

Bridging the Rural Finance Gap: The Synergistic Role of Microfinance and Digital Payments in Advancing Farmers' Inclusion in Bihar

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ABSTRACT

In order to improve rural financial inclusion in Bihar, India, this study explores the revolutionary potential of combining digital payment systems with microfinance. Significant disparities in usage, accessibility, and digital literacy still exist despite major governmental initiatives like the Pradhan Mantri Jan Dhan Yojana and the growth of UPI-based services, especially among farmers, women, and young people living in rural areas. The study illustrates how digital tools and microfinance institutions (MFIs) can work together to promote financial empowerment by examining secondary data from RBI, NABARD, NPCI, and PMJDY in addition to insights from current literature. Key findings show that although account ownership has grown across socioeconomic categories, social, educational, and infrastructure hurdles continue to impede meaningful engagement. The paper suggests a multifaceted approach that includes MFI digitization, targeted digital literacy initiatives, SHGs, and rural fintech collaborations. The study concludes by highlighting the necessity of inclusive, technologically advanced financial ecosystems to close the gap between rural and urban areas and allow farming communities in Bihar to engage in the economy over the long run.

Keywords: Microfinance, Digital Payments, Rural Finance, Financial Empowerments, Bihar Farmers, UPI, Digital Literacy, Fintech.

Introduction

In the pursuit of equitable and sustainable economic development, financial inclusion has become a cornerstone policy objective—particularly in developing countries such as India. For countless small and marginal farmers across rural Bihar, one of the country's most financially underserved regions, access to formal financial services remains severely limited. The traditional banking infrastructure has largely failed to penetrate these rural areas, hindered by challenges such as poor connectivity, lack of physical branches, low literacy levels, and socio-economic marginalization. Nonetheless, a transformative shift is taking shape with the concurrent growth of microfinance institutions (MFIs) and the widespread adoption of digital financial technologies. Microfinance has proven instrumental in delivering small, collateral-free loans and savings facilities to rural households, offering an alternative to exploitative informal credit sources. Its decentralized, group-based approach has especially empowered women and landless farmers to invest in agriculture, microenterprises, and education (Lutfi et al., 2021; Rivera et al., 2018). In Bihar, MFIs have expanded their outreach by forming self-help groups (SHGs) and joint liability groups (JLGs), encouraging peer monitoring and enhancing repayment rates while providing basic financial literacy.

Parallel to this, the proliferation of digital payments—fueled by government-led initiatives like the Unified Payments Interface (UPI), Aadhaar-enabled Payment Systems (AePS), and the Pradhan Mantri Jan Dhan Yojana (PMJDY)—has begun to reconfigure how people in rural Bihar manage and access financial services (Khera et al., 2022; Tay et al., 2022). As of 2024, Bihar has witnessed a significant rise in UPI transactions even in tier-3 and rural towns, largely driven by the increasing availability of smartphones, affordable mobile data, and community-level fintech agents. Government benefit transfers, crop subsidies, and even microloan disbursements are now being routed digitally, reducing leakage and improving transparency (Guo, Li & Pang, 2024). Recent studies underscore the transformational potential of these digital shifts. Aad et al. (2020) emphasize how digital payments improve governance by minimizing rent-seeking and informal leakages, thereby enhancing financial transparency and productivity. Azeez and Akhtar (2020) highlight that despite technological progress, digital illiteracy and lack of awareness pose significant barriers in rural adoption. Banu et al. (2024) describe the coexistence of cash-based and digital systems in rural India, portraying this as a transitional phase shaped by socio-cultural dynamics.

UPI, in particular, has emerged as a low-cost, highly interoperable payment platform that facilitates rapid digital onboarding. Asanova et al. (2024) and Modwel & Trivedi (2024) show how UPI is significantly reshaping rural transaction behavior, enabling users with minimal literacy to carry out secure financial transactions. Dev et al. (2024) identify that digital incentives and behavioral nudges have successfully shifted payment preferences in semi-urban and rural communities. Balad et al. (2024) further explore how the platform not only drives financial inclusion but catalyzes entrepreneurial activities and enhances digital familiarity among rural residents. However, these gains are tempered by infrastructural constraints and trust deficits. Azeez et al. (2022) draw attention to the infrastructural limitations—such as erratic power supply and inconsistent internet connectivity—that impede smooth digital operations in remote areas. Golden and Cordie (2022) argue that promoting digital literacy among adult populations, especially women, is central to unlocking the full potential of digital finance. Jacob et al. (2024) and Joshi (2024) highlight psychological factors, noting that trust in digital systems, perceived usefulness, and peer influence are decisive in driving or impeding adoption among the rural poor.

At the institutional level, microfinance institutions are adapting to this new digital paradigm. Mishra et al. (2023) and MSC & NPCI (2022) reveal how MFIs are now integrating digital payment platforms such as UPI and AePS into their loan disbursement and repayment systems. This not only reduces cash handling and operational costs but also enables greater transparency and outreach. The digitization of MFI operations is particularly empowering women and smallholder farmers, enabling them to securely access microloans and make savings deposits with greater ease. Evidence from Singh et al. (2024) indicates that digital interfaces used by MFIs have improved customer satisfaction, reduced turnaround time for loans, and enhanced repayment monitoring. From a policy perspective, foundational government initiatives such as PMJDY have laid the infrastructure for inclusive financial growth. D'Silva et al. (2019) and the BIS (2020) underscore that India's robust digital public infrastructure—comprising Aadhaar, mobile connectivity, and interoperable payments—provides a replicable model for other developing nations. However, Nandini & Deshpande (2023) and Kejkar & Uttarwar (2023) caution that these gains are not evenly distributed; gaps in digital literacy and fears of cyber fraud continue to limit deeper penetration.

The rural Bihar context offers a compelling case study. Ragini & Prakash (2023) stress that successful financial inclusion strategies must account for contextual nuances—cultural norms, local language interfaces, and peer learning mechanisms can make or break adoption efforts. Goel et al. (2019) and Pradhan (2024) observe emerging behavioral shifts in rural households, including greater preference for saving through digital channels and a growing familiarity with credit management tools. A recent report by Kumar and Shahi (2024) outlines how digital microfinance has improved income-generating capabilities among small farmers in Gaya and Nalanda districts by enabling real-time access to microcredit, crop insurance, and mobile advisory services. Although several government programs and policies have aimed to enhance financial inclusion, a significant portion of Bihar's rural population—especially farmers—still lacks access to formal financial services. Factors such as poor digital literacy, weak infrastructure, limited financial knowledge, and the uneven reach of microfinance institutions continue to obstruct meaningful financial access. This raises a critical question: Can combining microfinance with digital payment systems genuinely transform the rural financial landscape for Bihar's farming communities?

This journal aims to explore this evolving landscape by examining how the synergy between microfinance and digital payments is reshaping rural finance in Bihar, analyzing its impact on financial inclusion, and identifying the roadblocks that must be addressed to sustain this momentum. The study aims to analyze the current state of microfinance and digital financial services in rural Bihar, with a particular focus on how these financial tools are accessed and utilized by the farming community. It seeks to evaluate the impact of these services on the financial behavior of farmers and their overall level of financial inclusion. Furthermore, the research will examine the interplay between microfinance institutions (MFIs) and digital payment systems, exploring how their integration may enhance the efficiency and outreach of rural financial services. In doing so, the study will identify key barriers that hinder the widespread adoption of these systems, as well as potential opportunities for expanding financial access across underserved regions.

Ultimately, it aims to propose well-informed policy interventions and institutional strategies that can improve financial access and equity for Bihar's rural population, particularly small and marginal farmers. This research contributes to the understanding of how technology-driven finance and grassroots credit models can work together to reduce poverty and boost agricultural productivity. It offers valuable insights for policymakers, development practitioners, and financial service providers aiming to strengthen the rural financial ecosystem through inclusive innovation.

