

THE ROLE OF DIGITAL FINANCIAL LITERACY IN PROMOTING FINANCIAL INCLUSION FOR RURAL WOMEN AGRIPRENEURS IN NIGERIA

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ABSTRACT

Digital financial literacy (DFL) is increasingly recognized as a critical factor in promoting financial inclusion, particularly for marginalized groups such as rural women agripreneurs in developing nations like Nigeria. This study explores the relationship between DFL and financial inclusion among rural female agricultural entrepreneurs, examining how digital skills impact access to financial services and economic empowerment. Through an extensive review of empirical literature, this paper addresses the unique challenges faced by these women, the role of DFL in overcoming these challenges, and the broader economic and social benefits of increased financial inclusion. Results highlight the importance of targeted educational initiatives, digital infrastructure development, and supportive policy frameworks to foster sustainable growth. This paper concludes with recommendations for stakeholders, including government agencies, non-governmental organizations, and financial institutions, to prioritize DFL as a foundational tool for fostering inclusive economic development in rural Nigeria.

Keywords: Agripreneurs, Digital, Finance, Literacy, Women, Rural.

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INTRODUCTION

Financial inclusion has gained increasing attention as a powerful tool for reducing poverty, fostering economic development, and promoting equitable access to resources, especially in marginalized and rural communities (Demirgüç-Kunt *et al.*, 2018; Ovwigho *et al.*, 2024). This concept goes beyond simply having access to financial services; it encompasses affordable and timely access to a full range of services, such as savings, loans, insurance, and digital payments, that are critical for financial stability and economic growth. In Nigeria, rural women engaged in agriculture, commonly referred to as agripreneurs, represent a significant portion of the agricultural workforce and are central to food security and local economic growth (Efobi *et al.*, 2017; Adefare *et al.*, 2024). Yet, their participation in the formal financial system remains minimal due to structural challenges, socioeconomic factors, and inadequate access to tailored financial services (Olowa and Olowa, 2020; Gumbo *et al.*, 2023).

Financial exclusion among rural women agripreneurs limits their ability to access credit and savings mechanisms, impeding their capacity to invest in resources, manage risks, and scale their agricultural enterprises. This exclusion is often exacerbated by limited literacy, restrictive cultural norms, and low income levels that confine them to informal financial practices (Afolabi, 2020; Ogbari *et al.*, 2024). Furthermore, rural women's restricted access to information and communication technology (ICT) resources, which could otherwise facilitate connections to broader markets and financial services, compounds their exclusion (Oloyede, 2018; Obisesan *et al.*, 2023). Many financial institutions tend to focus their services in urban centers, leaving rural areas underserved, which adds to the challenges rural women face in joining the formal financial system.

In recent years, the digitalization of financial services has emerged as a transformative solution for achieving broader financial inclusion (World Bank, 2022). With innovations such as mobile banking, digital wallets, and online payment platforms, even the most remote populations have the potential to access a variety of financial products

and services without physical banking infrastructure. For rural women agripreneurs, digital financial services (DFS) present opportunities to bypass conventional barriers, access credit, save, and make secure transactions directly from their mobile phones. However, leveraging these opportunities effectively depends on digital financial literacy (DFL)-the understanding, skills, and confidence to use digital tools safely and efficiently. DFL enables women to understand their financial products, assess risks, protect their data, and interact with the digital financial ecosystem more independently.

Unfortunately, rural women agripreneurs in Nigeria face particular challenges in acquiring DFL. Literacy levels remain low among this group, and sociocultural norms may discourage women from using digital tools, limiting their exposure and comfort with technology (Akinlo and Akinlo, 2019; Alabi *et al.*, 2022). Moreover, the high costs of mobile data, limited internet infrastructure in rural areas, and intermittent electricity make it difficult for many rural women to access or consistently use digital devices (Odum *et al.*, 2018; Modiba *et al.*, 2024; Oyekanmi, 2024). These barriers restrict their integration into digital finance, despite the potential benefits for income generation and economic resilience.

