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Digital financial inclusion for rural women : Challenges and opportunities for sustainable development

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Abstract

Digital financial inclusion plays important role in advancing the rural women economic empowerment by granting access to essential financial services through technology. Despite progress in digital infrastructure, rural women in Rajasthan continue to encounter numerous obstacles such as limited digital literacy, scarce availability of mobile devices and the internet, and societal barriers. Digital financial services offer a transformative opportunity to enhance women's independence and financial engagement.

The study delves into how tools like microfinance, banking facility accessibility via mobile phone, and digital payment systems can uplift rural women economically and contribute to sustainable development. By enabling access to savings, insurance, credit, and payment services, the study underlines how digital finance can drive empowerment. It also examines how community-driven strategies, policy innovation, and technological progress can further assist rural women. Noteworthy strides have been made through initiatives by

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government such as Digital India initiative. Projects like BharatNet aim to provide high-speed internet to rural regions and integrate digital finance within Self-Help Groups (SHGs).

Financial inclusion is key to sustainable development, supporting gender equality, poverty reduction, and economic resilience[1]. Digital financial inclusion ensures rural women can actively take part in economic processes [12], fostering inclusive growth and adhering to the UN's sustainability framework [2]. The paper come to the conclusion with practical recommendations for policymakers, financial service providers, and civil society to craft inclusive digital financial solutions that reflect the unique needs and constraints of rural women.

Subject Classification: *91B02, 62P25, 91B06.*

Keywords: *Digital financial inclusion, Rural women, Financial empowerment, Fintech, Sustainable development, Digital literacy.*

1. Introduction

Digital financial services have become more accessible as a powerful driver in today's global economy, especially in developing countries where financial exclusion is still a pressing concern. Achieving financial inclusion is essential for economic growth and sustainable development because it guarantees that financial services are available and accessible to everyone, particularly underserved populations like rural women. Financial inclusivity empowers people to save, obtain credit, carry out transactions securely, and engage in productive economic activities that contribute to national growth [3].

True financial inclusion extends beyond bank account ownership to encompass access to affordable loans, insurance, investments, and financial literacy. Studies show that financially independent women positively influence household well-being, children's education, and community development.

Despite the growing importance of digital finance, rural women in countries like India face persistent barriers such as low literacy, inadequate digital skills, restricted mobility, and gender biases [4]. Many still have less access to even basic services offered by bank or customized financial products. Nevertheless, tools like banking via mobile, microloans, and mobile wallets offer a chance to bridge these gaps [13]. Increased smartphone use and internet penetration have made financial services more attainable and user-friendly through platforms like UPI and Aadhaar-linked accounts [5], [6], [7].

Recognizing the potential of digital inclusion, the government of India have launched several policies targeting underserved communities.

For instance, the Pradhan Mantri Jan Dhan Yojana (PMJDY) allows individuals to have zero-balance account, aiming to universalize banking access. However, gender gaps persist. The Global Findex Database (2021) [8] states, while 85% of Indian men have bank accounts, only 77% of women do. Rural women also grapple with limited documentation, mobility constraints, and societal norms.

Programs like the Digital India initiative and Direct Benefit Transfer (DBT) have bolstered inclusion by directly depositing government benefits into accounts, enhancing transparency and reducing leakage. Microfinance institutions (MFIs) and Self-Help Groups have also played an important role in fostering economic participation by offering small, collateral-free loans for income-generating activities like farming, crafts, and small businesses [9].

Despite these advancements, several obstacles still hinder rural women's full engagement in the digital financial ecosystem. Their low educational and digital literacy levels make navigating financial platforms difficult[10]. Confusing interfaces and the fear of making errors reduce usage. Deep-rooted gender norms and a lack of exposure to financial decision-making further limit their autonomy. In addition, fears surrounding digital fraud, cybercrime, and misinformation—such as phishing and unauthorized deductions—foster mistrust in digital systems [11].

The purpose of this study is to examine the role, digital financial inclusion plays in sustainable development, as well as the potential and difficulties that it presents for rural women. By examining relevant policies, technological innovations, and social dynamics, it illustrates how digital tools can empower women and drive broader development goals.

Overcoming these challenges requires a holistic approach. Financial literacy programs must be tailored to rural women and delivered through community-based models in local languages. Vocational training should include digital skills to help women effectively use financial tools to elevate their quality of life. Collaboration among tech companies, financial institutions, and government bodies is crucial to design intuitive digital platforms. Additionally, local helplines and support services can build trust and encourage more rural women to adopt digital financial services.

