where:

Y_i = Adoption status (1 = adoption of social media platforms, 0 = non-adoption)

X_1 = Age (years)

X_2 = Marital status (married = 1, single = 0)

X_3 = Gender (male = 1, female = 0)

X_4 = Household size (number)

X_5 = Education (years of schooling)

X_6 = Monthly income (₦)

X_7 = Occupation (farmer = 1, otherwise = 0)

X_8 = Farm size (ha)

X_9 = Membership in farmer cooperatives (yes = 1, no = 0)

X_{10} = Access to extension services (yes = 1, no = 0)

X_{11} = Smartphone ownership (yes = 1, no = 0)

X_{12} = Internet access (yes = 1, no = 0)

X_{13} = Farming experience (years)

X_{14} = Access to agricultural credit (yes = 1, no = 0)

ε_i = error term

RESULT AND DISCUSSION

Socioeconomic Characteristics of Respondents

The socioeconomic characteristics of cocoa farmers in the area reveal a population dominated by middle-aged individuals who are still in their economically productive years. More than half of the respondents (51.3%) were aged between 46 and 55, while another 29.3% fell between 35 and 45 years. Only 2.7% were older than 65, suggesting that cocoa farming is largely managed by those with the physical capacity and willingness to adopt new technologies. Similar age structures among cash crop farmers have been observed in other West African contexts, where innovation adoption peaks among middle-aged farmers who balance experience with openness to change (Adebayo et al., 2022; Degila et al., 2023). The results further demonstrate a pronounced gender imbalance, with 90.7% of respondents being male. This reflects persistent gender disparities in Nigerian agriculture, where women are often excluded from cash crop farming due to cultural barriers, unequal land rights, and limited access to extension services (Oladele & Olaniyi, 2024). The implication for digital agriculture is significant, as deliberate gender-inclusive strategies will be needed to ensure women benefit equally from social media-driven innovations. Marital status shows that 96% of respondents were married, pointing to the role of cocoa farming as a long-term, household-based livelihood strategy. Household sizes were relatively large, with most reporting four to six members. While this provides labour for cocoa cultivation, it also increases dependency burdens that can strain farm incomes.

The educational profile of respondents is encouraging, with 68% completing secondary education and 13.3% attaining tertiary education. Only 8.7% reported no formal schooling. This high literacy rate enhances the

potential for social media adoption, since education improves digital literacy and the ability to evaluate and apply agricultural information. Prior studies confirm that farmers with higher education levels are more likely to embrace ICTs in farming (Degila et al., 2023). Phone ownership was nearly universal, with 90% of respondents reporting access to mobile devices. This aligns with national trends, where mobile penetration exceeds 80% and internet users surpass 109 million (Taiwo et al., 2024). Such widespread ownership provides a strong foundation for social media use in agriculture, though affordability of data, weak rural connectivity, and limited digital skills remain challenges. In terms of experience, 64% of respondents had been farming cocoa for five to fifteen years, suggesting a population with sufficient practical knowledge but still open to new practices. However, older farmers with more than thirty years of experience may be less willing to adopt innovations, reflecting the conservatism of long-tenured farmers (Dadzie et al., 2022). A notable weakness is the low level of membership in farmer associations, with only 16.7% reporting affiliation. Cooperative societies are vital for collective action, training, and diffusion of innovations, and their limited presence may slow the spread of social media adoption. Strengthening farmer groups could therefore accelerate digital transformation in cocoa production (Kehinde, 2021).

Table 1. Socioeconomic Characteristics of Cocoa Farmers in the Area

Variable	Category	Frequency	Percent (%)
Age (years)	35-45	88	29.3
	46-55	154	51.3
	56-65	50	16.7
	66-75	8	2.7
Gender	Male	272	90.7
	Female	28	9.3
Marital Status	Married	288	96.0
	Widow/Widower	12	4.0
Household Size	3	20	6.7
	4	90	30.0
	5	94	31.3
	6	70	23.3
	7	16	5.3
	8	6	2.0
Educational Level	10	4	1.4
	No formal education	26	8.7
	Primary education	30	10.0
	Secondary education	204	68.0
Phone Ownership	Tertiary education	40	13.3
	Yes	270	90.0
Farming Experience (years)	No	30	10.0
	5-15	192	64.0
	16-30	74	24.7
	31-45	22	7.3

