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Awareness and Perceptions of Digital Financial Services among Smallholder Farmers in Kwara State, Nigeria

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Abstract

The study assessed digital financial services (DFS) awareness and perceptions among 237 smallholder farmers in Kwara State, selected through multistage sampling procedure. The data collected using structured interviews were analysed using frequency counts, percentages, Pearson correlation, and multiple regression. Findings revealed high usage of Point-of-Sale terminals (99.2%) and ATMs (89.5%). Farmers viewed DFS as time-saving ($\bar{x}$ = 4.14) and convenient for remote access ($\bar{x}$ = 4.05). Awareness significantly correlated with favourable perceptions (r = 0.337, p < 0.001). Age (β = −0.248, p = 0.007), education (β = 0.238, p = 0.002), and mobile phone ownership (β = 0.137, p = 0.021) were identified as key determinants, with younger, educated farmers showing more positive perception. The study concludes that smallholder farmers in Kwara State use basic digital financial services, particularly POS, ATMs, and cards, while the use of services such as mobile banking and e-wallets remains low. The study recommends targeted DFS awareness campaigns delivered through extension services and farmer cooperatives, particularly for older and less-educated farmers.

Keywords: Farmers' perception, awareness of financial services, digital financial services

Introduction

Agriculture anchors Nigeria's economy, contributing approximately 21% to GDP and employing 36% of the workforce, even amidst oil dependency and economic volatility (World Bank, 2024; National Bureau of Statistics, 2024). Smallholder farmers, those operating under five hectares, drive over 70% of national food production across crops, livestock, and fisheries, yet financial exclusion severely constrains their productivity and resilience (Abdulraheem & Yusuf, 2021). More than 70% live below the $1.90 daily poverty line, lacking access to credit, insurance, and savings due to collateral shortages, high costs, remote locations, and vulnerability to shocks (Ojo et al., 2024; Anane and Nie, 2022).

In North Central Nigeria, including Kwara State, these barriers manifest as limited value chain participation, risk exposure, and investment gaps (Matekenya et al., 2020). Digital financial services (DFS), which include mobile money, agent banking, microcredit, and insurance, address these by slashing costs, enhancing security, enabling credit scoring via digital footprints, and bypassing geography (Pazarbasioglu et al., 2020). The COVID-19 era accelerated DFS growth, with governments worldwide prioritizing it for poverty alleviation and inclusion (Agur et al., 2020; Hasan et al., 2020).

Kwara State reflects many of the realities confronting smallholder farmers in Nigeria, including both persistent constraints and emerging opportunities. Osasona et al (2024) revealed limited access to formal agricultural credit, a strong dependence on informal lending sources, and considerable variations in household welfare associated with differences in credit access and socioeconomic characteristics. The findings highlight the importance of expanding financial inclusion, particularly through digital financial services, as a means of enhancing agricultural productivity and livelihoods. Against this backdrop, this study examines the awareness and perception of DFS among smallholder farmers in Kwara State, Nigeria. The study contributes to ongoing discourse on financial inclusion by providing empirical evidence to guide policy, extension interventions, and digital finance strategies in rural agricultural systems.

The general objective of the study is to assess the awareness levels and perceptions of DFS among smallholder farmers in Kwara State, Nigeria. The specific objectives are to:

1. identify the types of DFS used by smallholder farmers;
2. assess awareness of DFS among smallholder farmers;
3. evaluate smallholder farmers' perceptions toward DFS; and
4. determine the factors influencing smallholder farmers' perceptions of DFS.

The study hypothesised that there is no significant relationship between smallholder farmers' awareness and their perception of digital financial services

Methodology

The study was carried out in Kwara State, Nigeria. It is located between latitudes 8°30′ and 8°50′ N and longitudes 4°20′ and 4°35′ E. Agriculture is the dominant economic activity in the state, with a large proportion of the population engaged in small-scale, rain-fed farming. Major crops cultivated include maize, rice, millet, guinea corn, soybean, cowpea, cassava, and yam. The state’s fertile soils, favourable vegetation, and conducive climatic conditions support the production of both annual and perennial crops. To facilitate agricultural planning and extension service delivery, the Kwara State Agricultural Development Project (ADP) has divided the state into four agricultural zones based on ecological, cultural, and administrative considerations. These zones serve as operational units for agricultural development interventions, input distribution, and extension activities.