Research Objectives

This study's main goals are to determine the extent of digital financial inclusion among rural women and highlight the obstacles they encounter, and investigate ways to improve their financial involvement. The objective of this study is to:

1. Assess the level of digital financial inclusion among rural women.
2. To analyze the key barriers that hinder rural women's access to various digital financial services.
3. Examine the opportunities available to improve Fintech literacy and access.
4. Provide policy recommendations for promoting digital financial inclusion for sustainable growth.

Research Gap

Despite growing global interest in digital financial inclusion (DFI), there remain notable research gaps, especially concerning rural women. Much of the existing literature focuses on general access to financial services, often overlooking the unique challenges rural women face due to intersecting geographic and gender-based disadvantages. While issues related to infrastructure and technology are frequently discussed, fewer studies delve into socio-cultural barriers—such as patriarchal standards—that limit women's financial freedom. Additionally, the emphasis for most evaluations remains on the availability of services rather than on key outcomes like empowerment or decision-making ability. In particular, the link between DFI and rural women's decision-making power in Rajasthan remains inadequately explored, even though this relationship is vital to understanding the real impact of financial inclusion [14].

Literature Review

Financial Inclusion and Economic Growth

- [15] argue that boosting financial inclusion—especially among rural women—has a remarkable beneficial impact on the economic development of Indian states.
- [16] focuses on Rajasthan, highlighting that improved access to financial services has helped tribal rural women achieve greater socio-economic empowerment.

Barriers to Digital Financial Inclusion for Rural Women

- [17] reveal how cultural expectations, rigid gender roles, digital illiteracy, and weak infrastructure restrict women's access to digital finance.
- [25] highlight similar challenges such as limited smartphone ownership, safety concerns, and lack of digital skills, and propose both policy and grassroots-level interventions.
- [18] emphasize the low skill and awareness of digital financial knowledge among rural women and advocate for targeted educational initiatives.

Role of Technology and Fintech in Inclusion

- [19] discuss how technological solutions like Aadhaar-enabled payments and mobile banking have helped bypass traditional banking obstacles in rural regions.
- [20] underscore the importance of improving digital literacy and tech access as crucial steps toward achieving broader financial inclusion.
- [21] promote fintech as a key instrument in closing gender gaps in financial access, and recommend strong digital literacy and cybersecurity frameworks.

Digital Literacy and Financial Decision-Making

- [22] identify a strong link between digital financial proficiency and rural women's ability to make aware financial commitments.
- Women's World Banking (2024) provides empirical evidence showing that well-designed inclusive programs can boost women's confidence and participation in digital finance.

Global Perspectives and Comparative Insights

- [23], through the Global Financial Inclusion Database, show that rural women globally are among the most financially excluded groups, while highlighting the part played by digital financial tools in bridging these gaps.
- [24] review international studies on women's financial inclusion in developing nations, pointing out common challenges and emerging best practices.

Research consistently indicates that inclusivity of digital financial significantly enhances economic empowerment of rural women's and contributes to overall economic progress [15], [16]. However, deep-rooted cultural norms, lack of digital education, and insufficient infrastructure continue to act as major barriers [17], [25]. Fintech innovations and digital literacy are essential to overcoming these challenges [22], [26]. To fully include rural women in the digital financial ecosystem, it is imperative to adopt inclusive, technology-driven strategies, ensure community involvement, and implement supportive policy measures—insights echoed in both national and global research.

Challenges in Digital Financial Inclusions

While financial services digitally available have the ability to revolutionize, the economic empowerment of rural women, a range of interconnected challenges still hinder their full participation. These challenges span across socio-cultural, educational, infrastructural, and economic domains.

- **Limited Digital Literacy and Technological Familiarity**

  A major barrier to inclusivity of digital finance is the extensive scarceness of digital literacy among rural women. Many are unfamiliar with using smartphones, mobile apps, or digital financial platforms. Women in developing regions are also significantly improbable than men to have mobile devices or have accessibility of internet, limiting their participation in digital services [23]. Without basic digital skills, even simple [13] online transactions can become intimidating and inaccessible.