Literature Review

Microfinance has long served as a critical tool for bridging the financial gap in underserved rural communities. Initially modeled on the principles of the Grameen Bank by Nobel Laureate Muhammad Yunus, microfinance in India evolved through institutions such as Microfinance Institutions (MFIs). These platforms provide small, collateral-free loans primarily targeting women, enabling rural families to initiate income-generating activities and achieve a degree of financial independence. Swain and Wallentin (2009) assert that microfinance does more than enhance income—it fosters both economic and social empowerment, particularly for women in rural settings. In parallel, the rapid expansion of digital payment systems has significantly transformed how rural populations engage with financial services. Tools like the Unified Payments Interface (UPI), Aadhaar-enabled Payment Systems (AePS), and mobile wallets have streamlined transactions, reduced dependency on cash, and broadened access to formal financial systems. These innovations have enhanced transparency, lowered transaction costs, and enabled more efficient delivery of government subsidies and financial services. Digital payments are not only reshaping consumption and savings patterns but are also facilitating better financial planning and reducing the need for costly and time-consuming physical banking infrastructure. Initiatives like Direct Benefit Transfers (DBTs) and the Pradhan Mantri Jan Dhan Yojana (PMJDY) have further amplified the reach of these technologies, embedding digital finance into the everyday lives of rural citizens.

The emergence of digital financial tools has revolutionized how people in rural areas interact with money. Platforms such as the Unified Payments Interface (UPI), Aadhaar-enabled Payment Systems (AePS), mobile banking, and Direct Benefit Transfers (DBTs) have broadened access to financial services. As highlighted in the Global Findex Report (Demirgüç-Kunt et al., 2018), these technologies reduce transaction costs, boost transparency, and expand the reach of formal financial systems. Initiatives like the Pradhan Mantri Jan Dhan Yojana (PMJDY) have dramatically increased account ownership, yet challenges persist in states like Bihar, where account inactivity remains high due to digital illiteracy, infrastructural limitations, and socio-economic barriers. Several studies shed light on the mechanism through which digital finance enhances productivity and innovation. Hongli and Pengcheng (2021) find a strong link between digital finance and improvements in total factor productivity among listed firms. Similarly, Li Xiuping and Bingtao (2022) argue that digital finance, when aligned with leadership diversity, promotes enterprise innovation. Xiaoge, Shihu, and Xiaoxin (2021) further explain that digital finance helps correct financial misallocation, which is critical for innovation and resource optimization.

The intersection between digital finance and sustainability is another recurring theme. Kong et al. (2022) and Shusong, Nina, and Ke (2022) explore how digital finance supports green innovation by reducing information asymmetries and expanding access to environmentally focused funding mechanisms. Li et al. (2023) extend this narrative by showing that digital finance contributes to high-quality development and aligns firms with environmental goals. These studies emphasize digital finance's role in promoting energy efficiency, green transformation, and climate adaptation—particularly vital in

developing economies aiming for inclusive and sustainable growth. Recent literature also highlights how digital finance encourages ESG (Environmental, Social, and Governance) investing in rural sectors traditionally excluded from sustainable finance initiatives. These developments reflect broader efforts to integrate rural development, digital innovation, and climate resilience.

In rural settings, Xiuhua, Xiaojin, and Jing (2012) provide a thorough analysis of financial exclusion in China's hinterlands. Ying (2024) and Xiaoyi (2020) show how digital inclusive finance empowers SMEs in underdeveloped areas through scalable, customized solutions that foster innovation and resilience. Digital platforms help overcome logistical and institutional barriers, enhance credit allocation, and stimulate entrepreneurship. The integration of AI and big data into rural financial systems enables more precise targeting of financial services, allowing underserved entrepreneurs to maintain and expand operations. A growing body of literature emphasizes the essential role of financial literacy and digital inclusion in boosting MSME performance. Research from ASEAN countries shows that access to digital tools and financial education enables rural entrepreneurs to manage resources and endure economic shocks (Panjaitan et al., 2021; Raya et al., 2021; Susan, 2020; Anggadwita et al., 2023; Hirawati et al., 2021; Ong et al., 2023). Digital literacy is a major enabler of financial inclusion (Setiawan et al., 2022; Suyanto et al., 2023). Digital training and community-based learning models are also cited as effective in fostering financial responsibility and entrepreneurship among rural youth and women. Greater digital proficiency improves adoption of e-wallets, online credit systems, and supply chain financing.

The COVID-19 pandemic accelerated digital adoption but exposed disparities in access. Anggadwita et al. (2023) and Anggia et al. (2021) highlight how Indonesian craft sectors adapted through digital platforms. Triwardhani et al. (2023), Dirgiatmo et al. (2020), Drummond et al. (2023), and Susanty et al. (2020) document how social media and e-commerce supported rural SMEs. These studies also underline the importance of digital agility, an innovation-driven culture, and adaptive capacity during economic disruptions. The pandemic period also saw increased use of mobile-based peer lending, crowdfunding, and government-to-person (G2P) transfers, reshaping the financial landscape for rural entrepreneurs. Literature from Africa and MENA regions affirms that digital finance enhances livelihoods and resilience (Frimpong et al., 2022; Akande et al., 2023; Al-Smadi, 2023). Human capital theory (Becker, 1967) and open innovation frameworks (Raya et al., 2021; Siregar et al., 2020) highlight the connection between financial capability and rural innovation. These perspectives suggest that financial education combined with digital tools can foster entrepreneurial mindsets and unleash innovation potential in marginalized regions. Digitally enabled MSMEs are better positioned to produce value-added goods, access diverse markets, and grow sustainably.

The integration of microfinance and digital technologies is receiving increased scholarly attention. IFMR LEAD (2017) and CGAP (2020) report that digital microfinance cuts costs and enhances transparency. Mobile-enabled SHG operations in Tamil Nadu and Karnataka have seen success, though issues such as poor connectivity, limited digital skills, and social resistance persist. Evidence suggests that combining microfinance principles with digital innovations like mobile interfaces, e-KYC, and blockchain-based ledgers can streamline processes, build trust, and reduce fraud.

Chinese literature (Guo et al., 2023; Guo and Zhu, 2022; Rong, 2022) underscores how advanced fintech tools—particularly machine learning and big data analytics—are revolutionizing banking risk management. These technologies enable more accurate credit scoring, fraud detection, and real-time monitoring of financial behavior, thereby enhancing both operational efficiency and financial stability. These studies emphasize the importance of digital infrastructure and data-sharing ecosystems in unlocking the full potential of AI-driven financial services, especially in rural and underserved markets. Global research complements these insights by exploring the broader implications of fintech for competition, market structure, and regulation. Phan et al. (2020), Gomber et al. (2018), and Pierri and Timmer (2020) examine how the rise of digital platforms is disrupting traditional banking models, lowering barriers to entry, and fostering more customer-centric financial ecosystems. However, they also caution that rapid fintech growth can introduce systemic risks if left unregulated, especially through shadow banking and cyber vulnerabilities. A strong regulatory framework becomes essential—not to stifle innovation, but to guide it toward inclusive and stable financial development. Foundational contributions from Bernanke (2007), Dewatripont and Freixas (2012), and Bourreau and Valletti (2015) advocate for a balanced approach, where regulatory agility ensures that fintech innovations serve public interest while

safeguarding systemic integrity. This balance is particularly crucial for developing economies like India, where financial innovation must coexist with institutional capacity-building and consumer protection.

