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FROM TRADITION TO TRANSFORMATION:
THE ROLE OF TECHNOLOGY IN SHAPING FINANCIAL
INCLUSION IN RURAL INDIA COMMUNITIES (SHGS)

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ABSTRACT

The cornerstone for achieving sustainable economic growth and poverty reduction is achieving financial inclusion among all members of society, providing universal access to essential financial services. However, in a country as diverse as India, with a high percentage of rural population and large tracts of land resulting in isolated villages, the democratization of financial inclusion becomes a challenge.

While it is true that microfinance institutions are reaching the unbankable and SHGs, enabling the provision of financial services in villages and accomplishing broader coverage through local agents and partnerships with rural banks, there is still a long way to go to achieve a homogeneous financial inclusion across the country.

Thus, the advent of technology in the banking world is transforming the financial reality of SHGs, making financial services more accessible and inclusive than ever in rural India, stimulating sustainable economic growth (both local and national), and empowering communities.

Based on the observations obtained during the ten days in Mangalore visiting SHGs, meetings with the leaders of microfinance institutions, and literature research, this study will attempt to answer the questions: *What is the role of technologies in reshaping financial inclusion among SHGs? How far can the empowerment, autonomy, and growth of SHGs be achieved by using technology as a lever for change?*



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1. ECONOMIC LANDSCAPE OF RURAL INDIA AND MICROFINANCE

Agriculture is one of the fastest-growing sectors in the Indian rural economy, with a Compound Annual Growth Rate (CAGR) of 11% in the last five years [12].

According to the World Bank's 2022 report and the latest Economic Survey of India (2023) [14], agriculture is the foundation of the Indian economy, contributing to the country's Gross Domestic Product of 39% by 2023 [12]. Proteins, fats, fruits, and vegetables account for 60% of the value of agricultural production, while rice and wheat cover around 40% of India's cultivated land, representing a quarter of the total value of agricultural production. To cover all this agricultural activity, about 65% of the rural population is registered [12].

However, despite the agricultural industry being one of the country's driving forces, the rural population still faces significant obstacles in accessing traditional banking services, primarily due to the geographical remoteness of many villages and the lack of banking infrastructure [10]. This makes it difficult for large financial institutions to extend their coverage into these areas.

In other words, large financial institutions fail to meet the basic economic needs of the rural population, increasing the exclusion of essential financial services [2], such as savings accounts, credit, and insurance, affecting a precarious sector and millions of people and communities in vulnerable situations.

At this juncture, microfinance organizations play a fundamental and indispensable role in the quest to combat and alleviate poverty through economic capacity building and empowering SHGs, the majority of which are formed by women. In other words, microfinance institutions have responded to the problem of many by "banking the unbankable" [18] and uplifting women's communities.

These goals are achieved by offering banking products alongside savings and granting small, low-interest loans to SHGs, backed by the joint liability approach, mitigating the risk of defaults and ensuring repayment of the loans, resulting in a win-win situation for all stakeholders. This is why **microfinance has become a turning point for the economy in rural and more remote regions in India, enhancing access to financial services, reducing inequality, stimulating economic growth, and lessening poverty, paving the way for a more inclusive and prosperous future for rural communities.**

By bringing saving and borrowing opportunities to marginalized groups along with other banking products, progress is being made toward achieving financial inclusion, defined as access to financial services in a **fair, transparent, reliable, and equitable manner at an affordable cost** [7] [19].

Thus, financial inclusion aims to help vulnerable individuals and groups access banking and other financial products, making a big difference in reducing the struggles of poverty. Thus, financial inclusion becomes a key driver of economic development. For example, 96% of the first microloans are for income-generating activities, fostering entrepreneurial spirit, empowerment, and poverty reduction.

2. HOW TECHNOLOGIES INTERSECT WITH RURAL INDIA AND MICROFINANCE

In this complex situation, a determining factor must be added to continue working towards the financial inclusion of SHGs: *technology*. Technology is spreading rapidly across India, reaching both microfinance businesses and all spheres of rural communities' lives, creating new channels of participation and inclusion, expanding opportunities, and increasing innovation, empowerment, and entrepreneurship.