Given the substantial hurdles, there is a critical need to assess the current state of DFL among rural women agripreneurs in Nigeria. Enhancing DFL through targeted interventions such as tailored training programs, community-based digital education, and gender-sensitive policies could bridge the existing gaps and lead to significant improvements in financial inclusion. Governmental policies that support infrastructure development, along with partnerships between financial institutions and non-governmental organizations (NGOs), could make digital services more accessible and relevant to rural women's unique needs (Odularu and Okhale, 2024). A comprehensive approach involving stakeholders across sectors can empower rural women agripreneurs to actively participate in the digital financial ecosystem, fostering inclusive economic growth and reducing poverty at the grassroots level. Thus, the specific objectives of this research review were to identify the barriers to DFL among rural women agripreneurs; assess the impact of DFL on

financial inclusion; and identify the challenges and opportunities in promoting DFL.

THEORETICAL FRAMEWORK

The theoretical framework for this study draws on multiple theories to understand the connection between DFL and financial inclusion for rural women agripreneurs. Each theory provides insights into the factors influencing the adoption of DFS and the broader socioeconomic impacts of enhanced DFL on financial empowerment.

Diffusion of innovations theory (Rogers, 2003)

Rogers' Diffusion of Innovations theory is instrumental in explaining how new ideas, technologies, or practices spread within a community. DFS are relatively new in rural areas, especially among women agripreneurs who may face specific challenges in technology adoption due to limited education, traditional financial habits, or societal expectations. According to this theory, factors such as relative advantage (the perceived benefits over traditional methods), compatibility with existing values and experiences, complexity (ease of use), trialability (ability to experiment with the service), and observability (visible benefits observed by others) all influence the rate of adoption (Rogers, 2003). In this context, the adoption of DFS among rural women agripreneurs could be fostered by demonstrating how digital tools are compatible with existing financial practices and beneficial in terms of saving time and improving economic outcomes. In addition, social networks and community leaders often play a crucial role in influencing adoption rates in rural settings by endorsing new technologies.

Human capital theory (Becker, 1964)

Becker's Human Capital Theory asserts that investing in human capital, such as education and skill development, improves individual productivity and economic outcomes. This theory is central to understanding how DFL can empower rural women agripreneurs. Enhancing digital literacy increases their capacity to interact with financial services, assess risks, manage transactions, and make informed decisions. By increasing their human capital, rural women can access financial resources that were previously out of reach, fostering business growth and economic participation. Human capital investments, including DFL training, contribute to a virtuous cycle where increased skills lead to greater confidence in handling financial tasks, which in turn promotes sustained engagement with financial services and an enhanced likelihood of business expansion.

Capability approach (Sen, 1999)

Sen's Capability Approach underscores the importance of enabling individuals to achieve well-being by expanding their abilities and freedoms. In the context of financial inclusion, the capability approach highlights how DFL can empower rural women agripreneurs by enhancing their ability to access, understand, and manage financial resources independently. Rather than merely providing financial services, it emphasizes empowering women to effectively use and benefit from these services. For example, DFL enables women to make better savings decisions, access credit on more favorable terms, and plan for future investments. This empowerment process builds a foundation for economic independence, thus enabling rural women to make meaningful contributions to their households and communities. In addition, this theory emphasizes that the success of DFL initiatives depends on addressing external constraints- such as social norms, infrastructure, and policy barriers, that may restrict women's ability to utilize their capabilities fully.

These theoretical perspectives collectively provide a nuanced understanding of the dynamics through which DFL can impact financial inclusion and the adoption of DFS. They suggest that successful digital financial inclusion for rural women requires a multi-dimensional approach, addressing both internal factors (such as skills and knowledge) and external factors (such as social and cultural environments).

CONCEPTUAL FRAMEWORK

The conceptual framework for this study situates DFL as an essential component for achieving financial inclusion among rural women agripreneurs. It proposes that financial inclusion is a multi-dimensional construct, influenced by three key components: DFL, Access to DFS, and Socioeconomic and Cultural Factors (Fig. 1).

DFL

DFL encompasses knowledge, skills, and confidence in using DFS securely and effectively. For rural women, DFL includes:

- Knowledge of digital platforms: Understanding how to navigate mobile banking, e-wallets, and other DFS interfaces.
- Awareness of digital financial products: Being aware of services such as mobile loans, digital savings accounts, and insurance options available through DFS.
- Skills for secure online financial transactions: Knowing how to carry out transactions safely, protect personal information, and identify potential fraud risks.