Bihar presents a compelling case for examining digital financial inclusion due to its unique socio-economic landscape and persistent developmental challenges. Studies by NABARD (2019), IndiaSpend (2021), and MicroSave (2020) reveal several barriers, such as dormant accounts, low levels of digital and financial literacy, limited internet connectivity, and deeply entrenched socio-economic constraints that hinder the full realization of financial inclusion goals. Nevertheless, Bihar has also shown notable progress, particularly with the proliferation of digitally-enabled SHGs and the expansion of Common Service Centres (CSCs), which act as accessible points of contact for digital and financial services in remote areas. These developments suggest a gradual but meaningful shift toward greater digital participation and financial empowerment. Microfinance continues to play a key role in agricultural advancement in Bihar by providing timely inputs, enabling investment in tools and seeds, and reducing dependency on high-interest informal credit sources (Seibel, 2005; Bhatt & Tang, 2002). Complementing this, digital payments are enhancing the functionality of rural economies by promoting efficiency, transparency, and direct fund transfers that bypass traditional bureaucratic hurdles (Ghosh, 2016; RBI, 2020; Sarma & Pais, 2011). This synergy between microfinance and digital innovation creates an enabling ecosystem for financial resilience and economic diversification in the state.

Government programs like PMJDY, Digital India, NRLM, and PM-KISAN have increased financial access and digital infrastructure. Reports by NCAER (2019) and Indicus Analytics (2018) acknowledge these advances but also stress the continued influence of structural challenges—poor connectivity, low trust in banks, and gender-based digital gaps—particularly in Bihar. These realities call for locally tailored, participatory policies that engage grassroots stakeholders and reflect community needs. Strengthening digital public infrastructure and creating community-based digital literacy initiatives can play a pivotal role in closing these gaps.

Gender dynamics are central to financial inclusion in rural areas. Although women in Bihar are actively engaged in community-based finance, they still face obstacles such as limited digital access, low device ownership, expensive data services, and restrictive gender norms (Mahalekshmi & Gnanadhas, 2010; World Bank, 2021; GSMA, 2022). The digital gender gap in mobile ownership and internet use hampers women's ability to access and use financial services. There is a need for gender-sensitive financial education, digital literacy programs, and service models that empower women as independent financial actors. Bridging this gap is not only an issue of equity but also key to achieving broader financial inclusion. Research suggests that digitally empowered women reinvest in their families and communities, amplifying the developmental effects of inclusive finance.

Emerging digital microfinance models – such as biometric KYC and AI-driven credit scoring—are gaining traction (Kumar & Shah, 2020). Despite an extensive literature on microfinance and digital payments, few studies have examined their combined effect in agricultural contexts like Bihar. Most existing studies treat microfinance and digital payments as separate mechanisms of financial inclusion. Limited literature specifically addresses the synergy between the two in rural, agriculture-dependent states like Bihar. A need exists to study how integrating microfinance and digital tools impacts rural farmers' access to financial services, especially in low-income, low-literacy environments. This study aims to fill that gap and offer actionable insights and policy recommendations for advancing sustainable rural financial inclusion.

Research Methodology

This study is based entirely on secondary data sourced from a range of well-established and authoritative institutions to ensure analytical depth, credibility, and contextual relevance. Primary data providers include the Reserve Bank of India (RBI), the National Bank for Agriculture and Rural Development (NABARD), and the National Payments Corporation of India (NPCI), all of which offer robust datasets and reports on rural credit, banking performance, financial inclusion, and the adoption of digital financial services across India. The research also integrates insights from flagship national initiatives such as the Pradhan Mantri Jan Dhan Yojana (PMJDY) and uses global benchmarks like the World Bank's Global Findex Database to assess India's progress in financial inclusion and identify regional disparities. To capture localized socio-economic dynamics, the study incorporates data from official publications of the Government of Bihar - including state economic surveys, Budget Speeches, and Finance Department reports, chosen as a representative case due to its vibrant agricultural economy

and active participation in microfinance programs. Supplementary data on digital transaction patterns, such as UPI volumes, AePS activity, and Direct Benefit Transfer (DBT) disbursements, are drawn from the NPCI statistics portal to evaluate the reach and effectiveness of digital financial infrastructure in rural Bihar.

• Data and Summary Statistics

Methodologically, the study adopts a descriptive and analytical research design. The descriptive component involves compiling and presenting existing data to portray the current state of financial inclusion and digital payment adoption. The analytical aspect examines the interplay between variables such as income levels, access to digital infrastructure, and financial behavior, aiming to identify potential causal relationships. Grounded entirely in secondary data, this approach allows for the exploration of macro-level patterns and regional disparities without relying on direct field-based data collection. The selected timeframe of 2011 to 2021 marks a transformative era of financial digitization in India, encompassing the introduction of UPI, expansion of Aadhaar-enabled systems, and the widespread rollout of DBTs – all of which coincide with the growing integration of microfinance and digital platforms – making it an ideal period for analyzing the evolving rural financial ecosystem and its impact on Bihar's small and marginal farming communities.

• Analytical Tools

The study uses a variety of analytical techniques to investigate how digital payments and microfinance can improve financial inclusion in Bihar's rural areas. Indicators of financial inclusion, such as account ownership, card usage, and access, are summarized and compared across various demographic categories using descriptive statistics. Finding trends and changes in financial access and usage over time, especially between 2011 and 2021, is made easier with the aid of trend analysis. By comparing Bihar's performance to both national and state-level averages, comparative analysis provides a contextual knowledge of the state's financial inclusion status. All of these resources work together to provide a comprehensive, fact-based evaluation of inclusion gaps and progress.

Data Analysis and Findings

India's financial inclusion made significant strides between 2011 and 2017, according to the report, thanks in large part to programs like the Pradhan Mantri Jan Dhan Yojana (PMJDY), which increased account ownership from 35% to 80% before slightly declining to 78% by 2021. Access did not, however, always result in active use; a decline in deposit activity and an increase in inactive accounts suggested low involvement. Men, urban dwellers, the well-educated, and those with higher incomes regularly exhibit more access to and usage of financial services than do women, rural populations, and the impoverished. These disparities hold true across gender, education, income, and geography. In 2021, for example, only 20% of women had a debit or credit card, compared to 35% of men, and rural card ownership was lower at 21% than urban card ownership at 36%. Even though mobile money usage rose from insignificant levels in 2011 to 10% in 2021, its uptake is still quite low. When compared to the rural farming population of Bihar, these trends indicate exacerbated issues brought on by low educational attainment, inadequate internet infrastructure, and a lack of financial literacy. Although the groundwork for financial inclusion has been established, closing the gap between access and efficient use is still essential for inclusive economic growth.

Table 1: Global Findex Indicators for India (2011-21)

Year	Account (% 15+)	Debit Card (% 15+)	Made Deposit	Inactive Account (% 15+)	ATM as Main Mode (%)	Mobile Money Account	Saved Any Money	Saved at Financial Institution	Borrowed from Formal FI	Borrowed from Family
2011	35	8	57	15	18	0	12	8	8	20
2014	53	22	47	17	33	2	38	14	9	32
2017	80	33	42	31	15	2	34	20	8	33
2021	78	27	29	27	10	10	24	13	12	31

Source: World Bank. (2022). *Global Findex Database 2021: Country brief—India*.

Table 1 (a): Overall Account ownership (Age 15+)

Year	Female (%)	Male (%)	Young (15–24)	Older (25+)
2011	26%	44%	27%	38%
2014	43%	63%	43%	57%
2017	77%	83%	71%	83%
2021	78%	78%	68%	81%

An impressive increase in account ownership among those over 15 has been observed in India, indicating a major advancement in the direction of financial inclusion. The percentage of women who had a bank account rose significantly from 26% in 2011 to 78% in 2021, according to Global Findex data, closing the gender gap that previously defined access to formal financial services.

