# Influence of Digital Technology on Microfinance Sector: A Study in Kerala

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## ABSTRACT

**Purpose**: *This study aims to evaluate how digital technology integration enhances operational efficiency and expands financial inclusion within India's microfinance sector. It also seeks to analyze beneficiary satisfaction levels with digital microfinance services to inform strategies for improving service delivery and overall impact.*

**Design/Methodology/Approach:** *The study utilizes a mixed-methods research design, integrating both quantitative techniques such as Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM), and qualitative data gathered through a structured questionnaire. This approach enables a thorough assessment of beneficiary satisfaction with digital microfinance services in Kerala, offering valuable insights into enhancing service delivery and maximizing sector-wide impact.*

**Findings/Result**: *The study reported high satisfaction levels among respondents with digital microfinance services in Kerala, particularly noting that Digital Savings Accounts and Mobile Payments significantly enhance satisfaction due to their convenience and accessibility. However, Advisory Services and Micro insurance Products were identified as areas with potential for improvement.*

**Originality/Value:** *The study adds unique value by examining how digital technology integration specifically enhances beneficiary satisfaction within Kerala's microfinance sector. It provides detailed insights using both quantitative methods like Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) and qualitative data, offering actionable recommendations to optimize digital microfinance services in the region.*

**Paper Type:** *Empirical Research.*

**Keywords:** Digital technology, Microfinance sector, Beneficiary satisfaction, Structural Equation Modeling

## 1. INTRODUCTION :

Microfinance, traditionally aimed at providing financial services to underserved populations, has witnessed transformative impacts with the integration of digital technology. Historically, microfinance institutions (MFIs) have focused on offering small loans, savings accounts, and insurance products to individuals and small businesses that lack access to traditional banking services. These initiatives have played a crucial role in poverty alleviation, economic empowerment, and fostering entrepreneurship in developing economies. However, the conventional delivery models often faced challenges such as high operational costs, limited outreach, and inefficient service delivery, hindering their scalability and impact. The advent of digital technology has revolutionized microfinance by overcoming many of these barriers [1]. Digital platforms enable MFIs to reach a broader audience at reduced costs, enhance operational efficiency, and provide services in remote and underserved areas where physical branches are impractical [2]. Mobile money services, for instance, facilitate quick and secure transactions, allowing clients to receive loans, make payments, and manage savings through their mobile phones. This digital transformation has not only improved accessibility but also increased transparency and accountability in financial transactions, thereby fostering trust among clients and stakeholders. Moreover, digital data analytics enable MFIs to better understand client needs, tailor

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financial products accordingly, and mitigate risks more effectively, thereby enhancing the overall sustainability and impact of microfinance initiatives [3]. As digital technologies continue to evolve, their integration with microfinance holds promise in further advancing financial inclusion, reducing poverty, and promoting economic development worldwide.

Digital technology has become indispensable in transforming microfinance programs by enhancing their efficiency, scalability, and impact [4]. One crucial benefit is the expanded reach of financial services to underserved populations in remote areas. Mobile banking, for example, allows clients to access loans, savings accounts, and insurance products conveniently through their phones, bypassing the need for physical branches. This accessibility not only reduces transaction costs and time but also empowers clients by giving them control over their finances. Moreover, digital platforms enable real-time data collection and analysis, providing valuable insights into client behaviors and preferences. This data-driven approach helps microfinance institutions (MFIs) tailor financial products more effectively, improving client satisfaction and retention [5].

Another significant advantage of digital technology in microfinance is its role in enhancing transparency and reducing operational risks [6]. Digital records of financial transactions minimize the potential for fraud and corruption, thereby fostering trust between MFIs and their clients. Furthermore, digital platforms facilitate quicker loan disbursements and repayments, reducing administrative burdens and operational costs for MFIs. This efficiency translates into lower interest rates and fees for clients, making financial services more affordable and accessible. Overall, the integration of digital technology in microfinance programs not only amplifies their outreach and operational efficiency but also strengthens their impact on poverty alleviation and economic empowerment in communities worldwide.