Access to digital technologies and the creation of new banking platforms improve the exchange of information between SHGs and microfinance organizations, facilitate transactions at low cost, and reduce risk [18].

Thus, as the costs of financial operations (such as transaction costs or account maintenance fees) lower, this leads to improved efficiency. Efficiency drives greater interest on the part of financial institutions to continue to expand their coverage, increase resources, and provide a wide range of financial services, reaching more SHGs and unbanked individuals in the country, even in the most remote areas. In other words, **the technology bridges last-mile customers and financial banking organizations, increasing the viability of financial inclusion in rural areas.**

This technological revolution in the world of microfinance in rural India has its “epicenter” at the large-scale penetration of smartphones and the Internet (over 30% CAGR in the last four to five years) [12], which has facilitated the emergence of new services such as mobile banking, increasing the impact of technologies on financial inclusion.

2.1. Government's Role and Initiatives fostering the Technological Revolution in rural India

On the other hand, the Government has become a key stakeholder in driving digitalization across the country through the Prime Minister's Wi-Fi Access Network Interface (PM - WANI) scheme [24], which aims to provide broadband services to rural areas with the objective of creating 2 million public Wi-Fi access points. In addition to this, the Indian Government has also promoted other technological initiatives such as:

- **Digital India (2015) [21]** is a program that seeks to transform India into a digital society and economy by boosting digital infrastructure as a core utility, offering government services on demand, and empowering digital knowledge [Annex #1].
- **Digidhan Mission [11]** promotes a digital (“cashless”) economy through the democratization of seamless electronic transactions and digital payments in a convenient manner.
- **The Pradhan Mantri Jan Dhan Yojana (Jan Dhan) program [17]** promotes financial inclusion by offering access to essential banking services in urban and predominantly rural areas, providing bank accounts, financial education, credit, insurance, and pensions, along with a RuPay debit card.

- **Aadhaar** [23] is a unique 12-digit identification number based on 12 biometric data (ten fingerprints and two irises) of Indian citizens. This number serves as a reliable proof of identity and address, facilitating access to a variety of Government and financial services (schemes and subsidies), simplifying service delivery processes, and opening bank accounts.
- **JAM Trinity** [13] seeks to provide access to financial services such as bank accounts, remittances, credit, insurance, and pensions to the poor in India through the combination of the above initiatives: 1) the cell phone, 2) Jan Dhan, and 3) the unique Aadhaar identity number [Annex #2].

On the other hand, the Government passed the Model Agriculture Produce and Livestock Contract Farming and Services (2018) [15] to 1) empower farmers through participation in contract farming with wholesale buyers and 2) facilitate online trading in rural regions by allowing Farmer Producer Organization (FPO) and Farmer Producer Company (FPC) to act as aggregators on the National Agriculture Marketplace (eNAM) Digital Platform [8] so that they can trade from their collection centers.

The Reserve Bank of India (RBI) launched the Payments Infrastructure Development Fund (PIDF), creating 30 lakh digital payment touchpoints yearly. The initiative is being well embraced by financial institutions and rural communities, which is why the Government has extended it until 2025 [20].

2.2. Banking Institutions and Microfinancial Organizations' Role and Initiatives

The development of a digital payments ecosystem in India is also driven by the efforts of microfinance and fintech organizations through initiatives such as:

- **Immediate Payment Services (IMPS) and Unified Payments Interface (UPI)** through digital payment players such as **Paytm, PhonePe, Google Pay, and QR code-based** collections, which are rapidly expanding among SHGs.
- **NUUP (National Unified USSD (Unstructured Supplementary Services Data) Platform)** [6] enables financial and non-financial transactions via a cell phone without an Internet connection.
- **NABARD's EShakti program** [16] encourages digitization among self-help groups by addressing issues such as bookkeeping standards, group membership, and members' credit records. Technology facilitates access to affordable credit, removing barriers to participation and increasing transparency of self-help group information in the banking system.
- **Global Positioning System (GPS) and General Packet Radio Services (GPRS)** are mobile technologies capable of monitoring the location of banking correspondents and guiding them through the different SHG communities.