DFL plays a foundational role in financial inclusion, as it enables rural women to confidently engage with DFS and make informed decisions. Without DFL, women are more vulnerable to fraud and may experience increased financial stress, which could deter further usage of DFS.

Access to DFS

Access to DFS is the availability and ease with which rural women agripreneurs can use digital banking, mobile money, digital wallets, and other financial services tailored to their needs. Key aspects include:

- Infrastructure: Reliable internet access, affordable mobile devices, and the availability of DFS providers in rural areas are essential.
- Affordability: The cost of accessing DFS, including mobile data costs and transaction fees, should be reasonable for rural women to sustain regular use.
- Relevance of services: DFS offerings must be designed with rural women's needs in mind. For instance, flexible loan products, low-balance savings accounts, and accessible customer service channels can encourage adoption and sustained use.

Access alone, however, is insufficient if the services are not adapted to the unique needs and contexts of rural women. Platforms that do not consider cultural preferences, usability concerns, or cost barriers are unlikely to achieve broad adoption.

Socioeconomic and cultural factors

Socioeconomic and cultural factors play a moderating role in how DFL and access to DFS influence financial inclusion. These factors include:

- Literacy levels: Basic literacy and numeracy skills are prerequisites for understanding and using DFS. Rural women with limited literacy may struggle with text-heavy applications and financial terminology, which inhibits adoption.
- Gender norms: In many communities, women's participation in financial matters is limited by cultural expectations. Gender roles may discourage women from independently handling finances or interacting with technology, affecting their confidence in DFS.
- Social networks: Peer influence and community norms significantly shape perceptions of digital finance. Women who observe other agripreneurs benefiting from DFS are more likely to adopt these services, whereas those in communities skeptical of digital finance may face social pressure to abstain.

Socioeconomic and cultural factors thus mediate the effectiveness of DFL and DFS access, shaping whether and how rural women engage with digital financial tools. Recognizing these influences is essential for designing interventions that address the unique constraints of rural women and create a supportive environment for DFS adoption.

Each step outlines the interconnection between DFL, access to DFS, and socioeconomic and cultural factors, leading to the desired outcome of financial inclusion for rural women agripreneurs.

Step 1: DFL*Objective*

Equip rural women with the necessary knowledge, skills, and confidence to effectively and securely use DFS.

Key features

1. Knowledge of digital platforms: Familiarity with mobile banking, e-wallets, and other DFS interfaces
2. Awareness of digital financial products: Understanding options such as mobile loans, savings accounts, and insurance
3. Skills for secure transactions: Proficiency in protecting personal data, avoiding fraud, and conducting safe transactions.

Outcome of step 1

Enhance women's ability to confidently engage with DFS, reduce vulnerability to fraud, and build trust in digital finance.

Step 2: Access to DFS*Objective*

Ensure rural women have practical and affordable access to DFS tailored to their specific needs.

Key features

1. Infrastructure: Availability of reliable internet, mobile devices, and service providers in rural areas
2. Affordability: Reduce costs such as transaction fees and mobile data expenses
3. Relevance of services: Design products for rural women, e.g., flexible loans, low-balance accounts, and accessible customer support.

Outcome of step 2

Facilitate the widespread adoption of DFS by addressing cost, infrastructure, and relevance barriers.

Step 3: Socioeconomic and cultural factors*Objective*

Address moderating factors that influence the effectiveness of DFL and DFS access on financial inclusion.

Key features

1. Literacy levels: Basic literacy and numeracy skills required for using text-heavy apps and financial tools
2. Gender norms: Cultural expectations and roles that may limit women's independence in financial matters
3. Social networks: Influence of community norms and peer behavior on DFS adoption.

Outcome of step 3

Create a supportive social and cultural environment that enables rural women to overcome structural barriers and confidently adopt DFS.

Step 4: Financial inclusion*Objective*

Achieve comprehensive financial inclusion by integrating DFL, DFS access, and cultural considerations.