The advent of financial technology (fintech) has revolutionized the microfinance sector, bringing forth innovations that significantly enhance accessibility, efficiency, and inclusivity. Fintech solutions encompass a range of digital tools and platforms tailored to meet the unique needs of underserved populations, particularly in remote or economically marginalized areas. These innovations have democratized financial services by leveraging mobile phones, internet connectivity, and digital payment systems to deliver banking services directly to clients' fingertips. By circumventing traditional barriers such as physical distance and bureaucratic hurdles, fintech has enabled microfinance institutions (MFIs) to expand their reach exponentially, reaching millions of previously unbanked individuals [7].

Moreover, fintech innovations have streamlined operational processes within MFIs, improving transparency, reducing costs, and minimizing risks associated with cash-based transactions. Digital lending platforms, for instance, employ algorithms and machine learning to assess creditworthiness swiftly and accurately, facilitating faster loan approvals and disbursements [8]. This efficiency not only enhances client satisfaction but also increases the likelihood of loan repayment, thereby improving the overall sustainability of microfinance programs. Furthermore, fintech solutions enable MFIs to collect and analyze real-time data on client behavior and market trends, empowering them to tailor financial products and services more effectively. In essence, the invention and integration of fintech in the microfinance sector represent a paradigm shift towards more inclusive and sustainable financial ecosystems, empowering individuals and communities to build brighter economic futures.

## 2. LITERATURE REVIEW :

In India, the microfinance sector has played a pivotal role in promoting financial inclusion and empowering millions of underserved individuals, particularly in rural and semi-urban areas [10]. Microfinance institutions (MFIs) in India have emerged as key facilitators of small loans, savings programs, and insurance services tailored to meet the needs of low-income households and micro-entrepreneurs. These initiatives aim to alleviate poverty, foster entrepreneurship, and enhance economic resilience among marginalized communities [11-13].

The sector's growth has been propelled by supportive regulatory frameworks and advancements in technology, which have enabled MFIs to scale their operations efficiently [14]. Traditional barriers to financial access, such as lack of collateral and credit history, are circumvented through innovative

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credit scoring models and digital payment solutions [15]. The success of microfinance in India is underscored by its impact on improving livelihoods and enabling socio-economic mobility for millions [16]. Despite challenges related to over-indebtedness and regulatory compliance, the sector continues to evolve, leveraging partnerships with banks, government initiatives, and fintech innovations to expand its reach and deepen its impact on poverty alleviation efforts nationwide [17].

Digital technology is poised to revolutionize the Indian microfinance sector by enhancing efficiency, outreach, and impact. One of the most significant changes brought about by digital technology is the facilitation of financial inclusion [18-19]. With the widespread adoption of mobile phones and internet connectivity, digital platforms enable microfinance institutions (MFIs) to reach previously underserved populations in remote areas [20]. This access is crucial for delivering financial services such as loans, savings accounts, and insurance products to individuals who traditionally lacked access to formal banking systems.

Moreover, digital technology enhances operational efficiency for MFIs [21]. Automated loan processing, digital documentation, and mobile payment solutions streamline administrative processes, reduce transaction costs, and minimize the risks associated with cash handling. This efficiency not only improves service delivery but also enables MFIs to scale their operations more effectively, reaching a larger number of beneficiaries without compromising service quality [22-23]. Additionally, digital technology empowers clients by providing them with greater control over their finances [24]. Mobile banking applications allow borrowers to check their account balances, make payments, and track loan repayments conveniently from their mobile devices [25]. This transparency fosters trust between clients and MFIs and encourages responsible financial behavior among borrowers. Furthermore, data analytics and artificial intelligence (AI) are increasingly being utilized to assess creditworthiness and tailor financial products to the specific needs of microfinance clients [26]. This personalized approach not only improves the likelihood of loan repayment but also ensures that clients receive services that are aligned with their financial goals and capabilities. In essence, the integration of digital technology in the Indian microfinance sector holds immense potential to deepen financial inclusion, enhance operational efficiency, empower clients, and drive sustainable socio-economic development across the country [27-28].

