

Determinants of utilisation of digital financial services among rural farmers in IDO local government of Oyo state, Nigeria

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ABSTRACT

Digital financial services (DFS) have the potential to enhance financial inclusion among rural farmers, yet their utilisation remains limited due to socio-economic and infrastructural challenges. This study assessed the determinants of utilisation of DFS among rural farmers in Ido local government Oyo state. It specifically examined the socio-economic characteristics of rural farmers and their awareness, access, constraints to, and utilisation of digital financial services. Results revealed that the age, household size, farm size, and farm income were 35.98 ± 10.62 years, 5.57 ± 1.14 members, 4.65 ± 4.58 acres and ₦66,804.12 $\pm$ 41,377.24, respectively with a male majority (79.4%), being primarily farmers (80.4%) and had secondary education (45.4%). The rural farmers were aware of Point of Sales (POS) services (99.0%), USSD services (88.7%), and e-wallets (85.6%) among the available DFS. Access to USSD, e-wallets, and POS services was highest ($\bar{x} = 1.00$) among the DFS while the most utilised being POS services ($\bar{x} = 1.95$). Electricity supply ($\bar{x} = 4.01$) and internet connectivity ($\bar{x} = 2.45$) were significant constraints to utilisation. Respondents farm/enterprise income ($B = 0.93$), household size ($B = 2.10$), and awareness ($B = 2.35$) significantly influenced the DFS utilisation positively, while farm size ($B = -1.33$) and constraints ($B = -4.10$) were deterrents. The study recommends infrastructural improvements, financial literacy programmes, and policy reforms to enhance digital financial inclusion among rural farmers.

Keywords: Digital financial services, rural farmers, socio-economic factors, financial inclusion,

INTRODUCTION

Agriculture remains the backbone of rural economies, providing livelihoods for millions and contributing significantly to food security (Hasan *et al.*, 2023). In rural areas, farming is not just an economic activity but a way of life, deeply intertwined with local cultures and traditions. Despite its significance, agricultural productivity in many developing countries, including Nigeria, is constrained by limited access to financial resources (Adegbite & Machethe, 2020). Farmers require funds to invest in modern inputs, irrigation systems, and improved farming techniques. However, rural farmers often struggle to access formal financial services, which hinders their ability to expand their agricultural enterprises, for increase productivity, adopt climate-smart agricultural practices, and improve their overall livelihoods (Tay *et al.*, 2022 & Adegbite *et al.*, 2021). Access to financial services is crucial for agricultural development as it enables farmers to purchase inputs such as seeds, fertilisers, and machinery (Akpaeti & Archibong, 2022). Traditional financial institutions, including banks and cooperative societies, have historically played a role in providing loans and credit to farmers. However, stringent collateral requirements, high-interest rates, and bureaucratic bottlenecks often prevent smallholder farmers from accessing these services (Chinelo & Ayodeji, 2023). The lack of formal credit opportunities forces many farmers to rely on informal lenders who charge exorbitant interest rates, thereby deepening their financial burdens (Abbas & Song, 2020). As a result, many rural farmers continue to

operate at subsistence levels, unable to scale up their production or invest in value-added processes (Naika *et al.*, 2021). The limitations of conventional financial services highlight the urgent need for alternative financial mechanisms that can bridge the financing gap for rural farmers (Naika *et al.*, 2021).

Digital financial services (DFS) have emerged as a viable alternative to traditional financial systems, offering farmers the opportunity to access financial products through mobile banking, Point of sales, cryptocurrency, digital credit platforms, and electronic wallets (Anane & Nie, 2022). These services provide a more efficient and inclusive financial ecosystem, reducing the dependency on physical bank branches and simplifying the loan application process. Study by Hasan *et al.* (2023) and Akpaeti and Archibong (2022) suggest that DFS can improve farmers' access to credit, savings, and insurance, thereby fostering economic resilience. Additionally, digital platforms enable farmers to make transactions with ease, receive payments promptly, and access market information that can enhance their profitability (Mapiye *et al.*, 2023). The use of fintech solutions in agriculture is therefore an innovative approach to addressing financial exclusion among rural farmers (Adegbite *et al.*, 2021).