Key outcomes

1. Economic empowerment: Increased financial autonomy and income for rural women agripreneurs
2. Enhanced livelihoods: Access to savings, credit, and insurance improves resilience to financial shocks
3. Community development: Empowered women serve as role models, fostering broader adoption of DFS in rural communities.

DIAGRAMMATIC REPRESENTATION OF THE FRAMEWORK**Input factors**

- DFL
- Access to DFS
- Socioeconomic and cultural factors.

Process

- Implementation of tailored training and services
- Addressing cultural and infrastructural barriers.

Output factors

- Increased DFS usage
- Economic empowerment of rural women agripreneurs.

Outcome

- Comprehensive financial inclusion for rural women agripreneurs.

This breakdown emphasizes the interaction between the core components and their collective impact on financial inclusion. A visual representation is shown below.

Here is the visualization of the conceptual framework:

Inputs

- DFL
- Access to DFS
- Socioeconomic and cultural factors.

Process

Implementation of tailored training and services to address literacy, accessibility, and cultural barriers.

Outputs

Increased usage of DFS and economic empowerment for rural women agripreneurs.

Outcome

Comprehensive financial inclusion that improves livelihoods and fosters community development.

This diagram highlights the flow from input factors to the final outcome, showing how each component interlinks to drive financial inclusion.

RESEARCH METHODOLOGY

The study draws information from journals, conference proceedings, monographs, edited books, newspapers, etc. to deduce an insight into the role of DFL in promoting financial inclusion among rural women agripreneurs in Nigeria.

RESULTS AND DISCUSSION**Barriers to DFL among rural women agripreneurs***Limited access to ICT infrastructure*

Rural areas in Nigeria are often underserved in terms of digital infrastructure, which is essential for accessing DFS. Internet connectivity is limited, and access to affordable mobile devices is a major barrier (Oloyede, 2018; Akpuokwe *et al.*, 2024). The high cost of mobile data and irregular electricity supply make it challenging for women to consistently access digital tools, thus limiting their participation in digital finance. Research shows that only about 30% of rural areas in Nigeria have reliable Internet, with mobile data costs being prohibitive for the average rural household (Uduji and Okolo-Obasi, 2022). Consequently, lack of ICT infrastructure disproportionately affects women agripreneurs, who are often unable to afford the devices or the ongoing connectivity costs necessary for financial inclusion.

Low digital and financial literacy levels

Many rural women agripreneurs in Nigeria have limited educational backgrounds, which affect both their financial literacy and digital

skills. Digital literacy is closely linked to general literacy levels, which remain low in many rural Nigerian communities (Akinlo and Akinlo, 2019; Ugwuja *et al.*, 2020). For many women, even basic mobile banking applications are difficult to navigate due to limited familiarity with digital interfaces and financial terminology. This lack of foundational skills creates a barrier to using digital financial tools effectively, preventing rural women from making informed financial decisions, accessing credit, or managing savings. In addition, the limited availability of educational resources focused on digital finance in rural areas further perpetuates this gap, as there are few local training programs specifically designed to teach these skills (Uduji and Okolo-Obasi, 2018; Oyekanmi, 2024).

Gender and cultural norms

Sociocultural norms in many Nigerian communities often restrict women's roles in financial decision-making and may discourage women from participating in digital finance due to security and privacy concerns (Efobi *et al.*, 2017). In some households, women have limited control over income and financial resources, which restricts their ability to make independent financial decisions. Social norms may discourage women from engaging with digital platforms, as there are often societal expectations that prioritize men's access to financial resources (Olowa and Olowa, 2020). In addition, there may be concerns around women's privacy and security in digital spaces, which further complicates their willingness to engage with DFS. Thus, the cultural environment often becomes a barrier to women's financial autonomy, reinforcing a cycle of exclusion.

Impact of dfl on financial inclusion

Enhanced financial access and saving

Digital literacy opens up new avenues for rural women agripreneurs to engage with financial services, which are typically inaccessible through traditional banking channels. With improved digital skills, women can use mobile banking, mobile money, and digital wallets to save small amounts, accumulate capital over time, and build a financial safety net (Demirgüç-Kunt *et al.*, 2018; Rani and Kumar, 2024). Studies show that when women have access to digital financial tools, they are more likely to save regularly and increase their economic resilience (Chinelo and Ayodeji, 2022). Mobile money platforms such as Paga and Firstmonie in Nigeria have demonstrated success in helping rural populations engage in financial activities such as savings and microloans, providing women agripreneurs with vital resources to sustain their businesses.