In the realm of microfinance, several key variables play pivotal roles in shaping service delivery, client outcomes, and overall impact. Digital loans are essential as they enable swift and efficient access to credit through digital platforms, crucial for microfinance clients in rural and underserved areas [29]. Mobile payments and transfers revolutionize financial transactions, offering safe and convenient alternatives to cash handling, thereby enhancing financial access and trust in formal financial services [30-31]. Digital savings accounts provide secure platforms for clients to save and accumulate funds, promoting financial resilience and planning among populations lacking traditional banking access [32].

Micro insurance products mitigate risks associated with health emergencies and other uncertainties, safeguarding clients' financial stability and enabling quick recovery from setbacks. Advisory services, including financial education and personalized guidance, enhance clients' financial literacy and decision-making skills, empowering them to maximize the benefits of microfinance services [33-34]. These variables collectively underscore the transformative impact of digital technology in microfinance, expanding outreach, improving efficiency, and fostering sustainable economic development and financial inclusion in communities across India and beyond.

Microfinance institutions (MFIs) play a pivotal role in driving digital innovation within the microfinance sector, particularly in harnessing technology to enhance financial inclusion and improve service delivery [35]. These institutions leverage digital platforms to extend financial services to previously underserved populations, including those in remote rural areas. By adopting mobile banking, digital payment solutions, and automated loan processing systems, MFIs streamline operations and reduce costs, thereby expanding their outreach and improving accessibility for clients [36]. Digital innovations enable MFIs to overcome traditional barriers such as geographical distances and administrative inefficiencies, making financial services more convenient and affordable for low-income individuals and micro-entrepreneurs [37]. Moreover, MFIs contribute significantly to the

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development and implementation of digital financial products tailored to meet the specific needs of their client base [38-39]. They innovate by introducing products like mobile savings accounts, micro insurance through digital platforms, and advisory services delivered via mobile apps. These innovations not only cater to the financial needs of underserved communities but also enhance their financial literacy and capability through educational content and personalized financial guidance. By integrating digital technology into their service offerings, MFIs enhance client engagement, foster trust, and promote responsible financial behavior among borrowers [40]. Overall, MFIs play a crucial role as catalysts of digital microfinance innovation, driving inclusive growth and socio-economic development by leveraging technology to expand financial access and empower marginalized communities across diverse regions.

The integration of digital technology into India's microfinance sector represents a profound opportunity to address longstanding barriers to financial inclusion and economic empowerment [41]. By leveraging mobile phones, internet connectivity, and innovative digital platforms, microfinance institutions (MFIs) can effectively reach marginalized populations in remote areas, offering essential financial services like loans, savings accounts, and insurance products [42]. This expansion not only enhances operational efficiency and reduces costs but also fosters greater transparency and trust between MFIs and their clients. The transformative impact of digital technology extends beyond operational enhancements to fundamentally reshape the socio-economic landscape [43]. It empowers individuals by providing them with greater control over their finances and equipping them with the tools needed to make informed financial decisions. Through personalized services and data-driven insights facilitated by artificial intelligence and analytics, MFIs can tailor offerings to better meet the diverse needs of microfinance clients [44]. This holistic approach not only improves access to financial services but also strengthens economic resilience, fosters entrepreneurship, and contributes to sustainable development goals. Looking ahead, continued investment in digital infrastructure, regulatory support for fintech innovations, and strategic partnerships will be crucial in unlocking the full potential of digital microfinance in India [45]. By embracing these advancements, the sector can further accelerate progress towards achieving universal financial inclusion and creating pathways to prosperity for millions of underserved individuals and communities across the country

## 3. OBJECTIVES OF THE STUDY :

(1) To evaluate the impact of digital technology on the microfinance sector.
(2) To analyze the reliability and effectiveness of various digital services in the microfinance sector.
(3) To analyze the satisfaction levels of beneficiaries regarding different digital microfinance services.

## 4. HYPOTHESES OF THE STUDY :

$H_{01}$: Digital Loans do not significantly contribute to satisfaction with digital microfinance services.

$H_{02}$: Mobile Payments and Transfers do not significantly contribute to satisfaction with digital microfinance services.

$H_{03}$: Digital Savings Accounts do not significantly contribute to satisfaction with digital microfinance services.

$H_{04}$: Micro insurance Products do not significantly contribute to satisfaction with digital microfinance services.