The adoption of digital financial services in Nigeria has gained momentum in recent years, driven by increased mobile phone penetration and government initiatives promoting financial inclusion (Benjamin & Foye, 2022). Fintech companies and telecommunications firms have introduced mobile

money services, digital credit facilities, and blockchain-based financial solutions tailored to the needs of farmers (Oyinbo *et al.*, 2022). According to Chinelo and Ayodeji (2023), leveraging digital technology has significantly enhanced financial inclusion among agripreneurs in Southern Nigeria. Similarly, Adegbite *et al.* (2021) emphasize that digital financial solutions are reshaping the financial landscape by offering flexible and accessible options for smallholder farmers. Despite these advancements, rural farmers still face several challenges in adopting these services. Issues such as poor digital literacy, lack of internet infrastructure, and concerns about transaction security hinder the widespread use of DFS in rural areas (Adeyemi *et al.*, 2023).

While digital financial services hold great potential, their effectiveness depends on farmers' awareness, access, and utilisation (Abdulai *et al.*, 2023). Many rural farmers remain unaware of the various digital financial products available to them or lack the requisite knowledge to navigate digital platforms (Tay *et al.*, 2022). As noted by Abdulai *et al.* (2023), awareness and training play a crucial role in increasing DFS adoption among smallholder farmers. Furthermore, access to digital services is often limited by factors such as inadequate network coverage and unreliable electricity supply in rural areas (Nwali *et al.*, 2022). Even when farmers gain access to these services, the extent to which they utilise them remains low due to fears of fraud, hidden charges, and technical difficulties (Akpaeti & Archibong, 2022). The gap between the availability of DFS and its actual utilisation underscores the need for targeted interventions aimed at educating farmers and improving the infrastructure necessary for seamless digital transactions (Adegbite & Machethe, 2020).

As agriculture remains a key driver of economic development in Nigeria, ensuring that farmers can effectively participate in the digital economy is essential for poverty alleviation and rural transformation (Adegbite *et al.*, 2021). Previous studies, such as those by Adeyemi *et al.* (2023) and Babajide *et al.* (2020), highlight the critical role of financial technology in bridging financial gaps among rural populations. However, this study is justified by

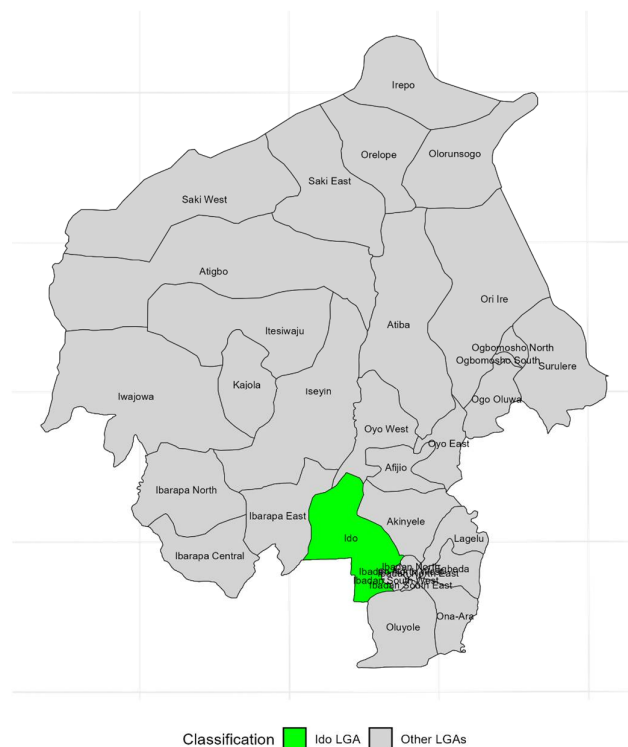
the need to understand the factors influencing rural farmers' access to and utilisation of digital financial services in Ido Local Government, also, there is limited empirical evidence on the specific challenges associated with DFS adoption among rural farmers in Ido Local Government (Abbas & Song, 2020). Against this backdrop, the study assessed the determinants of utilisation of digital financial services among rural farmers in Ido local government of Oyo state, Nigeria. Specifically, the objectives of the study were to;