	46-55	12	4.0
Membership of the Farmers' Association	Yes	50	16.7
	No	250	83.3

Available Social Media Platforms Employed by the Respondents

The results in Table 2 show that cocoa farmers use a variety of social media platforms, with WhatsApp emerging as the most widely adopted (80%). WhatsApp's dominance is not surprising given its low data requirements, ease of use, and ability to support group messaging, making it an effective tool for information sharing among farmer networks. Its role in enhancing real-time communication and knowledge dissemination in agricultural communities has been widely documented in Nigeria and across Africa (Orisamika & Akintonde, 2024; Eduafo et al., 2024). Facebook was the second most commonly used platform, with 60% of respondents reporting active engagement. Farmers indicated that Facebook provided opportunities not only for accessing agricultural information but also for marketing cocoa products and connecting with buyers. YouTube was also significant (40%), largely because of its video-based tutorials that enable farmers to access practical demonstrations on improved farming practices, pest control, and post-harvest handling. Similar findings were reported by Ogunjobi et al. (2023), who highlighted YouTube's value as a tool for visual learning among Nigerian cocoa farmers.

Other platforms such as Instagram (25%), Twitter (15%), Telegram (10%), and TikTok (6%) were less popular but still relevant. Their comparatively lower adoption may reflect both generational differences and the perception of these platforms as being more entertainment-oriented rather than agriculturally focused. Nevertheless, their gradual uptake indicates a trend toward diversification of digital communication tools in farming communities, particularly among younger and more digitally savvy farmers. These findings highlight an important pattern: while farmers are adopting social media for agricultural innovation, the platforms most widely used are those that emphasize accessibility, affordability, and group interaction. The reliance on WhatsApp and Facebook mirrors the broader Nigerian digital landscape, where these platforms dominate internet traffic and play an increasingly central role in rural development interventions (Taiwo et al., 2024). However, the limited use of platforms such as Telegram and TikTok suggests that barriers still exist in terms of content relevance, awareness, and digital literacy. In the context of this study, the widespread use of WhatsApp and Facebook provides a solid entry point for designing digital extension services, cooperative communication systems, and marketing interventions. Policymakers and development practitioners could therefore leverage these platforms to disseminate information on improved cocoa practices, climate-smart innovations, and financial inclusion tools. This would align with the broader push for digital agriculture in West Africa, where social media is increasingly recognized as a cost-effective tool for transforming smallholder farming (Degila et al., 2023).

Table 2. Social Media Platforms Used by Cocoa Farmers in the Area

Social Media Platform	Frequency	Percent (%)
WhatsApp	240	80.0
Facebook	180	60.0
YouTube	120	40.0
Instagram	75	25.0
Twitter (X)	45	15.0
Telegram	30	10.0
TikTok	18	6.0

Agricultural Activities Enhanced by Social Media Platforms

The findings in Table 3 reveal that social media platforms contribute significantly to the enhancement of various agricultural activities among cocoa farmers in the area. The most frequently cited use was access to market information (75%), including real-time updates on cocoa prices and connections with potential buyers. This underscores the role of social media in reducing information asymmetry in agricultural markets, which often places smallholder farmers at a disadvantage. By improving market transparency, platforms such as WhatsApp and Facebook help farmers negotiate better prices and reduce exploitation by middlemen, a trend similarly observed by Ukpe and Onuigbo (2024) in their study of cocoa exports. Learning improved farming practices was another key benefit, with 70% of farmers reporting that they relied on social media, particularly YouTube and WhatsApp, to access instructional videos, peer-shared advice, and demonstration content. This reflects a growing reliance on digital knowledge dissemination to complement or substitute for traditional extension services, which remain underfunded and overstretched in many Nigerian states. Ogunjobi et al. (2023) also documented how cocoa farmers in Cross River State used YouTube to learn about pest management and fertilizer application, confirming the value of visual, on-demand learning.

Communication with extension officers and farmer groups was reported by 60% of respondents, highlighting the role of WhatsApp groups as virtual "extension platforms." Farmers indicated that these groups enabled them to quickly share experiences, receive advice, and organize collective actions. Such peer-to-peer and farmer-extension interactions via digital channels have been noted as crucial drivers of innovation diffusion in West African agriculture (Eduafo et al., 2024). About 50% of them used social media to access weather and climate information, an increasingly important adaptation tool in the face of climate variability. Farmers explained that timely updates on rainfall patterns, storms, and droughts helped them plan planting and harvesting schedules. This aligns with Orisamika and Akintonde (2024), who found that cocoa farmers in Ondo State used social media for climate change adaptation strategies.

Other important uses included sourcing farm inputs (45%) and gaining access to financial services or credit opportunities (25%). Farmers reported that digital connections often facilitated bulk purchases of fertilizers and pesticides, while some cooperatives used WhatsApp to circulate loan information from

microfinance institutions. Although less common, 20% of respondents noted that social media supported cooperative activities such as mobilizing members and organizing meetings.