In the same time frame, male account ownership increased from 44% to 78%, suggesting almost ubiquitous coverage. Youth between the ages of 15 and 24 show a noteworthy trend, with account ownership rising from 27% in 2011 to 68% in 2021. This increase is a result of both mobile banking advances and specific government efforts. Ownership among older persons (25+) increased from 38% to 81%, most likely as a result of social programs like the PMJDY project, pension-linked accounts, and Direct Benefit Transfers (DBT).

Despite the fact that gender parity in account ownership seems to have been attained by 2021, differences still exist in terms of account usage, credit availability, and digital financial literacy, especially in rural areas like Bihar where formal accounts might not correspond to active financial participation. According to these patterns, vertical inclusion—the breadth and caliber of financial access—remains a crucial area for empowering rural farmers and economically disadvantaged groups, even though India, including states like Bihar, has attained horizontal inclusion.

Table 1 (b): Account ownership by Income group

Year	Poorest 40% (%)	Richest 60% (%)
2011	27%	41%
2014	44%	59%
2017	77%	82%
2021	78%	77%

Table 1 (b), The change in account ownership across India's income categories from 2011 to 2021 tells a compelling story of the influence of inclusive financial policy. A glaring example of income-based financial exclusion was evident in 2011, as just 27% of the poorest 40% held a bank account, compared to 41% of the richest 60%. As a direct result of financial inclusion initiatives like the Pradhan Mantri Jan Dhan Yojana (PMJDY), Aadhaar-linked banking, and Direct Benefit Transfer (DBT) programs, this disparity was considerably reduced by 2017, with 77% of the poorest and 82% of the richest reporting account ownership, remarkably, in 2021.

The wealthiest 60% had somewhat greater account ownership than the poorest 40% (78% vs. 77%), indicating that focused state efforts have been more effective in bringing lower-income groups into the formal financial system. This inversion, which is uncommon in patterns of financial inclusion around the world, shows that India's welfare-linked financial infrastructure is reaching its target audience, even in areas like Bihar that are rural and economically underdeveloped. But among the poor, this "access parity" conceals more serious problems including limited usage, poor credit availability, and digital exclusion. Many of the poorest account holders in areas like Bihar might continue to rely on these accounts only for DBT inflows, without making the switch to active economic participation.

Table 1 (c) : Account Ownership by Education

Year	Primary or Less (%)	Secondary or More (%)
2011	31%	59%
2014	43%	64%
2017	75%	85%
2021	76%	81%

According to Table 1(c), account ownership in India increased dramatically between 2011 and 2021 for all educational levels, rising from 31% to 76% for those with elementary education or less and from 59% to 81% for those with secondary school or above. The success of inclusion initiatives like the Jan Dhan Yojana, which made banking easier for those with less education, is reflected in this closing gap. Disparities still exist, though, particularly in areas like Bihar where the less educated's lack of digital and financial literacy prevents them from engaging in meaningful financial activities beyond simple account ownership.

Table 1 (d): Labor Force Participation & Accounts

Year	Out of Labor Force (%)	In Labor Force (%)
2011	26%	44%
2014	41%	63%
2017	75%	84%
2021	73%	81%

In India, account ownership increased dramatically among both those inside and outside the labor force between 2011 and 2021 (Table 1(d)). Ownership among those not in the labor force, which frequently includes women, students, and the elderly, rose from 26% in 2011 to 73% in 2021. In the same time frame, it increased from 44% to 81% among those who were employed. Even while the gap between the two categories has closed, it still represents enduring obstacles like low income, restricted mobility, or a lack of digital literacy among individuals who are not actively employed. These statistics emphasize the need for focused financial outreach and easily accessible, low-barrier banking in rural regions like Bihar, where a sizable portion of the population is not employed.

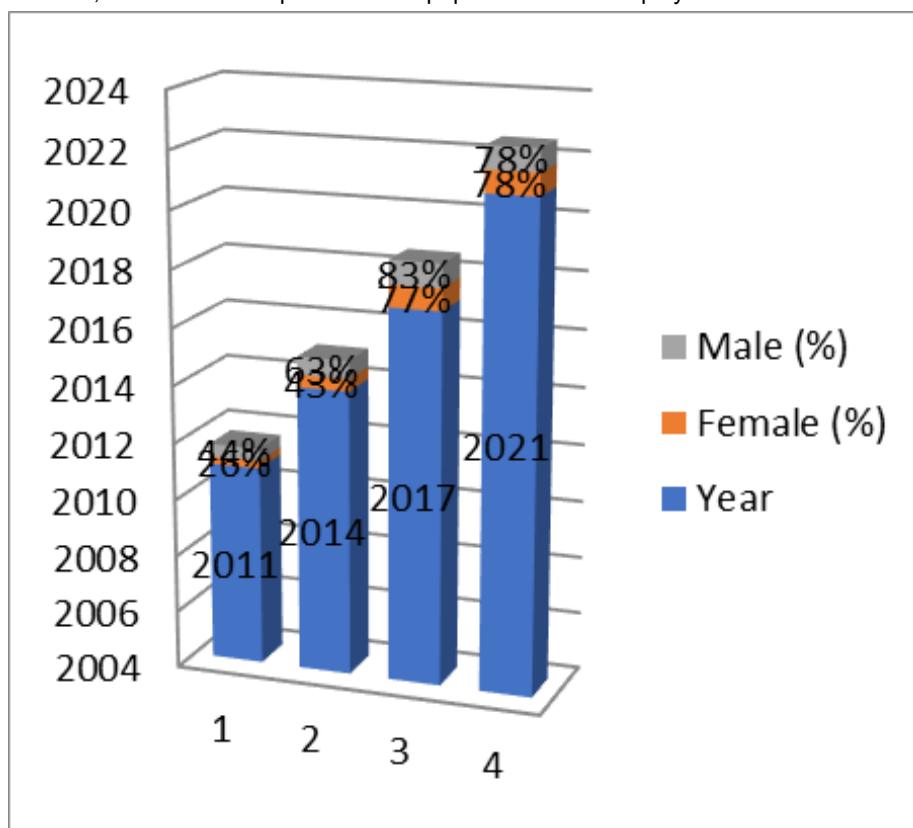


Figure 1 (a) No. of Account, Male and Female (%)