1. assess the level of awareness of, access to and utilisation of digital financial services amongst the rural farmers.
2. identify the constraints to accessing digital financial services amongst the rural farmers;
3. model the utilisation of digital financial services among farmers using selected characteristics, level of awareness of digital financial services, access to digital financial services, and constraints to their usage

METHODOLOGY

This study was conducted in Ido local government area in Oyo state. It is an area of 986km² and a population of 103,261 based on 2006 census. Ido Local Government covers the area spanning Apata, Ijokodo, Omi-Adio, Akufo and Apete. Ido has the longitude of 134.161968 and the latitude of 34.266249. It shares boundaries with Oluyole, Ibarapa East, Akinyele, Ibadan South-West, and Ibadan North-West Local Governments in Oyo State and Odeda Local Government in Ogun State. The primary occupations of the people include fishing and farming, with some engaging in office work in the township areas. The population of the study were the rural farmers in the study area.

A total of 120 farmers were selected from a list of registered farmers in Ido Local Government Area of Oyo state using a simple random sampling method. The key variables measured include awareness, access, utilisation, and constraints to DFS. Awareness was measured by respondents' familiarity with different digital financial services.



Data collected on farmers selected socioeconomic characteristics such age, sex, marital status, educational attainment in the study area. Respondents' awareness of available DFS was measured and coded as 1 for 'aware' and 0 for 'unaware'. Access to the available DFS was measured by whether respondents had access to each DFS with the option response 1 for 'yes' and 0 for 'no'. The respondents' utilisation of the DFS was measured based on the frequency of use, coded as 0 for 'never,' 1 for 'occasionally,' and 2 for 'always'. Respondents' Constraints were rated on a five-point scale of Very high (VH), High (H), Moderate (M), Low (L), Very Low (VL) with scores of 4, 3, 2, 1, 0 respectively and included items such as internet connectivity, distance, affordability, language barriers, trust, regulatory issues, and power supply.

Composite scores for awareness, access, and utilisation were obtained by summing responses across all DFS services listed for each variable. Higher composite scores indicate greater awareness, access, or utilisation of DFS. The constraint severity score was derived by summing up all indicated/rated constraints, such that the higher the constraint scores, the more the severity level of constraints to use of DFS. These composite scores were used to explore the determinants of digital financial service utilisation among rural farmers. Summarily, analysis explored the use of both descriptive and inferential statistics.

RESULTS AND DISCUSSION

Socioeconomic characteristics of the respondents

Table 1 shows that, the mean age of the rural farmers was 35.98 ± 10.62 years, with a majority (54.6%) falling within the 31-40 years age range. This suggests that most farmers were in their productive years, which can positively influence the adoption of agricultural innovations. This aligns with Abbas and Song (2020), who noted that younger farmers are more receptive to digital services due to their familiarity with technology. The majority (79.4%) of the respondents were male, indicating a male-dominated farming sector. About 80.4% of the farmers were married, implying that most had family responsibilities, which may affect financial decision-making. Regarding education, 45.4% of respondents had secondary education, while 11.3% had no formal education, which could influence digital financial service adoption. This corroborates Abdulai *et al.* (2023), who found that educated farmers are more likely to engage with digital financial tools.