$H_{05}$: Advisory Services do not significantly contribute to satisfaction with digital microfinance services.

## 5. RESEARCH METHODOLOGY :

This research aimed to evaluate the satisfaction levels of beneficiaries with the services offered by MFIs through digital channels, examining variables such as Digital Loans, Mobile Payments and Transfers, Digital Savings Accounts, Micro insurance Products, and Financial Education and Advisory Services. The study employed a mix of empirical and descriptive methods, utilizing both primary and secondary data. Primary data was gathered directly from 250 respondents who had used microfinance services from selected MFIs in Kerala. A questionnaire, designed with input from field experts, was used to collect this data, covering sections on demographic details, digital microfinance service usage,

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and satisfaction with each service. Confirmatory Factor Analysis (CFA), a form of Structural Equation Modeling (SEM), was applied to investigate the relationships among these variables and their underlying constructs. To evaluate statistical reliability, Cronbach's alpha was used, showing strong internal consistency across all variables. Additionally, SEM was employed to assess model fit using indices like GFI, NFI, CFI, and RMSEA, all of which met the recommended standards, confirming the model's suitability.

## 6. ANALYSIS :

The study aimed to assess the satisfaction levels of beneficiaries regarding services provided by MFIs through digital channels. The variables under evaluation included Digital Loans, Mobile Payments and Transfers, Digital Savings Accounts, Micro insurance Products, and Financial Education and Advisory Services. Confirmatory Factor Analysis (CFA), a type of Structural Equation Modeling (SEM), was utilized to examine the relationships among these variables and their underlying constructs.

**Reliability and Validity Analysis**
Before proceeding with further validation analysis, it is essential to evaluate statistical reliability using Cronbach's alpha. A Cronbach's alpha value of 0.80 or higher indicates strong internal consistency, while a value of 0.70 or above is considered significant [46].

**Table 1:** Reliability and Validity

|  | Cronbach's Alpha |
| --- | --- |
| Digital Loans | 0.788 |
| Mobile Payments and Transfers | 0.832 |
| Digital Savings Accounts | 0.894 |
| Micro Insurance Products | 0.839 |
| Advisory Services | 0.854 |

The Cronbach's alpha values for the variables examined—Digital Loans (0.788), Mobile Payments and Transfers (0.832), Digital Savings Accounts (0.894), Microinsurance Products (0.839), and Advisory Services (0.854)—demonstrate strong internal consistency. These values confirm the reliability of the measurement scales used to assess beneficiaries' satisfaction with digital MFI services.

**Table 2:** Mean, Co-Efficient Of Variation and Rank of Variables

| Variables | Mean | S.D | Max | Mean % | CV | Rank |
| --- | --- | --- | --- | --- | --- | --- |
| Digital Loans | 16.41 | 2.36 | 28 | 62.53 | 16.5 | 1 |
| Mobile Payments and Transfers | 11.69 | 1.85 | 14 | 45.76 | 42.65 | 3 |
| Digital Savings Accounts | 8.12 | 3.23 | 16 | 49.78 | 52.1 | 2 |
| Micro Insurance Products | 6.03 | 3.01 | 12 | 34.61 | 49.83 | 5 |
| Advisory Services | 5.38 | 2.65 | 12 | 34.79 | 49.27 | 4 |

The table demonstrates how beneficiaries perceive various digital microfinance services. Digital Loans received the highest average score of 16.41, indicating strong satisfaction with minimal variability (CV = 16.50). Digital Savings Accounts followed with a mean score of 8.12, showing more varied satisfaction levels (CV = 52.10). Mobile Payments and Transfers ranked third with an average score of 11.69 and a CV of 42.65, indicating moderate satisfaction with notable variability. Microinsurance Products and Advisory Services received lower scores (6.03 and 5.38 respectively), suggesting lower overall satisfaction and similar levels of variability (CVs around 49%). Addressing variability and improving service delivery across these digital microfinance services is crucial for enhancing overall beneficiary satisfaction.