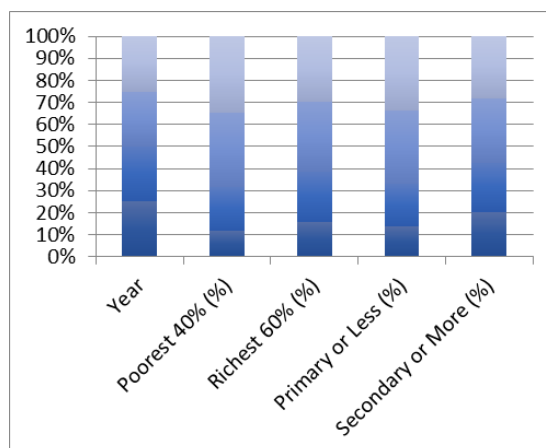


Figure 1 (b) Percentage of Account, Education Vs income Group

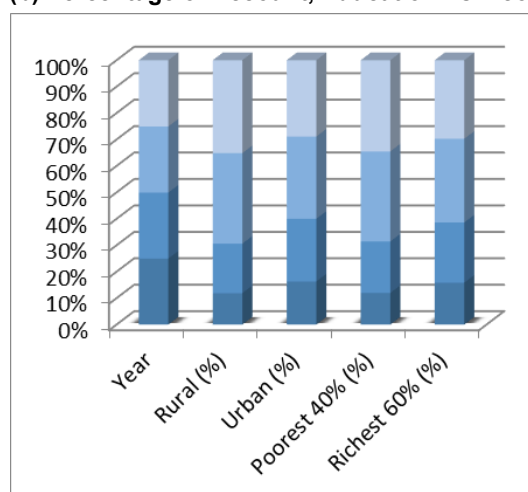


Figure 1 (c) No. of Account (%), Rural Vs Urban

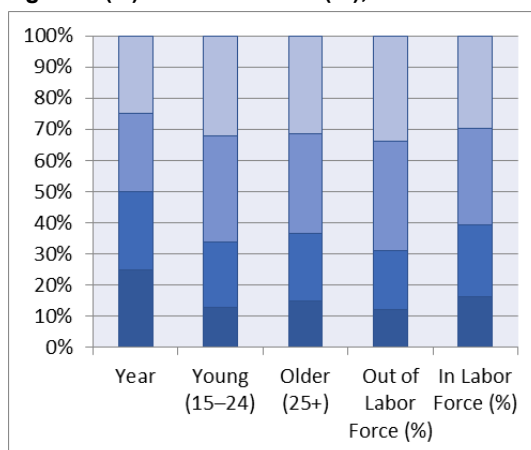


Figure 1 (d) No. of Account (%) among Labour Force

India has seen a tremendous increase in financial inclusion over the last ten years, with notable advancements in all demographic groups. The biggest change is the sharp increase in female account ownership, which went from only 26% in 2011 to 78% in 2021, thereby closing the gender gap in formal financial access, which is now on par with men. Young people and the elderly show similar growth patterns, suggesting that financial services are more widely used across age groups.

According to the aforementioned **figures 1 (a) (b)**, targeted financial inclusion initiatives like the Pradhan Mantri Jan Dhan Yojana (PMJDY) and Aadhaar-linked banking contributed to a significant increase in bank account ownership in India between 2011 and 2021 across all key demographic segments. Ownership grew from 27% to 67% among youth (15–24) and from 38% to 81% among older persons (25+) (**Figure 1 (d)**). As per **Figure 1(c)**, account ownership among those outside the work force, who are frequently students, stay-at-home moms, and the elderly, increased from 26% to 73%. This was closely followed by those in the labor force, who increased from 44% to 81%. Geographically, account ownership in rural areas increased from 26% to 77% in 2021, almost reaching urban levels at 78%. In terms of income, the lowest 40% increased from 27% to 78%, almost matching the wealthiest 60% at 77%. This suggests that broad-based access, or horizontal financial inclusion, has been largely accomplished.

Lower-educated people now own more bank accounts, and the income gap has reversed, with the poorest 40% now owning slightly more accounts than the richest 60%. These trends show how effective targeted programs like the Pradhan Mantri Jan Dhan Yojana (PMJDY), which made opening an account easier and provided zero-balance features, were. But these advancements in basic access point to more serious problems with real financial service use and engagement. Due to their limited exposure to digital payments, loans, insurance, and savings, younger people, non-working people, and rural communities—especially in states like Bihar—continue to show lower levels of vertical financial inclusion. Account ownership increased sharply in rural areas, from 26% in 2011 to 77% in 2021, almost matching metropolitan levels. By 2021, the difference in account ownership between rural and urban areas had shrunk to just 1%, demonstrating the effectiveness of last-mile financial outreach. Crucially, those who are formally employed are no longer the only ones who can access financial services. Notable progress has been made among the elderly, homemakers, and students, indicating that the inclusion agenda is now reaching out to previously unreached and non-traditional groups of people. All of these changes point to a more diverse and egalitarian financial sector in India.

Table 2: Credit and Debit Card Ownership in India (2011–2021)

Category	2011	2014	2017	2021
Owns a Credit Card				
Female	1%	2%	2%	2%
Male	2%	7%	4%	7%
Primary Education or Less	1%	1%	2%	2%
Secondary Education or More	5%	7%	4%	10%
Income (Poorest 40%)	1%	3%	2%	2%
Income (Richest 60%)	2%	5%	4%	6%
Rural	—	—	—	3%
Urban	—	—	—	6%
Owns a Debit Card				
Female	5%	11%	22%	19%
Male	12%	32%	43%	35%
Primary Education or Less	8%	20%	29%	19%
Secondary Education or More	9%	23%	34%	43%
Income (Poorest 40%)	5%	9%	16%	16%
Income (Richest 60%)	26%	37%	52%	35%
Rural	3%	11%	17%	20%
Urban	12%	30%	43%	36%

Credit card ownership increased significantly in India between 2011 and 2021, which is consistent with broader trends of digital financial inclusion. Nonetheless, over the course of the decade, credit card penetration stayed consistently low. Significant access inequities were evident in 2021, as

only 2% of women and 7% of males reported possessing a credit card. Access to credit cards was significantly influenced by education; those with at least a secondary education had a five-fold higher chance (10%) of having a credit card than those with only a primary school or less (2%). Another significant difference was income level, with the wealthiest 60% having three times the likelihood of owning a credit card (6%) compared to the poorest 40% (2%).

Debit card ownership, on the other hand, increased steadily across all demographic groups. While male ownership increased from 12% to 35% over the same time period, female ownership went from 5% in 2011 to 19% in 2021. The growth was especially notable among the 60% of the population that is wealthier (from 26% to 35%) and educated (from 9% to 43%). Urban regions grew significantly as well, rising from 12% to 36%. Debit card ownership also grew among historically underserved groups, encouragingly rising from 3% to 20% in rural areas and from 5% to 16% among the poorest 40%. Government-led programs like the Pradhan Mantri Jan Dhan Yojana (PMJDY), the launch of RuPay cards, bank account connections based on Aadhaar, and the quick growth of digital platforms like UPI are mostly responsible for these advancements.

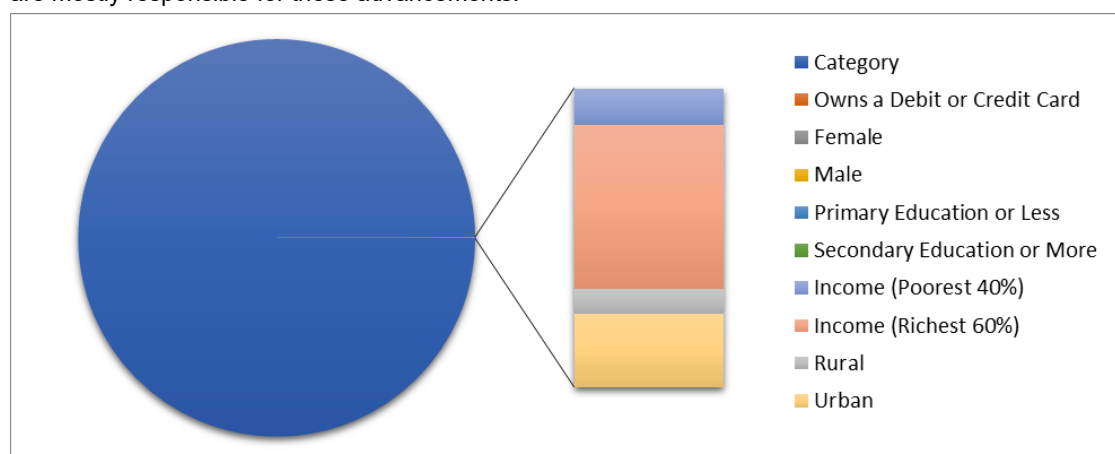


Figure 2: Owns a debit or credit cards by different group

The changing patterns of debit or credit card ownership in India between 2011 and 2021 are depicted in **Figure 2**, which first shows growth before plateauing or declining across a range of demographic and socioeconomic groups. Due to financial inclusion efforts, card ownership increased dramatically between 2011 and 2017 for all demographics, including women (from 5% to 24%), men (13% to 40%), the lowest 40% (from 6% to 17%), and rural inhabitants (from 4% to 18%). In many categories, however, ownership decreased or stagnated by 2021: urban ownership went from 44% to 36%, women's ownership fell to 20%, and the poorest people's ownership stayed at 16%. The wealthiest 60% (35%) and those with at least a secondary education (44%) continue to have a distinct edge in terms of education and income.