- **Infrastructure and Connectivity Issues**

  Poor digital infrastructure remains a core issue, including unstable electricity, low smartphone usage, and unreliable internet connections. Compounding this, rural women are about 10% less probable than men to have a mobile phone [27]. These infrastructural deficiencies reduce the reliability of financial services available digitally and reinforce the ongoing digital divide among rural areas.

- **Socio-Cultural and Gender-Based Norms**

  Traditional gender roles and patriarchal social structures continue to restrict women's financial freedom. In many rural households, financial decisions are dominated by male members, leaving women with limited autonomy. [28] highlight that these deep-rooted societal norms hinder women's accessibility of digital tools and reinforce exclusion from formal financial systems.

- Low Financial Knowledge and Risk Awareness

  Even when digital financial services are accessible, many rural women lack the financial literacy to use them effectively. This gap can lead to poor financial decisions, vulnerability to scams, and underutilization of available financial products. Studies suggest that gender-sensitive educational programs can significantly enhance financial literacy, enabling rural women to navigate digital financial tools more confidently and responsibly.

Opportunities for Sustainable Development

- **Economic Empowerment**

  Digital financial services improve access to credit, allowing rural women to launch and grow small businesses. Research indicates that tools like mobile banking and microfinance have significantly boosted women's economic participation in rural areas [29]. Digital platforms also connect women to broader markets, enabling them to sell their products beyond local communities.

- **Financial Literacy and Capacity Enhancement**

  Various initiatives have been introduced to boost rural women's financial and digital literacy. Both governmental and non-governmental organizations have launched training programs to help women better utilize digital financial services [30]. These programs enhance women's confidence in managing finances independently.

- **Fintech Innovations**

  Technological advancements in fintech—such as mobile wallets and blockchain-based platforms—are transforming financial access in rural regions. Services like Paytm in India and M-Pesa in Africa have significantly increased women's engagement with financial systems [31]. Additionally, AI-powered financial advisory services are offering personalized support, further empowering women with tailored financial solutions.

- **Social and Community Support Structures**

  Women-led cooperatives and Self-Help Groups (SHGs) play a critical role in promoting inclusivity of digital financial. Studies show that SHGs encourage collective financial decision-making and build trust in digital platforms [32]. Community-based approaches not only enhance participation but also reduce the risks associated with digital financial fraud.

Methodology

Research Approach

This study uses multi-methods research type for the research purpose. In order to evaluate digital financial inclusion among Rajasthani rural women quantitative methodology is used by using structured questionnaires. It intended to examine how access to digital financial services is impacted by age, occupation, income, and education. Secondary data was sourced from government reports, journal articles and previously published reports.

Research Design and Sampling

A standardized questionnaire with five sections—demographics, access, obstacles, opportunities, and recommendations—was used to perform a descriptive, cross-sectional survey. A purposive sampling method was adopted to intentionally select women with likely exposure to digital financial services, such as those in agriculture, self-employment, and homemaking. Although it limited generalizability, this non-random approach made sure participation had contextual significance.

Data Analysis

Data analysis involved descriptive statistics and visualizations using MS Excel and SPSS. Excel was used for data cleaning, percentage calculations, and demographic charts. Deeper analysis was conducted by SPSS, which also performed reliability testing using Cronbach's Alpha for Likert scale items and cross-tabulations (e.g., education vs. digital payment use). The main demographic details of the 80 respondents are shown in Table 1.

In order to ensure the questionnaire's accuracy, construct validity was evaluated using SPSS's Exploratory Factor Analysis (EFA), and content validity was guaranteed by review. The goal of these actions was to improve accuracy and dependability. However, the findings' robustness and generalizability can be impacted by the small sample size (n=80) and limited validity testing.

Table 1

Demographic characteristics of Respondents

Demographic Factor	Categories	Percentage (%)
Age Group	18-24	15 %
	25-40	50 %
	41-55	25 %
	56 & above	10 %
Level of Education	Absence of Formal Education	20 %
	Elementary Education	30 %
	Secondary Education	35 %
	Higher Education	15 %
Occupation	Agriculture	43 %
	Self Employed	28%
	Home maker	19%
	Others	10 %
Monthly Income	Below ₹10,000	45 %
	₹10,000-₹25,000	35 %
	Above ₹25,000	20 %

Demographics and Education

Indicating that middle-aged rural women are more actively involved in financial activities, the study discovered that half of the respondents (50%) were between the ages of 25 and 40. A significant 20% of participants lacked formal education, which may have limited their access to and proficiency with digital financial instruments, even if many had finished secondary or higher school.