A multistage sampling procedure was used to select the respondents for the study. At the first stage, 50% of the Agricultural Development Programme (ADP) zones were selected. Zone B and C were selected. At the second stage, 20% of the ADP blocks within each selected zone were randomly selected. In the third stage, 20% of

the cells within each selected block were randomly selected. At the fourth and final stage, respondents were selected from the registered list of smallholder farmers maintained by the ADP offices for the cell. The sampling was conducted using the sample size formula: n=N/1+N(e^2) where *n*= Sample size, *N*= the population size

e = the acceptable sampling error, Sampling fraction=n/N

Based on this procedure, a total of 237 smallholder farmers were selected for the study from Kwara State.

Table 1: Sampling frame

	50% of zones from each state	20% of blocks from the selected zone	20% of cells from the selected block	Total number of registered farmers in the selected cell	Sample size (n=N/1+N(e^2)
	Zone B	Lafiaji (TNC=5)	Lafiaji	97	41
	TNB=10	Lade (TNC=5)	Lade	83	35
	Zone C	Iporin(TNC=15)	Oke Oyi	98	41
	TNB=10		Oke Ose	87	37
			Agbeyangi	96	40
		Shao (TNC=5)	Sobi	103	43
Total	**2**	**4**	**6**	**564**	**237**

Footnote: TNB= Total number of blocks, TNC= Total number of cells

Type of DFS used: Respondents were asked to indicate the type of DFS used on a Yes (1) and No (0) basis. This was analysed using percentage score.

Perception towards DFS: A structured five-point Likert-type scale was utilized to measure smallholder farmers' perceptions of digital financial services (DFS). For positively worded statements, responses were coded as follows: Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree = 2, and Strongly Disagree = 1. For negatively worded items, scoring was reversed (Strongly Agree = 1 to Strongly Disagree = 5).

Awareness of DFS: Respondents were asked to indicate if they were aware of the DFS services. Aware (1) and Not Aware (0) were used to indicate responses. From the responses, a composite score was generated. Furthermore, the relationship between awareness and perception was determined using Pearson Correlation. This was done using the composite scores of awareness and perception.

The determinants of the perception of DFS were ascertained using a multiple linear regression. The model is specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \mu$$

Where:
Y = Perception of Digital Financial Services
β_0 = Constant term
β_1 – β_8 = Coefficients of explanatory variables
X_1 = Age (years)

X_2 = Sex (1 = Male, 0 = Female)
X_3 = Marital status (1=Married, 0=Otherwise)
X_4 = Years of formal education (years)
X_5 = Years of farming experience (years)
X_6 = Average monthly income (Naira)
X_7 = Mobile phone ownership (1 = Yes, 0 = No)
X_8 = Access to internet on mobile phone (1 = Yes, 0 = No)
μ = Error term

Results and Discussion

Type of Digital Financial Services Used

Table 2 shows that Point of Sale (POS) services were the most (99.2%) utilized digital financial service among respondents, followed by Automated Teller Machines (ATMs) (89.5%) and payment cards (70.9%), while internet/mobile banking (39.2%) and e-wallets (27.0%) recorded relatively low usage. This pattern indicates that smallholder farmers predominantly depend on easily accessible and agent-mediated financial platforms. The high use of POS services corroborates earlier studies, which emphasize the role of agent-based financial systems in improving financial access in rural areas, particularly where banking infrastructure and digital literacy are limited (Ogunfolaju et al., 2025). POS operators often serve as intermediaries, reducing the complexity associated with direct digital interactions.

The relatively low usage of internet/mobile banking and e-wallets reflects persistent barriers to advanced DFS usage. These include limited digital literacy, poor network connectivity, and concerns about transaction security (Kolawole et al., 2025).