- **Geographic Information System (GIS)** is a web-based technology that has all the details of existing branches, ATMs, banking correspondents, and state cooperatives. This helps banks identify the financially excluded regions where an expansion of services needs to be carried out.

Many microfinance institutions are looking at technology not only to improve their operations (direct debit or disbursement) [2] but also to get closer to their clients by offering personalized services. For example, SKDRDP grants microloans to individuals in the SHGs, considering the economic background and credit history for creating clustering models (Machine Learning models). In this way, appropriate borrowers are identified, and microloan amounts are adjusted to significantly reduce the non-performing loan (NPL) ratios in the short term and achieve greater loan service availability in the long term.

So microfinance institutions work closely with SHGs to understand their needs and offer financial products that are more tailored to their professional (such as opening a business, increasing production, purchasing materials, like fishing boats) and personal (such as repairing houses, financing education, or buying life insurance) objectives.

Therefore, while rural India continues to pursue financial inclusion, the transition to the digital realm, the ever-evolving technologies, and the efforts of the Government and financial institutions are materializing a future in which everyone (especially rural, remote populations, and women's groups) can fully participate in the formal financial and social ecosystem, opening up new opportunities for economic development and prosperity.

3. NEW APPLICATIONS THAT BRIDGE THE INEQUALITY GAP AND ENHANCE SHGS EMPOWERMENT

As discussed in previous points, in the face of financial inclusion challenges, transformative solutions have emerged thanks to the advent of new technologies, the penetration of mobile phones, and the launch of public-private-driven technological initiatives. This has been instrumental in breaking down barriers to financial inclusion and bridging the economic gap in rural India. While these digital solutions are extensive, it is necessary to analyze how SHGs are leveraging these technologies in their day-to-day operations:

- **Payments and Digital Wallets:** As observed in the visits to the SHGs, Paytm and Google Pay are the most used platforms to carry out digital payments in rural areas. According to the State Bank of India (SBI), rural areas account for 25% of UPI transactions, while semi-urban areas account for 35% [10] (slowly closing the gap). These digital platforms have reduced cash dependency and improved financial efficiency in rural areas.
- **Digital Banking:** The use of technologies such as USSD and AEPS (Aadhaar-enabled payment system) has facilitated financial inclusion in rural areas of India. According to a report by NPCI (National Payments Corporation of India), AEPS transactions increased by 45% in 2022 in rural India [10]. Digital banking has expanded the rural population's access to banking services and improved economic growth in these areas.

- **Microfinance and Digital Loans:** financial technology platforms employ alternative credit assessment methods to offer small loan concessions at competitive interest rates to address the needs of neglected rural populations.
- **Financial Literacy Applications:** More and more microfinance institutions (SKDRDP Temple or SCDCC) are offering financial and technology education programs in local languages, helping individuals and villages to make informed financial decisions and better manage their finances. During visits to the two sites (SKDRDP Temple and SCDCC) and to the SHGs, leaders of the groups commented on the perception of increased financial literacy and a greater understanding of the benefits of saving and investing thanks to these applications.
- **Insurtech Solutions:** Other financial products enjoyed by SHGs include offering affordable digital insurance tailored to the needs of rural customers in India, such as life, accident, and health insurance, extending policy protection not only to the insured but also to their family members.

4. BENEFITS THAT SHGS PERCEIVE FROM LEVERAGING TECHNOLOGIES

Financial technologies demonstrate a positive and transformative impact on rural populations and SHGs. Although the document mentions the benefits, they will be presented more precisely in this section.

SHGs acquire **greater autonomy and knowledge** when managing financial transactions and decision-making within the community, resulting in **extraordinary individual and community empowerment**. In other words, SHGs will participate more actively in financial and business decision-making, which improves their ability to achieve their goals.

Transparency and trust are the pillars on which SHGs are built. Thus, the technologies **promote transparency** in financial transactions, **foster accountability**, and **strengthen trust** among SHG members and those towards microfinance institutions and other stakeholders. In addition, the involvement of technology in SHG dynamics helps to **create a greater sense of community and unity** by sharing information about digital methods and **strengthens trust** in financial services.

SHGs also perceive **more protection** through effective identity management, closer customer service, and reduced fraud cases, also resulting in **increased customer trust and transparency** in digital financial systems.