As shown in Table 1, Christianity was the predominant religion (67.0%), followed by Islam (33.0%). This implies that faith-based financial norms or religious institutions may influence attitudes toward financial transactions and the adoption of digital services, especially in areas where religious teachings affect interest or savings practices. The mean farm size was 4.65 ± 4.58 acres, with more than half (53.6%)

cultivating farms of 3 acres or less. This suggests smallholder farming dominance, which implies limited surplus production and potential financial vulnerability, making access to inclusive digital financial services essential for capital access and risk mitigation. The mean farm/enterprise income was ₦66,804.12±41,377.24, with only 32.0% earning above ₦100,000. This indicates income disparities and implies that low-income farmers may be financially excluded due to affordability issues or lack of documentation required for formal financial services. This aligns with Akinwale *et al.* (2023), who highlighted that farmers with higher incomes have greater access to digital financial platforms, reinforcing the digital divide based on income level. Table 1 reveals that the mean household size was 5.57±1.14 members, with most farmers (81.4%)

having 4–6 family members. This implies that household financial needs may be higher, potentially increasing demand for savings tools, credit access, and flexible remittance platforms. Oyinbo *et al.* (2020) observed that larger households require more financial planning, making digital financial services crucial for efficient household financial management in rural settings. Labor sources varied, with self-labour being the most common (84.5%), followed by family labour (71.1%) and hired labour (35.1%). This indicates strong dependence on personal and household effort and implies that limited capital may restrict labour outsourcing. Consequently, access to financial services that support credit, or labour-saving technologies could help ease labour constraints and enhance productivity.

Table 1: Socioeconomic characteristics of rural farmers

Variables	%	Mean	S.D.
Age		35.98	10.618
Less or equal to 20	12.4		
21-30	11.3		
31-40	54.6		
41-50	11.3		
>50	10.3		
Sex			
Male	79.4		
Female	20.6		
Marital status			
Single	19.6		
Married	80.4		
Educational attainment			
No formal education	11.3		
Primary education	22.7		
secondary education	45.4		
Religion			
Christianity	67.0		
Islam	33.0		
Farm/Enterprise size		4.65	4.58
Less or equal 3	53.6		
4-6	16.5		
7-9	5.2		
10-12	14.4		
>12	10.3		
Farm/Enterprise income		66804.12	41377.24
Less or equal 20000	16.5		
21000 to 40000	20.6		
41000-60000	25.8		
61000-80000	4.1		
81000-100000	1.0		
>100000	32.0		
Household/Family size			
Less or equal 3	2.1	5.57	1.136
4-6	81.4		
>6	16.5		
Source of labour			
Self	84.5		
Family	71.1		

Hired	35.1
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Source: Field survey, 2024

Awareness, access to and utilisation of digital financial services

Awareness of digital financial services

The findings in Table 2 indicate that awareness was highest for Point of Sales (POS) services (99.0%), followed closely by USSD services (88.7%) and e-wallets (85.6%). This suggests that these services are well known among rural farmers, likely due to their frequent use in financial transactions and ease of operation. The relatively high awareness of mobile banking (80.4%) and internet banking (81.4%) indicates that these services have also gained significant recognition, possibly through banking institutions' awareness campaigns. In contrast, awareness of microfinance platforms (16.5%) and cryptocurrency exchanges (18.6%) was the lowest, reflecting limited knowledge and exposure to these advanced financial tools. The low awareness of cryptocurrency may be due to its volatility and regulatory restrictions in Nigeria. This finding aligns with Abbas and Song (2020), who noted that rural farmers often lack awareness of sophisticated digital financial services due to inadequate digital literacy and limited formal financial education. Similarly, Abdulai *et al.*, (2023) observed that digital awareness among smallholder farmers in Africa is often limited to basic financial tools, with emerging fintech services remaining underutilised.

Access to digital financial services

As shown in Table 2, USSD services, e-wallets, and POS services ranked highest in access, each with a mean score ($\bar{x}$) of 1.00, suggesting that farmers could readily use these services. Internet banking ($\bar{x} = 0.72$) and mobile banking ($\bar{x} = 0.76$) also showed moderate accessibility, while online payment gateways ($\bar{x} = 0.13$) and microfinance platforms ($\bar{x} = 0.05$) had the lowest access levels. This indicates that while conventional digital financial tools are available, more advanced platforms remain difficult for farmers to access. This corroborates Naika *et al.* (2021), who highlighted that mobile-based services such as USSD and POS terminals are widely accessible to rural populations due to their ease of use and infrastructure compatibility.