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**Structural Equation Modeling (SEM): Model fit assessment**

**Table 3:** Model fit assessment

| | $\chi^2$ | DF | P | Normed $\chi^2$ | GFI | AGFI | NFI | TLI | CFI | RMR | RMSEA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Recommended** | | | >.05 | <3 | >0.90 | >0.90 | >0.90 | >0.90 | >0.90 | <1 | <.08 |
| **Actual** | 6.96 | 4 | 0.13 | 1.66 | 0.964 | 978 | 976 | 0.97 | 995 | 0.22 | 0.31 |

Structural Equation Modeling (SEM) was employed to evaluate how well the research model fits the collected data. SEM is chosen for its capability to simultaneously analyze interdependencies among variables, including direct and indirect effects within the model [47]. In SEM, several indices are utilized to assess model adequacy. In addition to the $\chi^2$/df ratio, where a value less than 5 indicates acceptable fit, researchers also rely on other fit indices: Goodness of Fit (GFI), Normed Fit Index (NFI), Standardized Root Mean Residual (SRMR), and Comparative Fit Index (CFI) [48]. The model fit indices in this study all met the recommended thresholds for acceptable fit. Specifically, the normed $\chi^2$ value ($\chi^2$/df) was well below the suggested threshold of 3, indicating a good fit for the model.

According to the criteria a well-fitting model should have an RMSEA of 0.08 or lower, a CFI and NFI of 0.90 or higher, and a GFI of 0.90 or higher to indicate satisfactory alignment between the data and the proposed measurement model [49]. The GFI for this study achieved a value of 0.964, surpassing the recommended threshold [50]. Additionally, other metrics such as AGFI, CFI, TLI, and NFI also showed satisfactory results, with values of 0.978, 0.995, 0.973, and 0.976 respectively. The chi-square divided by degrees of freedom ($\chi^2$/df) was 1.740, well below the threshold of 5, further supporting a good fit. Furthermore, the RMSEA value of 0.031 indicated a strong absolute fit of the model to the data [51]. The hypotheses tested were as follows

$H_{01}$: Digital Loans do not significantly contribute to satisfaction with digital microfinance services.
$H_{02}$: Mobile Payments and Transfers do not significantly contribute to satisfaction with digital microfinance services.
$H_{03}$: Digital Savings Accounts do not significantly contribute to satisfaction with digital microfinance services.
$H_{04}$: Micro insurance Products do not significantly contribute to satisfaction with digital microfinance services.
$H_{05}$: Advisory Services do not significantly contribute to satisfaction with digital microfinance services.

The findings indicate that Digital Loans, Mobile Payments and Transfers, Digital Savings Accounts, Microinsurance Products, and Advisory Services collectively significantly contribute to beneficiaries' overall satisfaction with digital microfinance services. These results suggest that each of these services plays a meaningful role in shaping the satisfaction levels of beneficiaries in the context of digital microfinance.

**Standardized Regression Weights**

**Table 4:** Standardized Regression Weights

| Variables | Estimate | Rank |
|---|---|---|
| Digital Loans | 0.472 | 3 |
| Mobile Payments and Transfers | 0.712 | 2 |
| Digital Savings Accounts | 0.725 | 1 |
| Micro Insurance Products | 0.412 | 5 |
| Advisory Services | 0.414 | 4 |

The standardized regression weights indicate the strength and direction of the relationships between the latent variable (beneficiaries' satisfaction) and each digital microfinance service [52]. Digital Savings Accounts have the highest weight of 0.725, suggesting that satisfaction with these accounts has the most significant impact on overall satisfaction among beneficiaries. Mobile Payments and

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Transfers follow closely with a weight of 0.712, indicating their substantial influence on satisfaction. Digital Loans, despite being third in weight at 0.472, still contribute significantly to satisfaction levels. Advisory Services and Micro Insurance Products have lower weights of 0.414 and 0.412, respectively, suggesting they contribute less to overall satisfaction compared to the other services. These weights highlight the relative importance of each service in shaping beneficiaries' overall satisfaction with digital microfinance offerings.