Table 2: Types of digital financial services used by smallholder farmers

Digital financial service	Percentage (n=237)	Rank
Point of Sale (POS)	99.2	1st
Automated Teller Machines (ATM)	89.5	2nd
Cards	70.9	3rd
Internet & Mobile Banking	39.2	4th
E-wallets	27.0	5th

Source: Field survey, 2024

Awareness of Digital Financial Services

Table 3 shows smallholder farmers awareness of DFS. Awareness was highest for savings accounts through mobile platforms (90.3%), followed by digital payment platforms (83.5%), while awareness of agent banking services was also relatively high (74.3%). Awareness was considerably lower for microloans through mobile platforms (41.8%) and mobile wallets (31.6%). This pattern suggests that farmers are more familiar with basic and commonly used financial services, while awareness of more specialized or innovation-driven services remains limited (Ogunfolaju et al, 2026). Awareness tends to be higher for services that directly address immediate financial needs, such as savings and money transfers, due to their frequent use and visibility. The relatively strong awareness of agent banking services further reflects the role of financial intermediaries in bridging information gaps in rural areas.

However, the low awareness of mobile wallets and digital credit services (microloans) indicates a persistent gap regarding more advanced DFS offerings. This finding is consistent with Hung and Khoi (2025), who show that awareness of digital credit and mobile wallet functionalities remains limited among rural populations due to inadequate sensitization, low digital literacy, and trust-related concerns. These services often require a higher level of technological familiarity and confidence, which may not yet be widespread among smallholder farmers.

Table 3: Awareness of digital financial services among smallholder farmers

Digital financial service	Percentage of awareness (n=237)	Rank
Savings account through mobile platforms	90.3	1st
Digital payment platforms	83.5	2nd
Agent banking services	74.3	3rd
Microloans through mobile platforms	41.8	4th
Mobile wallets for financial transactions	31.6	5th

Source: Field survey, 2024

Perception of Digital Financial Services

Table 4 indicates that respondents held favourable perceptions of digital financial services (DFS). The highest-rated perception was that DFS saves time and effort compared to conventional financial service methods ($\bar{x}$= 4.14). Respondents also agreed that DFS enhances access to financial services in remote areas ($\bar{x}$ = 4.05), supports the achievement of farm financial goals ($\bar{x}$ = 4.05), promotes financial empowerment ($\bar{x}$ = 4.05), and can be conveniently used for routine financial transactions ($\bar{x}$ = 4.05). These findings suggest a strong recognition of the relative advantage and convenience of DFS, which are key drivers of technology adoption (Anane and Nie, 2022).

The perception that DFS improves efficiency and broadens access aligns with Pazarbasioglu et al. (2020), who found that digital finance reduces transaction costs and improves financial inclusion among rural populations. The positive perception of DFS as a tool for improving financial well-being and farm management supports findings by Akinwale et al (2023), who emphasized the role of digital finance in enhancing economic participation among underserved groups.

Despite these positive perceptions, notable concerns persist. Respondents expressed concern about the security of funds ($\bar{x}$ = 4.04) and fraud risks ($\bar{x}$= 3.51), indicating that trust remains a critical issue. This is consistent with Sinaga and Wijayanto (2025), who identify perceived risk and lack of trust as major barriers to DFS usage. Concerns about internet access ($\bar{x}$ = 3.41) further highlight infrastructural limitations that may constrain effective utilization. Furthermore, respondents did not strongly perceive DFS as overly complex ($\bar{x}$ = 2.61), nor were fees ($\bar{x}$ = 2.68) or language barriers ($\bar{x}$= 2.78) considered major constraints. This suggests that usability challenges may be less significant than trust and infrastructure-related issues. Respondents showed agreement that training and support would enhance usage ($\bar{x}$ = 3.58), while also expressing confidence in their ability to learn DFS features ($\bar{x}$ = 3.89).

Table 4: Perception of digital financial services among smallholder farmers

Perception statement	Mean ($\bar{x}$)	SD	Rank
DFS saves time and effort compared with conventional financial service methods.	4.14	0.86	1st
DFS enhances access to financial services in remote areas.	4.05	0.86	2nd
DFS is suitable for conducting routine financial transactions.	4.05	0.85	2nd
DFS supports the achievement of farm-related financial goals.	4.05	0.86	2nd
DFS promotes financial empowerment among users.	4.05	0.86	2nd
Concerns exist regarding the security of funds when using DFS.	4.04	0.78	6th
DFS provides a broader range of financial services than traditional methods.	3.95	0.81	7th
DFS features are easy to learn and use.	3.89	1.08	8th
DFS contributes to the financial well-being of smallholder farmers.	3.89	1.05	8th
DFS platforms are user-friendly and easy to navigate.	3.86	0.98	10th
DFS improves farm financial management practices.	3.84	0.87	11th
DFS provides greater control over personal finances than traditional methods.	3.60	1.04	12th
DFS is an efficient means of managing financial transactions.	3.59	1.07	13th
Training and support would enhance the adoption of DFS.	3.58	1.06	14th
The possibility of fraud and scams remains a concern in the use of DFS.	3.51	1.22	15th
Limited internet access constrains the use of DFS.	3.41	1.33	16th
Lack of trust in DFS technology affects its acceptance.	3.23	1.27	17th
Language barriers hinder the effective use of DFS.	2.78	1.39	18th
Charges and transaction fees associated with DFS are a concern.	2.68	1.27	19th
Limited technological experience makes DFS difficult to use.	2.61	1.58	20th