Improved business management and growth

DFL equips women agripreneurs with the skills to efficiently manage their finances and business operations. For instance, digital tools enable women to access real-time market information, track expenses, and make secure transactions. These capabilities are especially valuable in agriculture, where market prices and supply chains can be highly variable (Olowa and Olowa, 2020). Digital skills empower agripreneurs to make more informed business decisions, expand their market reach, and respond to economic opportunities. Furthermore, digital literacy enables them to access e-commerce platforms where they can sell their produce beyond local markets, thus boosting their income and market visibility (Oloyede, 2018; Maigari and Yelwa, 2023).

Economic empowerment and social capital

Beyond financial inclusion, DFL has profound social implications. As women gain confidence in using digital tools to manage their finances, they become more autonomous in household financial decisions, which can lead to shifts in traditional gender dynamics (Afolabi, 2020; Soetan and Mogaji, 2024). DFL enhances women's social capital by enabling them to join digital communities, participate in online forums, and network with other entrepreneurs, which fosters a sense of community and shared purpose. These connections increase their exposure to new ideas and resources, further reinforcing their economic and social empowerment. As women in rural communities adopt digital finance

tools, they often serve as role models, inspiring others to follow suit and gradually changing perceptions around women's economic roles (Rutashobyta *et al.*, 2021; Uduji and Okolo-Obasi, 2022).

Challenges and opportunities in promoting DFL

Educational initiatives and capacity building

Effective DFL programs that are specifically designed for rural women agripreneurs can close the digital literacy gap. Localized and practical training, offered through community centers or partnerships with local leaders, can help address the literacy challenges that women face (Oloyede, 2018; Gichuki and Kamau, 2022). The integration of audio-visual aids, which require minimal reading skills, is particularly effective in DFL training in low-literacy contexts. Programs that include practical, hands-on training and focus on specific digital financial tools are more likely to empower women to use these tools independently. Partnerships with NGOs, microfinance institutions, and local cooperatives can expand the reach of such programs and ensure their long-term sustainability.

Policy and institutional support

Governmental policies that prioritize ICT infrastructure in rural areas are essential for increasing DFS access. By incentivizing telecommunications and financial institutions to expand digital infrastructure and services, the government can make DFS more accessible in underserved regions. Financial institutions can partner with NGOs to develop gender-sensitive DFL programs that address the unique challenges rural women face (Hassan, 2022; Ogunrinde, 2024; Oyekanmi, 2024). Furthermore, targeted subsidies and incentives for mobile data usage can alleviate the financial burden of accessing DFS for low-income rural women. Policy interventions can also include mandates for gender inclusion in financial literacy programs, ensuring that these efforts are inclusive and reach rural women.

Building trust and addressing security concerns

Trust and security are foundational for the successful adoption of DFS among rural women. Many rural women have concerns regarding the safety of digital financial transactions, and overcoming these fears is critical to increasing their engagement with digital platforms (Akinlo and Akinlo, 2019; Mohamud and Mohamed, 2023). Educating women about cybersecurity practices, such as recognizing phishing scams and securely storing digital credentials can help mitigate these concerns. Institutions can further build trust by establishing customer support services in local languages and providing troubleshooting assistance to ensure women feel supported as they navigate digital platforms. In addition, financial service providers can use community-based "digital champions" to promote trust and provide peer-to-peer assistance, which helps build credibility for DFS.

Technology adaptation for low-literacy users

Financial services providers can enhance DFL by adapting mobile interfaces and applications to accommodate users with low literacy. Simple, icon-based navigation, voice prompts in local languages, and interactive tutorials can make digital platforms more accessible to rural women agripreneurs who have limited reading skills. For example, apps that provide visual cues and minimize text can help users navigate complex transactions without needing to rely on literacy skills.