In addition, technologies allow flexibility and adaptability of financial products to the needs of the poor and marginalized. This adaptability helps to offer financial products with lower risk and greater repayment viability, which, in the long run, reduces operating, financial, and credit costs while improving efficiency and broadening SHGs' access to financial services. All this results in a **more successful integration of SHGs into the formal economy and society**.

5. ONGOING CHALLENGES TO OVERCOME

While innovation and the integration of digital technology present significant benefits for SHGs and notorious cohesion across India, there are persistent challenges, such as lack of digital literacy, heterogeneity of connectivity, and lack of trust in formal financial systems, as well as the isolation of remote communities and the risk of small-scale transactions. **These challenges result in asymmetries that make the services offered by banks and MFIs take longer to reach poor and vulnerable people, increasing financial exclusion.**

As mentioned above, traditional banking services find it difficult to establish a robust presence in remote areas due to the **lack of physical banking infrastructure and high operational costs** [2], which exacerbates the digital gap, resulting in a significant portion of the rural population remaining excluded from the formal financial system, relying on informal channels and cash transactions.

In addition to the previous point, **connectivity problems** are another challenge to be addressed, as many rural areas still **lack reliable Internet access**. The absence of a solid telecommunications infrastructure hinders the operation of digital payment platforms, leading to transaction delays and increased risk.

In addition, concerns about the security of digital transactions play a significant role, as cases such as fraud, data breaches, and cybercrime contribute to a prevailing sense of apprehension [2]. **Deficiencies in financial literacy and education** accompany the **lack of trust and security in digital systems**.

As a result, SHGs find informal systems of credit, barter, and cash-nature transactions more convenient and user-friendly (in comparison to formal and digital financial systems), as they have been rooted in the local culture for generations. Therefore, introducing digital payment methods requires overcoming technological barriers and changing cultural habits and perceptions [2].

All these challenges hinder the adoption of digital financial tools and the homogenization of financial inclusion in rural areas.

6. THE USE OF TECHNOLOGY IN MICROFINANCE TO IMAGINE TOMORROW'S SHG's REALITY

While the technologies positively impact the lives of SHGs and the country's economy, there is still a long way to go to achieve financial inclusion in rural areas. Thus, a **multifaceted approach is needed to address the previous challenges**.

Initiatives should encompass **literacy campaigns and digital knowledge** sharing to educate the population, as well as the **creation of financial education centers** (such as rural training centers and financial literacy counseling centers) [3]; **the development of telecommunication infrastructure** to close connectivity gaps (such as the expansion of bandwidth services and cell phone towers); substantial investments to improve the

banking network infrastructure (more kiosks and access points), or the **implementation of rigorous security measures** to instill confidence in the digital payments ecosystem.

Also, in this multidisciplinary approach, the **role of governments and regulators is essential to design national strategies and technology regulations** that ensure the creation and improvement of digital financial services, taking into account the needs of SHGs and unbankables to ensure universal protection and inclusiveness.

Only through combined efforts on these fronts will the transformational potential of technologies be harnessed to **achieve scalability, financial and social inclusion, and prosperity** for India's rural populations.

7. CONCLUSION

The road to financial inclusion in rural India is complex, but the advent of technology is changing the rules of the game in the quest to achieve financial inclusion. Digital solutions offer a lifeline to the historically marginalized, especially in neglected rural areas and among women, by putting digital banking services right in their hands.

So, technology applied to the financial sector has become a powerful catalyst for change. As technology continues to evolve and reach even the country's remotest corners, the goal of seeing a financially inclusive India seems to be coming closer to reality.

By harnessing the potential of Digital Payments, Digital Banking, Microfinance, and Digital Loans, the gap between urban and rural economies, the rich and the unbanked, men and women, is slowly closing, empowering millions of people to participate fully in the nation's progress. Hence, **the transformative power of technology serves to build a more inclusive and equitable society.**

But there is still a long way to go to reach the pinnacle of a digital revolution in rural areas. **Digital solutions should not be working alone. Advancing toward a more inclusive, equitable, and fair financial system in rural India requires an integrated approach that combines education, infrastructure development, regulatory policies, and governmental initiatives** focused on leveraging technology to address challenges, reduce economic inequalities, and ensure homogenous access to financial services, reaching every corner of rural India.