The relationship between overall satisfaction (S) and various digital microfinance services ($X_i$) can be represented by the following statistical model:

$$S = \sum_{i=1}^{5} \beta_i X_i$$

$S$ = Satisfaction of digital services
$X_i$ = The $i$ th digital microfinance service, including Digital Loans, Mobile Payments and Transfers, Digital Savings Accounts, Micro Insurance Products, and Advisory Services.
$\beta_i$ = The standardized regression weight associated with each service $X_i$

Based on the standardized regression weights obtained from Structural Equation Modeling (SEM), the model is expressed as:

$S$=0.472×Digital Loans+0.712×Mobile Payments and Transfers+0.725×Digital Savings Accounts+0.412×Micro Insurance Products+0.414×Advisory Services

The standardized regression weights revealed the relative importance of each digital microfinance service in influencing overall satisfaction among beneficiaries. Digital Savings Accounts emerged as the most influential factor ($\beta = 0.725$), indicating that satisfaction with these accounts has the strongest impact on overall satisfaction. Mobile Payments and Transfers followed closely with a weight of 0.712, highlighting their significant role. Digital Loans, though slightly lower in weight at 0.472, still made a substantial contribution to satisfaction levels. In contrast, Advisory Services and Microinsurance Products exhibited lower weights (0.414 and 0.412 respectively), suggesting a comparatively lesser impact on overall satisfaction.

Overall, these findings underscore the collective significance of Digital Loans, Mobile Payments and Transfers, Digital Savings Accounts, Micro insurance Products, and Advisory Services in shaping beneficiaries' satisfaction with digital microfinance services. Enhancing these services can potentially lead to improved overall satisfaction among beneficiaries, thereby contributing to the effectiveness and relevance of digital microfinance offerings in meeting client needs and expectations.

## 7. FINDINGS :

The major findings are as follows;
1) The Digital Savings Accounts had the strongest positive impact ($\beta = 0.725$) on overall satisfaction among beneficiaries, indicating their critical role in influencing perceptions.
2) Digital Loans received the highest satisfaction score (16.41), showing strong satisfaction levels with minimal variability (CV = 16.50), while Micro insurance Products and Advisory Services scored lower (6.03 and 5.38, respectively) with similar variability (CVs around 49%), suggesting lower overall satisfaction.
3) The most influential factors on satisfaction, based on standardized regression weights, were Digital Savings Accounts (0.725), followed by Mobile Payments and Transfers (0.712), and Digital Loans (0.472). Advisory Services (0.414) and Micro insurance Products (0.412) contributed less to overall satisfaction, indicating areas for improvement.
4) The structural equation modeling (SEM) analysis confirmed a good fit of the research model to the data, with GFI (0.964), NFI (0.995), CFI (0.976), and RMSEA (0.031) meeting recommended thresholds. This validates the model's reliability in explaining how digital microfinance services impact beneficiary satisfaction.

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## 8. RECOMMENDATIONS :

The major recommendations are as follows;

1) Given their significant impact on overall satisfaction ($\beta = 0.725$), MFIs should prioritize improving digital savings account offerings. This could involve enhancing accessibility, features, and user benefits to further increase client satisfaction.
2) Mobile payments and transfers ($\beta = 0.712$) also play a crucial role in satisfaction. MFIs should focus on improving the efficiency, security, and ease of use of these services to maintain high satisfaction levels among beneficiaries.
3) Since advisory services ($\beta = 0.414$) and micro insurance products ($\beta = 0.412$) contribute less to overall satisfaction, there is room for improvement in these areas. MFIs should consider tailoring advisory services to better meet client needs and enhancing microinsurance products to provide more comprehensive coverage and benefits.

## 9. CONCLUSION :

The study examining the influence of digital technology on India's microfinance sector reveals substantial enhancements in operational efficiency, outreach, and client satisfaction. Employing empirical methods such as Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM), the research focused on assessing beneficiary satisfaction with digital microfinance services in Kerala. Key findings underscored the significant impact of Digital Savings Accounts and Mobile Payments, which were noted for their convenience and accessibility. Although Advisory Services and Microinsurance Products indicated areas for improvement, the overall integration of digital platforms has streamlined operations, reduced costs, and promoted transparency in financial transactions. These insights emphasize the ongoing need for innovation and targeted enhancements to strengthen the sector's role in fostering economic empowerment and financial inclusion across diverse communities in India.

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