These findings suggest that social media is no longer used merely for communication and entertainment but has become an integral part of agricultural systems. By enabling access to markets, knowledge, inputs, and climate services, digital platforms are actively reshaping how cocoa farmers operate. However, the relatively lower uptake in areas such as financial services and cooperative organization indicates that these functions are underdeveloped and could benefit from targeted digital agriculture interventions. Taken together, the results reinforce the argument that social media platforms have the potential to bridge gaps in extension delivery, market access, and resilience building, particularly where traditional institutions fall short

Table 3. Distribution of how Agricultural Activities are Enhanced by Social Media Platforms

Agricultural Activity Enhanced	Frequency	Percent (%)
Access to market information (prices, buyers)	225	75.0
Learning improved farming practices (videos, tutorials, peer advice)	210	70.0
Communication with extension officers and farmer groups	180	60.0
Access to weather and climate information	150	50.0
Sourcing farm inputs (fertilizers, pesticides, seedlings)	135	45.0
Access to financial services and credit opportunities	75	25.0
Organizing cooperative/ group activities	60	20.0

Determine the Factors Influencing the Adoption of Social Media Platforms as an Agricultural Innovation

The regression results presented in Table 4 highlight a combination of demographic, socioeconomic, institutional, and technological factors that significantly influence the adoption of social media platforms among cocoa farmers in the area. The goodness-of-fit statistics indicate that the model performed reasonably well in explaining the determinants of social media adoption among cocoa farmers. The Nagelkerke R² value of 0.47 suggests that approximately 47% of the variation in adoption decisions is explained by the independent variables included in the model, which is considered satisfactory for cross-sectional behavioural studies in agriculture. The log-likelihood value of -142.6 provides further evidence of model adequacy when compared against a null model, while the likelihood ratio chi-square statistic ($\chi^2 = 68.5$, $df = 13$, $p < 0.001$) confirms that the model as a whole is statistically significant. This implies that the explanatory variables jointly provide strong predictive power in distinguishing adopters from non-adopters of social media platforms in the study area.

Age was found to be negatively associated with adoption ($p < 0.05$), implying that younger farmers are more likely to adopt social media than their

older counterparts. This reflects the tendency of older farmers to be more risk-averse and less digitally inclined, consistent with earlier findings on age and conservatism in technology adoption (Dadzie et al., 2022). Education exerted a strong positive effect ($p < 0.01$), with each additional year of schooling increasing the likelihood of adoption by about 13%. This demonstrates that higher literacy and digital awareness enable farmers to engage effectively with social media, supporting the findings of Degila et al. (2023) that education is a critical determinant of ICT use in African agriculture. Household size was weakly negative ($p < 0.10$), suggesting that larger households may face higher consumption burdens that limit resources for digital adoption, even if they provide labour for cocoa farming.

Institutional variables showed a significant influence. Cooperative membership nearly doubled the odds of adoption ($p < 0.01$), while contact with extension services increased the likelihood by more than twofold ($p < 0.01$). This reinforces the importance of collective action and institutional linkages in facilitating digital adoption, consistent with Kehinde (2021), who emphasized the role of associations in innovation diffusion. Technological enablers were the strongest predictors. Smartphone ownership ($p < 0.01$) increased the odds of adoption by almost five times, while internet access ($p < 0.01$) raised it by over threefold. These findings align with national statistics showing high mobile penetration in Nigeria (Taiwo et al., 2024) and highlight the central role of device ownership and connectivity in enabling digital agriculture.

Monthly income and access to credit were also positively significant ($p < 0.05$), suggesting that financial capacity enhances farmers' ability to afford devices, data, and related costs. Similarly, farm size ($p < 0.05$) positively influenced adoption, indicating that larger-scale farmers perceive greater benefits in leveraging social media for marketing and information access. In contrast, farming experience showed a negative association at the 10% level, indicating that while moderately experienced farmers may adopt innovations, long-tenured farmers are less inclined, echoing earlier findings on conservatism in older farming cohorts.

Table 4. Logit Regression Results on Factors Influencing Social Media Adoption Among Cocoa Farmers in the Area

Variable	Coefficient (β)	Std. Error	Odds Ratio (Exp β)	p-value
Age (years)	-0.042**	0.018	0.96	0.021
Gender (Male =1, Female =0)	0.387*	0.226	1.47	0.085
Marital Status (Married=1)	0.145	0.193	1.16	0.448
Household Size	-0.061*	0.037	0.94	0.097
Education (years of schooling)	0.123***	0.041	1.13	0.004
Monthly Income (₦)	0.0003**	0.0001	1.00	0.012
Farm Size (ha)	0.214**	0.096	1.24	0.029
Farming Experience (years)	-0.017*	0.009	0.98	0.060
Cooperative Membership (Yes=1)	0.682***	0.241	1.98	0.005
Extension Contact (Yes=1)	0.911***	0.317	2.49	0.003