Utilisation of digital financial services

The POS services ($\bar{x} = 1.95$) ranked highest in utilisation, followed by USSD services ($\bar{x} = 1.74$) and e-wallets ($\bar{x} = 1.47$), indicating that farmers actively use these services. Mobile banking ($\bar{x} = 1.22$) and internet banking ($\bar{x} = 0.95$) were also frequently utilised, while cryptocurrency exchange ($\bar{x} = 0.63$) and microfinance platforms ($\bar{x} = 0.68$) had the lowest utilisation rates. This suggests that farmers prefer simpler and widely available financial services over complex or less familiar platforms. This is in line with Soetan and Umukoro (2023), who reported that rural dwellers are more likely to use digital financial services that require minimal internet access and have direct applicability to their financial transactions.

Table 2: Awareness, access to and utilisation of digital financial services

Variables	Awareness		Access		Utilisation	
	%	Rank	Mean	Rank	Mean	Rank
Mobile Money	69.1	6 th	0.36	6 th	0.71	8 th
Internet Banking	81.4	4 th	0.72	5 th	0.95	5 th
Mobile Banking	80.4	5 th	0.76	4 th	1.22	4 th
Online Payment Gateways	59.8	7 th	0.13	8 th	0.78	6 th
Cryptocurrency Exchange	18.6	9 th	0.00	10 th	0.63	10 th
Microfinance Platforms	16.5	10 th	0.05	9 th	0.68	9 th
Remittance Services	28.9	8 th	0.14	7 th	0.76	7 th
E-wallets	85.6	3 rd	1.00	1 st	1.47	3 th
USSD services	88.7	2 nd	1.00	1 st	1.74	2 th
Point of Sales (POS)	99.0	1 st	1.00	1 st	1.95	1 th

Source: Field survey, 2024

Constraints to utilisation of digital financial services

Results in Table 3 highlight electricity power supply as the most significant constraint ($\bar{x} = 4.01$), underscoring the infrastructural deficits that hinder digital financial inclusion, particularly in rural areas where unreliable power supply limits access to

electronic financial services. Limited internet connectivity ($\bar{x} = 2.45$) also presents a major barrier, as many rural farmers struggle with weak network signals, making it difficult to carry out seamless transactions. Similarly, affordability and access to devices ($\bar{x} = 2.39$) remain a challenge, indicating that the cost of smartphones and internet-enabled gadgets prevents many from utilising digital financial services

effectively. These findings align with Abdulai *et al.* (2023) and Soetan and Umukoro (2023), who noted that infrastructural limitations and affordability significantly impact financial inclusion in rural areas. Trust and security concerns ($\bar{x} = 2.15$) further hinder adoption, as fears of fraud and cybercrime discourage rural users from fully embracing digital financial platforms. Naika *et al.*, (2021) and Akinwale *et al.* (2023) further emphasized the role of trust and literacy

in influencing the adoption of digital financial tools. Language and literacy barriers ($\bar{x} = 2.00$) also affect accessibility, particularly for those with limited formal education, as they may struggle to navigate digital banking interfaces. Regulatory barriers ($\bar{x} = 1.47$) and distance to financial service points ($\bar{x} = 1.39$) were the least significant, suggesting that policy frameworks and service availability have improved, though challenges remain.