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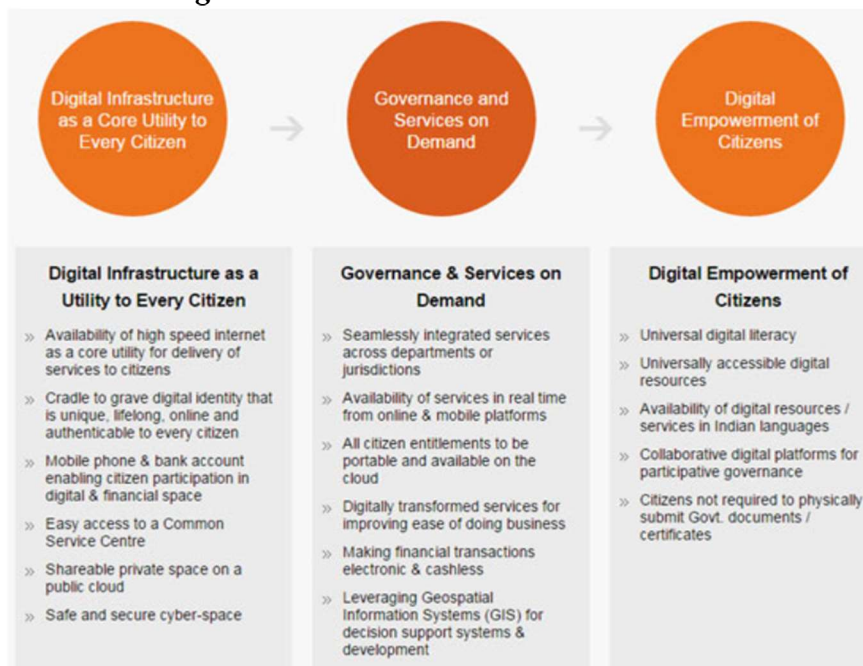
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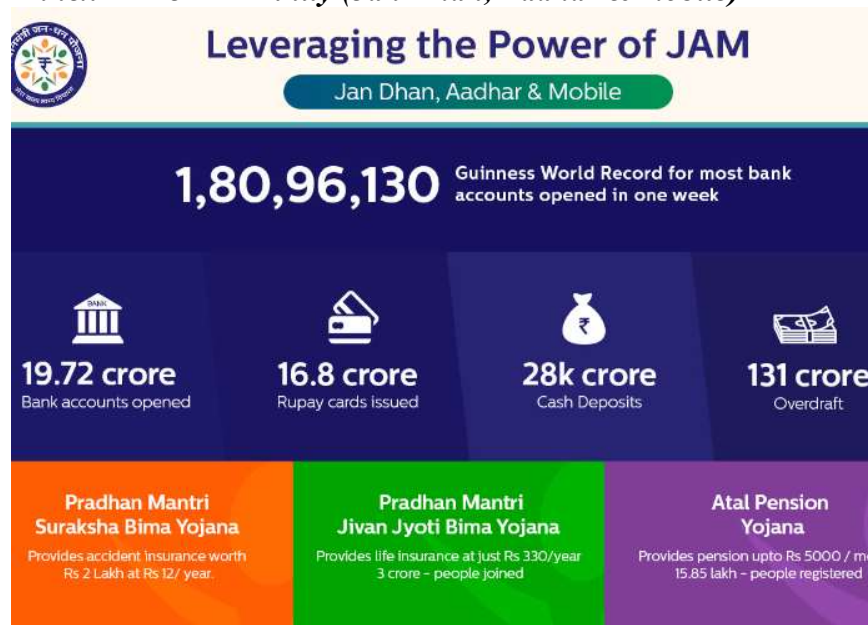
9. ANNEX

Annex #1 – Digital India



Source: The Ministry of Electronics and Information Technology - Government of India. (2015)

Annex #2 – JAM Trinity (Jan Dhan, Aadhar & mobile)



Source: JAM Trinity - Objectives, Significance, Drawbacks & Benefits. Testbook. (2023, April 12).