India has made significant and inclusive strides in financial inclusion when looking at the combined ownership of debit and credit cards. Card ownership roughly tripled from 13% to 35% among men and quadrupled from 5% to 20% among women between 2011 and 2021. Rural ownership increased from 4% to 21%, while the lowest 40% of the population increased from 6% to 16%. Ownership among educated people increased from 9% to 44%. These changes demonstrate the benefits of financial inclusion programs, digital transformation, and easier access to banking services. These improvements indicate that formerly marginalized groups are becoming more aware of and accepting of formal financial tools in addition to having better access to them. However, persistent structural imbalances temper this improvement. Women continued to lag much behind males in 2021, with a gender gap of 15 percentage points despite the general increase in card possession. In a similar vein, there are still significant disparities between urban and rural dwellers (36% vs. 21%) as well as between highly educated people (44%) and those with less education (20%). Ownership is also influenced by labor force involvement, as individuals who are employed are more likely to possess cards than those who are not.

Table 3: Saved any money by Individuals in India

Indicator / Group	2011	2014	2017	2021	Indicator / Group	2011	2014	2017	2021
Saved any money (Female)	7%	34%	30%	22%	Saved for old age (Female)	2%	9%	7%	10%
Saved any money (Male)	16%	42%	37%	25%	Saved for business (Female)	2%	6%	6%	6%
Saved at financial institution (Female)	7%	10%	17%	12%	Saved using group or informal (Female)	2%	3%	6%	6%
Saved at financial institution (Male)	16%	18%	22%	13%	Rural - Saved any money	--	--	26%	20%
Saved using mobile account (Female)	2%	3%	10%	2%	Urban - Saved any money	--	--	40%	28%
Saved using mobile account (Male)	4%	4%	13%	5%					
Saved for education (Female)	2%	8%	7%	8%					
Saved for education (Male)	4%	12%	12%	11%					

Source: World Bank. (2022). *Global Findex Database 2021: Country brief—India*.

From the above **Table 3**, India saw significant changes in saving habits between 2011 and 2021, especially with regard to gender and regional inclusiveness. During the immediate aftermath of financial inclusion initiatives like the Pradhan Mantri Jan Dhan Yojana (PMJDY), the percentage of women who save any money increased significantly from 7% in 2011 to 34% in 2014. Even while this percentage decreased little to 22% in 2021, it is still a significant improvement over the baseline. Similarly, for males, the rates decreased from 16% (2011) to 42% (2014) before decreasing to 25% (2021), indicating a general reduction in the gender disparity in saving habits. Women's savings through financial institutions rose from 7% to 17%, while men's savings through these institutions rose from 16% to 22%. However, by 2021, this had fallen to 13% for males and 12% for women, indicating a shift toward digital or informal channels or a decline in saving during pandemic years.

A relatively recent development, mobile account-based savings increased between 2014 and 2017 (from 3% to 10% for women and from 4% to 13% for men) before plummeting in 2021 (from 2% for women and 5% for men). This decline can be the result of reporting adjustments, a preference for UPI-led transactions (which don't necessarily preserve savings), or difficulties accessing mobile banking after demonetization. The percentage of women who saved for schooling and old age rose marginally over the course of the decade, indicating a rise in long-term planning and financial understanding. Although the amounts stayed low (about 6%), the same pattern was seen for group/informal mechanisms and business-related savings.

The gap between rural and urban areas in terms of saving also shrank geographically. Compared to 40% of urban inhabitants, 26% of rural respondents said they saved money in 2017. Although there was a general decline in saving rates, most likely as a result of economic hardship brought on by the pandemic, these figures by 2021 converged more closely to 20% in rural areas and 28% in urban areas, indicating growing parity once more. All things considered, the data show the achievements and shortcomings of financial inclusion programs. Even though almost everyone now has access to accounts, regular saving, particularly through official or mobile methods, is still unequal and susceptible to shocks to the economy. These results highlight the need for improved resilience in household financial behavior, focused financial literacy, and more trust in digital platforms. Significant

changes in saving habits across gender and geography occurred in India, initially as a result of robust financial inclusion initiatives like PMJDY but later as a result of economic upheavals like the epidemic. Rural areas gradually caught up to their urban counterparts, indicating stronger outreach, while women's saving involvement increased significantly, closing the gender gap. Formal savings and mobile account usage, however, decreased after reaching a peak in 2017, suggesting potential problems with digital adoption, trust, or financial capacity, despite greater accessibility. A shift toward non-saving digital platforms like UPI or a lack of digital infrastructure could be the cause of the drop in mobile-based savings, especially among women. Though overall savings behavior remained susceptible and variable, motivations for saving, such as for business, education, or old age, increased somewhat, suggesting growing financial knowledge.

Table 4: Borrowing Trends in India (2021)

Demographic Group	Borrowed (%)
Gender	
Female	10%
Male	15%
Age Group	
Youth (15–24 years)	10%
Older (25+ years)	14%
Education Level	
Primary education or less	10%
Secondary education or more	18%
Income Group	
Poorest 40%	11%
Richest 60%	14%
Location	
Rural	11%
Urban	15%
Employment Status	
Out of labor force	8%
In labor force	16%

Source: World Bank. (2022). *Global Findex Database 2021: Country brief—India*.

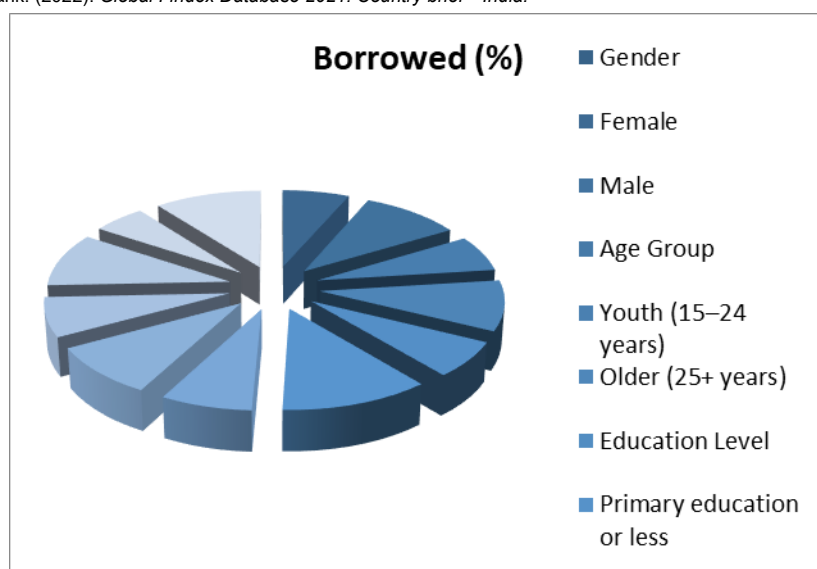


Figure 3: Borrowings Using Mobile A/C

Across a range of demographics, borrowing from official financial institutions or mobile money accounts in India showed a moderate but inclusive trend in 2021 (Table 4). Although there is a gender discrepancy of 5 percentage points, the fact that 15% of men and 10% of women reported borrowing suggests that women are becoming more financially involved. The rate of borrowing among age groups was 10% for younger people (15–24 years old) and slightly higher at 14% for older people (25+ years old), indicating that mature adults are more financially active. Those with primary school or less had a borrowing rate of 10%, while those with secondary education or more had a borrowing rate of 18%. This indicates that education continues to have a vital role in improving formal financial participation. A decreasing credit access gap between income categories was highlighted by the encouraging fact that the borrowing rate for the lowest 40% of the population was 11%, which was very close to the 14% rate for the richest 60%. Geographically, the gap between rural and urban loan availability has narrowed, with rural and urban populations reporting borrowing rates of 11% and 15%, respectively. Another important factor was labor force participation: 16% of people in the labor force obtained credit, compared to 8% of people not in the labor force, indicating that formal borrowing is still much facilitated by work. Although ongoing disparities by gender, education, and employment status need for focused policy interventions, these trends highlight the advancements made by India's inclusive finance program.