Table 3: Constraints to utilisation of digital financial services

Variables	VL	L	M	H	VH	Mean
Regulatory Barriers	73.2	16.5	0.0	10.3	0.0	1.47
Distance to services	76.3	18.6	0.0	0.0	5.2	1.39
Affordability	40.2	24.7	10.3	5.2	19.6	2.39
Language and Literacy	67	4.1	0.0	19.6	9.3	2.00
Trust and Security Concerns	46.4	13.4	23.7	11.3	5.2	2.15
Limited internet connectivity	22.7	24.7	37.1	15.5	0.0	2.45
Electricity and Power Supply	5.2	11.3	1.0	42.3	40.2	4.01

Source: Field survey, 2024

Determinant of respondents' utilisation of digital financial services

Table 4 presents the factors influencing the utilisation of digital financial services among rural farmers, with an R-value of 0.74 and an adjusted R² of 0.52, indicating that 52% of the variation in utilisation is explained by the included factors. Farm/enterprise income had the highest positive influence ($B = 0.93$), suggesting that farmers with higher incomes are more likely to engage in digital transactions due to better financial capacity, aligning with Abdulai *et al.*, (2023), who noted that higher financial capability enhances digital financial adoption. Household size ($B = 2.10$) was also significant, implying that larger families may rely more on digital financial services for managing household expenses, corroborating Oyinbo *et al.*, (2020), who found that larger households require structured financial management. Awareness ($B = 2.35$) positively influenced utilisation, highlighting the role of financial literacy, consistent with Abdulai *et al.*, (2023), who emphasized that access to financial knowledge drives digital finance adoption. Conversely, age ($B = -0.22$) negatively affected

utilisation, suggesting that older farmers are less inclined to adopt digital financial services, aligning with Soetan and Umukoro (2023), who found that older individuals are generally more skeptical about financial technology. Farm size ($B = -1.33$) also had a negative impact, implying that larger farm owners might prefer traditional financial methods. Religion ($B = -6.66$) and sex ($B = -3.64$) significantly influenced utilisation, indicating that cultural and gender-related factors shape financial technology adoption. The negative coefficient for religion implies that certain religious affiliations may be associated with lower digital financial service utilisation, potentially due to doctrinal concerns, limited tailored services, or trust-related issues. This aligns with Oyinbo *et al.* (2020), who emphasized that socio-cultural factors influence digital financial engagement in rural settings. Access ($B = -4.10$) was another major constraint, suggesting that despite availability, farmers may face affordability issues, network limitations, or security concerns, consistent with Olatunji *et al.*, (2025) and Naika *et al.*, (2021), who identified infrastructure and trust issues as key barriers to digital finance adoption in rural areas.

Table 4: Determinants of respondents' utilisation of digital financial services

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta	B	
(Constant)	18.22	6.29		2.90	0.01*
Married	5.54	2.23	0.28	2.48	0.02*
Educated	5.43	3.35	-0.14	-1.02	0.31
Christianity	-6.66	1.67	-0.41	-4.00	0.00*
Sex – Female	-3.64	1.50	-0.19	-2.42	0.02*
Age	-0.22	0.11	-0.30	-2.08	0.04*
Farm size (in acres)	-1.33	0.27	-0.79	-4.86	0.00*
Farm/Enterprise income	0.00	0.00	0.93	6.85	0.00*
Household/Family Size	2.10	0.59	0.31	3.58	0.00*

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
Constraints	-0.39	0.21	-0.25	-1.86	0.07*
Awareness	2.35	0.47	0.77	4.96	0.00*
Access	-4.10	0.82	-0.80	-4.99	0.00*

R= 0.74, R²= 0.55, Adjusted R square= 0.52, *=Significant at p≤ 0.05

Source: Field survey, 2024

CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, it is concluded that while awareness of digital financial services is relatively high, access and utilisation remain constrained by infrastructural, economic, and socio-demographic factors. Socioeconomic characteristics such as income, household size, and awareness positively influence utilisation, whereas religion, farm size, and access constraints serve as major deterrents. It is therefore recommended that efforts should focus on expanding internet and electricity infrastructure, enhancing financial literacy programs, and promoting affordable digital access through subsidies or financing options. This responsibility should be jointly undertaken by the government (particularly the Ministries of Communication and Agriculture), telecom and fintech companies, rural financial institutions, and non-governmental organizations (NGOs). Policymakers should also address regulatory barriers and security concerns to build trust in digital transactions, ensuring greater financial inclusion, especially among rural populations.

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