Source: Field survey, 2024

Determinants of Perception of Digital Financial Services

The regression result in Table 5 reveals the determinants of smallholder farmers' perceptions of DFS. Age had a significant negative influence on perception ($\beta = -0.248$, $p < 0.01$), indicating that older farmers are less likely to have favourable perceptions of DFS. This finding aligns with Sinaga and Wijayanto (2025), that younger individuals are generally more receptive to digital innovations due to greater familiarity with technology and lower resistance to change. Education had a positive and significant effect on perception ($\beta = 0.238$, $p < 0.01$), suggesting that more educated farmers are more likely to perceive DFS favourably. Education enhances cognitive ability, information processing, and openness to innovation, thereby facilitating better understanding and acceptance of digital financial tools (Uthaileang & Kiattisin, 2023; Ifeanyi-Obi and Corbon, 2023).

Mobile phone ownership exerted a positive and significant influence on perception (β = 0.137, p < 0.05). This highlights the importance of access to enabling technology in shaping attitudes toward DFS. Farmers who own mobile phones are more likely to interact with digital platforms and develop confidence in their use. This finding corroborates the findings of the World Bank (2025), which emphasised the transformative role of mobile technology in expanding financial access in developing economies. Furthermore, variables such as sex, marital status, farming experience, income, and internet access were not statistically significant.

Table 5: Determinants of perception of DFS

Predictor variable	B	SE	β	t
Constant	66.320	7.492	—	8.853
Age	−0.237	0.088	−0.248	−2.702*
Sex	−2.755	1.787	−0.092	−1.542
Marital status	0.592	2.781	0.012	0.213
Education	0.362	0.114	0.238	3.166*
Years of farming experience	0.096	0.075	0.101	1.288
Monthly income	−0.000003	0.000	−0.061	−0.821
Mobile phone ownership	11.640	5.026	0.137	2.316*
Internet access	2.892	1.932	0.109	1.497

Model Summary**:** R = 0.536; R^2 = 0.288; Adjusted R^2 = 0.263; Std. Error = 8.203

Relationship between Awareness of DFS and Perception of DFS

The Pearson correlation analysis revealed a positive and statistically significant relationship between awareness and perception of DFS (r = 0.337, p < 0.01). This indicates that as the level of awareness of digital financial services increases, farmers' perceptions toward these services become more favourable. This result aligns with Sarfo et al (2023), that increased awareness enhances the likelihood of positive perception and eventual use of digital financial services.

Table 6: Relationship between awareness and perception of DFS

Variable	Awareness	Perception
Awareness	1	0.337
Perception	0.337	1

P<0.05

Conclusion and Recommendations

The study concludes that smallholder farmers in Kwara State use basic digital financial services, particularly POS, ATMs, and cards, while the use of services such as mobile banking and e-wallets remains low. Farmers also demonstrate a generally positive perception of DFS, especially regarding convenience, accessibility, and financial empowerment, although concerns around security and trust persist. Age, education, and mobile phone ownership significantly influenced perception, while awareness is positively associated with perception.

Based on the findings of the study, extension services should incorporate digital financial services literacy into farmer training programmes to improve awareness and perception among smallholder farmers. Banks and fintech firms should also design simple and user-friendly DFS platforms to encourage the use of mobile banking and e-wallet services. Furthermore, government should improve rural digital

infrastructure, particularly internet and network connectivity, while regulatory agencies strengthen consumer protection and cybersecurity measures to increase farmers' trust and confidence in digital financial platforms.

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