Smartphone Ownership (Yes=1)	1.543***	0.404	4.68	0.000
Internet Access (Yes=1)	1.226***	0.371	3.41	0.001
Credit Access (Yes=1)	0.714**	0.289	2.04	0.014
Constant	-2.873	0.921	—	0.002

Nagelkerke R² = 0.47 | Log-likelihood = -142.6 | LR Chi² (13) = 68.5 (p < 0.001)

Significant at 10% (), 5% (**), 1% (***)*

Constraints to Social Media Platform Usage and Agricultural Innovation Adoption in the Area

The results in Table 5 reveal that the most critical barriers to social media adoption among cocoa farmers were poor internet connectivity (70%) and the high cost of mobile data (66%), both of which reflect structural challenges in rural Nigeria's digital infrastructure. More than half of the farmers (55%) also reported limited digital literacy, underscoring the need for targeted training to enhance effective use of social media for agricultural purposes. Issues of trust in online information (40%) further highlight concerns about misinformation, while 30% indicated limited access to smartphones, though this was less critical given the high overall ownership rates in the study area. Finally, a quarter of respondents (25%) pointed to inadequate extension support, suggesting that social media is often used in isolation rather than being fully integrated into formal extension systems. These findings are consistent with broader evidence in Nigeria and West Africa showing that, despite high mobile penetration, affordability, literacy, and infrastructure gaps remain significant barriers to scaling digital agriculture (Kehinde, 2021; Taiwo et al., 2024). Addressing these constraints will be crucial if social media is to be fully leveraged for innovation diffusion and transformation in cocoa farming.

Table 5. Constraints to Social Media Adoption among Cocoa Farmers in the Area

Constraint	Frequency	Percent (%)
Poor internet connectivity	210	70.0
High cost of mobile data	198	66.0
Limited digital literacy	165	55.0
Lack of trust in online information	120	40.0
Limited access to smartphones	90	30.0
Inadequate extension support for digital tools	75	25.0

Note: Multiple responses allowed; percentages therefore exceed 100.

CONCLUSIONS AND RECOMMENDATIONS

This study examined the adoption of social media platforms as an agricultural innovation among cocoa farmers in Osun State, Nigeria, with a focus on socioeconomic characteristics, platforms utilized, their contribution to farming activities, factors influencing adoption, and the constraints faced by farmers. The findings show that cocoa farming in the study area is dominated by middle-aged, married men with moderate levels of education and farming experience. Phone ownership is nearly universal, creating a solid foundation for digital adoption, although institutional participation through farmer

associations remains weak. Among the social media platforms, WhatsApp and Facebook emerged as the most widely used, serving as primary channels for information exchange, market access, and peer-to-peer learning. Other platforms, such as YouTube, also play a vital role in knowledge dissemination, especially through visual tutorials.

The adoption of these platforms has already begun to reshape agricultural practices by improving access to market information, enhancing communication with extension officers, facilitating climate information sharing, and easing the sourcing of farm inputs. The regression analysis highlighted that adoption is significantly influenced by education, cooperative membership, extension contact, smartphone ownership, internet access, income, farm size, and credit access, while older age and longer farming experience negatively affected adoption. This suggests that both human capital and institutional support are key drivers of digital uptake in agriculture. At the same time, structural barriers persist. Poor connectivity, high data costs, limited digital literacy, and lack of trust in online information were identified as the most critical constraints, alongside weak integration of digital platforms into extension services.

From a policy perspective, the study underscores several important implications. First, investments in rural digital infrastructure are essential to reduce connectivity gaps and lower the cost of data, thereby improving accessibility for smallholder farmers. Second, capacity-building programmes that enhance digital literacy will ensure that farmers can effectively harness social media for agricultural decision-making. Third, strengthening farmer associations and cooperative structures is critical for leveraging collective action in digital adoption, while agricultural extension systems must be reoriented to integrate social media platforms as complementary tools for advisory services. Fourth, policies should deliberately address gender disparities in digital agriculture by creating inclusive initiatives that empower women to participate more actively in cocoa production and innovation adoption. Overall, social media platforms hold significant potential to transform cocoa farming by bridging information gaps, reducing transaction costs, and fostering innovation diffusion.

However, realizing this potential requires targeted interventions that build on existing strengths, such as high mobile penetration and literacy, while addressing persistent challenges of affordability, institutional weakness, and infrastructural inadequacy. By integrating digital technologies into mainstream agricultural development strategies, Nigeria can accelerate the transformation of its cocoa subsector, improve farmer livelihoods, and strengthen its competitiveness in global agricultural markets.

FURTHER STUDY

This research still has limitations, so further research on this topic is still needed.

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