Table 5: Trends in Digital Payment Usage (2014–2021)

Category	2014	2017	2021
Female (15+)	14%	22%	28%
Male (15+)	30%	35%	41%
Youth (15–24)	19%	21%	30%
Older (25+)	24%	32%	37%
Primary Education or Less	14%	21%	29%
Secondary+ Education	32%	37%	48%
Poorest 40%	12%	20%	26%
Richest 60%	29%	35%	41%
Rural	—	—	30%
Urban	—	—	40%
Out of Labor Force	—	—	29%
In Labor Force	29%	34%	40%

Source: World Bank. (2022). *Global Findex Database 2021: Country brief—India*.

The use of digital payments in India increased dramatically (Table 5), affecting all given groups and mirroring the wider changes in the nation's financial system. A number of legislative and technological advancements, such as the introduction of the Digital India initiative in 2015, the revolutionary effects of demonetization in 2016, and the subsequent emergence of UPI-based platforms, Aadhaar-enabled services, and smart phone penetration, all contributed to this growth by improving digital accessibility and convenience. The closing gender gap in the uptake of digital payments was a noteworthy trend during this time. Just 14% of women and 30% of males used digital payments in 2014, a 16 percentage point difference. By 2021, the gender gap had shrunk to 13 points, with women's percentages improving to 28% and men's to 41%. Digital parity between men and women is still a problem, despite the fact that this shows significant progress toward gender-inclusive financial involvement.

It's interesting to note that older folks (those over 25) regularly used digital payments at a higher rate than young people. Compared to only 30% of young people, 37% of elderly people reported making digital payments in 2021. This implies that digital financial behavior is driven by active engagement in formal economic activities like job or enterprise, rather than just technology familiarity.

The adoption of digital payments in India is heavily influenced by factors such as geography, income, education level, and labor force status. In 2021, persons with secondary or higher education had a 48% utilization rate, compared to just 29% among those with primary school or less, suggesting persisting digital literacy obstacles. The use of digital payments by the richest 60% climbed from 29% to 41%, while the use of digital payments by the poorest 40% increased from 12% in 2014 to 26% in 2021, so reducing the income-based difference from 17 to 15 percentage points. Spatial gaps still exist, though, with rural utilization at 30% and urban usage at 40%, indicating the continued need for improved user

support and internet infrastructure in rural areas, suggesting that formal job and income-generating activities are important factors influencing digital financial involvement.

Financial Inclusion of Bihar's Farmers Through DBT and Digital Infrastructure

A comparative performance rating of Indian states and an examination of Direct Benefit Transfer (DBT) transaction trends over time might provide a clearer understanding of the changing financial inclusion scenario in Bihar, especially for rural populations like farmers. DBT transactions in Bihar increased steadily from 24.83 crore in FY 2019–20 to 94.44 crore in FY 2023–2024. This notable increase is a result of the state's growing financial accessibility, which is mostly due to the digitization of important welfare programs like PM-KISAN, MGNREGA, fertilizer subsidies, and rural pension plans, many of which have a direct impact on farmers' lives. The upward trend suggests that last-mile connectivity has improved, bank account penetration has increased, and rural beneficiaries—particularly small and marginal farmers—have greater faith in digital payments and governance. Bihar's comparatively strong performance in the national DBT implementation rankings supports this progress. With a score of 67.6, Bihar surpasses a number of larger or more developed regions, including Maharashtra, Karnataka, and Kerala, and comes in ninth place out of 36 states and union territories (**Figure 3**). Coverage, delivery accuracy, Aadhaar-enabled payment systems (AePS), institutional support, and grievance redressal processes are some of the aspects of DBT efficacy that are captured by this score. It implies that the state has established a strong administrative and technical foundation that enables prompt and precise digital transfers, which are essential for providing financial assistance that is focused on farmers.

The extent of financial inclusion in Bihar is still a major worry in spite of recent developments. Just 16% of India's poorest 40%, who mostly overlap with rural Bihar, own a debit or credit card, according to the Global Findex Database (2021). These numbers highlight the fact that even while welfare transfer accessibility has increased, many farmers continue to encounter obstacles to complete financial inclusion. These include a persistent reliance on cash withdrawals over the counter rather than digital transactions, low levels of digital and financial literacy, limited access to formal credit through organizations like banks or Kisan Credit Cards (KCCs), and limited availability of smartphones and internet connectivity. This circumstance draws attention to two realities. With DBT-linked bank accounts, Bihar has successfully onboarded a huge number of rural residents into the financial system, a process known as "horizontal inclusion." The usage of a wider range of financial services, including credit, insurance, savings, and investment instruments, is known as "vertical inclusion," but it is still in its infancy. This implies that farmers in Bihar are becoming more and more integrated into the financial system as passive beneficiaries of government assistance, but they still lack the necessary authority to actively engage in official financial and economic markets. They frequently lack access to vital enablers like credit histories, knowledge of digital payments, financial products designed to meet rural needs, and savings or insurance options.

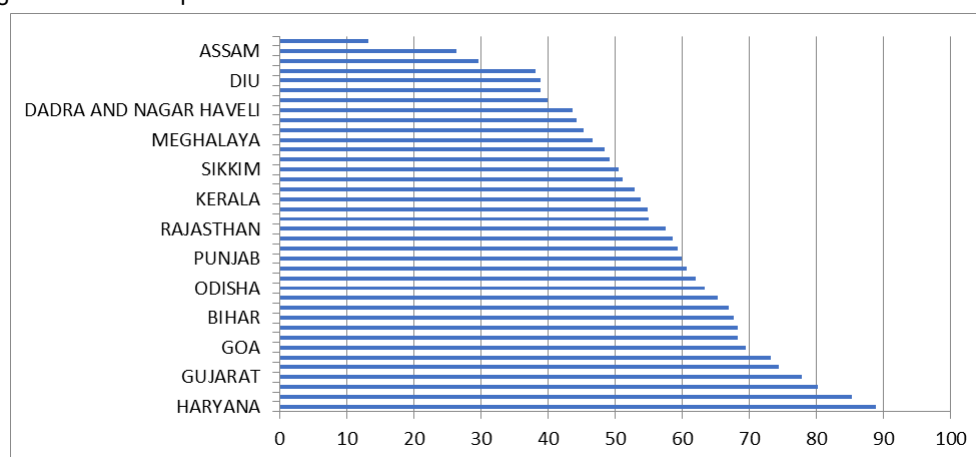


Figure 3: States Performance ranking Scores of Direct Benefit Transfer (DBT)

In conclusion, bringing Bihar's farmers into the official financial system has been made possible in large part by the DBT-led inclusion approach. However, a stronger push through innovation and legislation is needed to move from basic access to meaningful engagement. Priorities must be set for bolstering digital infrastructure, enhancing financial literacy, encouraging fintech innovations tailored to rural settings, and increasing access to reasonably priced loans and insurance. In order to guarantee that rural residents, particularly farmers, are not just included but also economically empowered, the next stage of financial inclusion in Bihar must concentrate on going "from cash to clicks" – from getting benefits to developing financial ability.