Collaborative approach involving community leaders

Community leaders and local influencers play a crucial role in influencing social norms. Engaging these leaders in DFL initiatives can facilitate community buy-in and support for women's digital financial engagement. Leaders can advocate for women's use of digital finance tools, challenge restrictive norms, and encourage family support for women's financial autonomy. This approach also helps create a supportive environment for women to learn and use digital tools within their cultural context.

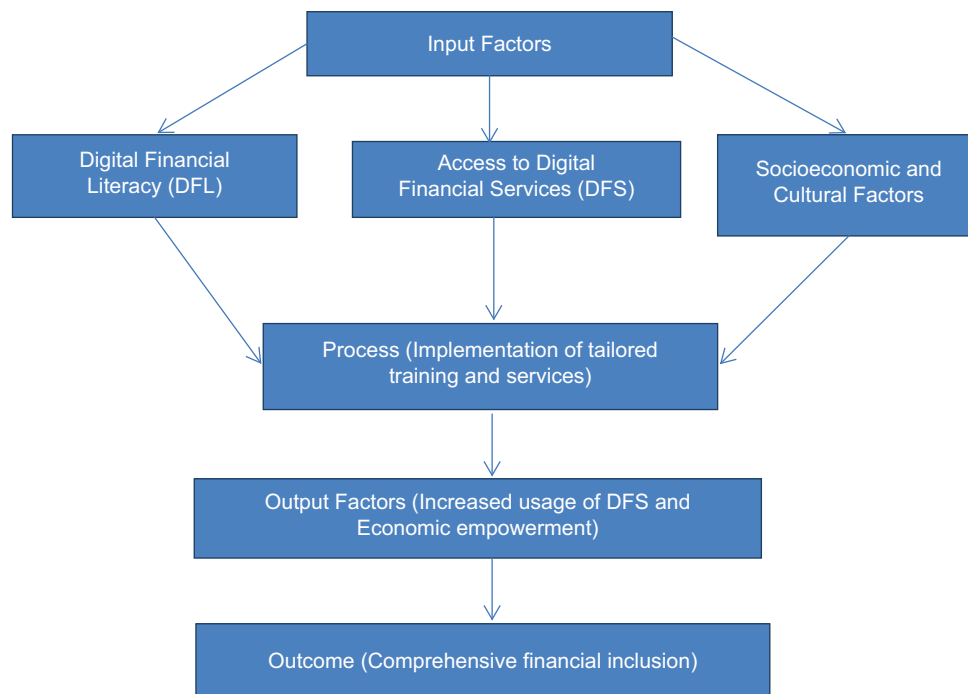


Fig. 1: Conceptual framework

Monitoring and evaluation of DFL programs

Continuous monitoring and evaluation of DFL initiatives is essential for assessing their impact and identifying areas for improvement. By tracking the effectiveness of DFL programs through metrics such as service usage rates, income changes, and savings behaviors, stakeholders can gauge the success of interventions and refine them to better serve rural women. This data-driven approach ensures that DFL programs remain responsive to the evolving needs of rural women agripreneurs.

CONCLUSION AND RECOMMENDATIONS

Enhancing DFL among rural women agripreneurs is essential for achieving inclusive financial growth in Nigeria. Digital skills enable these women to access a range of financial products, manage their finances more effectively, and enhance their entrepreneurial potential. This study emphasizes the need for targeted educational interventions, improved ICT infrastructure, and supportive policy measures to address the specific barriers faced by rural women. Further, the following recommendations are proffered:

Educational programs

Tailored DFL training that addresses the digital and financial literacy needs of rural women should be developed in collaboration with community leaders and NGOs.

Infrastructure development

The government should prioritize digital infrastructure in rural areas to make DFS more accessible.

Supportive policy frameworks

Polymakers should create policies that encourage financial institutions to offer products suited to the needs of rural women agripreneurs.

Social campaigns to shift gender norms

Awareness campaigns that promote the economic benefits of women's financial inclusion could help to shift cultural norms and empower rural women.

Enhanced security education

Programs that educate women about online security practices are critical to building trust in DFS.

By implementing these recommendations, Nigeria can empower rural women agripreneurs, improving not only their financial well-being but also that of their families and communities.

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