Occupational Profile

With 43% of women working in agriculture, it was the most prevalent occupation, reflecting the rural environment. Additionally, noteworthy was self-employment (28%), which suggests that rural women are active entrepreneurs. In contrast, 10% of respondents were classified as "Others," most likely informal or daily wage workers, and 19% were homemakers, indicating a reliance on family income.

Income Levels

The fact that 45% of respondents made less than ₹10,000 a month demonstrated their economic fragility. Only 20% made more than ₹25,000 per month, while another 35% made between ₹10,000 and ₹25,000. These numbers imply that frequent internet use and access to digital banking may be hampered by affordability.

Access to Financial Services

Eighty percent of respondents reported having a bank account, a figure that aligns with the impact of government program such as the Pradhan Mantri JanDhan Yojana. While access alone does not ensure regular or meaningful use, it does create the foundation for engaging in digital payments, savings, and financial transactions.

Digital Device Ownership, Connectivity and Utilization of Digital Financial Services

Despite 65% of respondents owning smartphones, only 40% actively used digital financial services. This gap highlights that device ownership does not equate to digital financial participation. Factors contributing to this discrepancy include shared device usage, limited privacy, lack of digital confidence, and fear of making mistakes. Concerns over online safety, unfamiliarity with digital platforms, and inconsistent internet access further discourage usage. The findings underscore the difference between the availability of digital services and their effective utilization.

Digital Literacy and Training Interest

A promising insight from the study is that over 70% of respondents (56 out of 80) expressed strong interest in receiving training in digital financial literacy. This demonstrates a willingness among rural women to adapt and engage with digital financial tools—provided they receive the right guidance and support.

Economic Impacts of Digital Financial Inclusion

Digital financial inclusion offers multiple benefits that go beyond mere access:

1. **Access to Financial Services –** Facilitates business growth, improves savings habits, and enables access to credit and insurance.
2. **Financial Autonomy –** Strengthens women's control over personal and household finances, enhancing their decision-making power.
3. **Income Generation –** Connects women to digital markets and mobile payment platforms, increasing their income and formal economic participation.
4. **Efficiency –** Saves time and reduces transaction costs, allowing women to engage more in income-generating activities.
5. **Credit Access –** Enables greater asset ownership and mobility through alternative credit scoring mechanisms.
6. **Insurance Coverage –** Promotes financial resilience by making insurance accessible via mobile platforms.

Limitations

Reliance on Secondary Literature

The study primarily draws on existing literature and secondary data sources. Without field-based primary research, it lacks nuanced insights into the lived experiences of rural women.

Limited Geographic Scope

While the study addresses rural contexts generally, it may not adequately reflect the diversity of regional, state-level, or global cultural settings.

Rapid Technological Change

With the fast pace of technological advancement and evolving financial regulations, some findings may become outdated over time.

Overlooked Sociocultural Diversity

The study does not fully capture the complex sociocultural factors that influence women's financial behavior across different contexts.

Lack of Intersectional Analysis

While focusing on gender-based barriers, the study does not sufficiently explore how other identities—such as caste, disability, or age—further impact financial exclusion.

Measurement of Impact: Although the report outlines potential benefits, it does not quantitatively assess the direct effects of digital financial inclusion on women's empowerment or sustainable development outcomes.

Conclusion

Ensuring that rural women can access and benefit from digital financial services is critical for inclusive and sustainable development. Despite progress, barriers such as traditional gender roles, infrastructural shortcomings, digital illiteracy, and distrust in online systems continue to hinder full participation.

A **holistic approach** is needed—one that integrates infrastructure development, financial education, policy interventions, and cultural awareness.

Key recommendations include:

Localized Financial Literacy Programs

Implement peer-to-peer models like *Digital Sakhis*, where trained women educate others in their communities.

Interactive Learning Tools

Use regional-language radio programs, gamified mobile applications, and community-based workshops to increase engagement.

Infrastructure Development

Expand rural broadband, establish digital kiosks, and provide affordable smartphones through telecom partnerships.

Social and Cultural Support

Promote family and community support systems, offer business training, and establish women-centric financial cooperatives.

Building Digital Trust

Strengthen cybersecurity, launch targeted awareness campaigns, and provide responsive customer service to build confidence in digital systems.

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