Discussion and Conclusion

• Interpreting the Trends in four coherent paragraphs

Women, small farmers, and low-income households are among the marginalized groups whose financial access has been improved by the expansion of microfinance in India, particularly in rural states like Bihar. Account ownership significantly increased between 2011 and 2017, primarily due to government-led financial inclusion initiatives, Self-Help Groups (SHGs), and microfinance institutions (MFIs). This increase in access hasn't entirely resulted in consistent use, though. Without further financial integration or a shift in behavior, access appears to remain superficial, as seen by the growing number of dormant accounts, the lack of formal savings behavior, and the ongoing reliance on informal borrowing. A new dimension has been introduced to the inclusion landscape by digital financial services, especially mobile-based platforms such as UPI. The use of mobile money has increased significantly in India since 2016, and the percentage of people who own a mobile account has increased from 2% in 2014 to 10% in 2021. However, due to socio cultural resistance, digital illiteracy, and infrastructure limitations, adoption is still uneven in rural Bihar. The adoption of these services is hampered by factors such as inadequate internet connectivity, low smartphone penetration, and low trust in digital platforms, particularly among women, the elderly, and those with lower levels of education.

The disparities in financial participation are further highlighted by demographic developments. Despite the fact that women's account ownership quadrupled from 14% to 28% between 2014 and 2021, their borrowing rates remained stagnant at 10%, far lower than men's 15%. Age, education, income, and geography all show disparities; older folks, those with more education, the wealthy, and those living in cities all routinely report using formal financial services more frequently. However, hurdles still exist for young people, those living in rural areas, people working in the informal economy, and people with less education, which supports the notion that financial inclusion is still selective and fragmented.

In conclusion, despite the fact that digital banking and microfinance have improved access to financial inclusion, socioeconomic and structural barriers still prevent meaningful participation. It will take an integrated strategy to close the gap between access and utilization, fusing the scope and effectiveness of digital technologies with MFIs' community reach. Localized financial literacy initiatives, digital infrastructure, and product innovation that caters to the requirements of underserved and rural communities must be given top priority by policymakers and practitioners. Then and only then will financial inclusion progress from establishing an account to actively and empoweredly participating in the financial system.

• The Power of Integration

An intriguing opportunity is presented by India's changing financial inclusion landscape: combining contemporary digital technology with conventional microfinance and Self-Help Group (SHG) models. While SHGs and microfinance institutions (MFIs) have long been vital lifelines for the underprivileged, especially women, small farmers, and rural business owners, their influence and reach have frequently been limited by high transaction costs, limited scalability, and operational inefficiencies. By lowering costs, increasing transparency, and facilitating real-time service delivery, digital technologies—particularly mobile banking, digital payments (like UPI), Aadhaar-enabled authentication, and fintech platforms—offer scalable solutions that can overcome these limitations. In rural areas like Bihar, where internet penetration is uneven and financial infrastructure is inadequate, integrating digital platforms with the community-based, high-trust model of SHGs and MFIs can have revolutionary effects. For example, mobile-based credit scoring and digital bookkeeping can enhance loan processing and lower default rates, while digital wallets and QR-based transactions can expedite loan disbursements and repayments, increasing operational effectiveness. In addition to improving end

users' access and convenience, this kind of integration fosters trust, which is essential in low-literacy, low-income environments, by empowering SHG leaders or field officers to serve as go-betweens and close the digital divide.

Digital tools can also help MFIs and SHGs provide a wider range of services tailored to rural needs, including insurance, remittances, savings, and pension products. SHG members themselves can grow adoption while maintaining the social cohesiveness and accountability that underpin SHG models by becoming digital champions in their communities with the right training and digital literacy initiatives. The future of inclusive finance therefore rests on combining the efficiency and scalability of digital innovation with the grassroots trust of SHGs and MFIs, rather than choose between traditional and digital approaches.

- **Implications for Bihar's Farmers**

Farmers in Bihar continue to be among the most economically disadvantaged groups in India, despite being the backbone of the state's rural economy. The majority of small and marginal farmers in the state still do not have their financial lives completely changed by digital payment systems and microfinance, despite their steady development. Major obstacles to the agricultural community's financial resilience include limited access to official credit, erratic cash flows, and a persistent reliance on informal moneylenders. By giving farmers small loans, especially through SHGs and Joint Liability Groups (JLGs), microfinance has given them a head start. These loans, however, are sometimes insufficient to pay for expensive agricultural inputs or manage risks associated with the weather. Crop insurance, structured savings plans according to seasonal revenue patterns, and larger and more flexible credit lines are still unavailable to farmers. Poor internet access, low smartphone usage, and digital illiteracy all contribute to the underutilization of digital payment systems like UPI and mobile banking.

Integration is essential if Bihar's farmers are to reap the benefits of financial inclusion. A stronger financial ecosystem can be produced by integrating microfinance with digital financial services like digital marketplaces, crop-specific lending products, and direct benefit transfers. Investments in digital infrastructure, training local banking correspondents who can provide doorstep services, and financial literacy initiatives targeted at rural agrarian populations can all help with this. Enhancing agricultural output, lowering vulnerability, and fostering rural economic development in Bihar would need providing farmers with tailored financial solutions backed by institutional assistance and digital tools.

Conclusion

For farmers in Bihar, the combination of digital payments with microfinance offers a revolutionary strategy to promote financial inclusion. Self-Help Groups (SHGs), microfinance institutions (MFIs), and specific government programs have greatly increased the availability of formal financial services in rural India within the last ten years. Simultaneously, the quick development of digital platforms like mobile wallets and UPI has brought scalable, reasonably priced instruments for safe financial transactions. However, despite these concurrent developments, rural Bihar still faces deeply ingrained obstacles that hinder the effective implementation of inclusive finance, ranging from low literacy and limited digital infrastructure to socioeconomic and cultural impediments. A troubling discrepancy between access and actual consumption is revealed by disaggregated financial data. Although account ownership has increased considerably, especially among women and low-income groups, formal credit, savings accounts, and digital transactions are still used sparingly and seldom. Widespread adoption is further hampered by gendered digital disparities, inadequate network access, and a lack of trust in digital systems. This suggests that the number of accounts alone is not a sufficient indicator of financial inclusion; the frequency and depth of financial interaction must also be taken into account.

The combination of digital tools and microfinance provides a vital safety net for Bihar's small and marginal farmers, many of whom depend on unofficial lenders and are nonetheless vulnerable to fluctuations in their income. Digital payments have the potential to increase price transparency, facilitate direct transfers of government benefits, and lessen reliance on middlemen. This is enhanced by microfinance, which makes loans more accessible, encourages frugal spending through collective savings, and develops social capital. However, the impact of these tools will remain restricted in the absence of enabling ecosystems, such as regional fintech companies, customized financial literacy programs, and supportive regulatory frameworks. In conclusion, Bihar's financial inclusion has to move away from banking and toward a digital, farmer-focused, and participatory model. A comprehensive,

integrated strategy that empowers the rural poor through the use of digital payments and microfinance is the way of the future. Policymakers, financial institutions, civil society, and technological companies must work together to realize this vision. Farmers in Bihar can only become active, resilient participants in the formal financial ecosystem by means of such cooperative initiatives, rather than passive consumers of financial services.

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