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Original Article

# Smart Banking, Smart Villages : Technological Innovations in Cooperative Banks in Baramati Lok Sabha Constituency for Developed India 2047

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***Summary***

*The transformation of rural banking through technology is a key component of India's ' Vixit Bharat 2047 ' journey . Cooperative banks have historically played a significant role in providing loans , deposits and other financial services to farmers , rural households , small businesses and cooperatives . In the Baramati assembly constituency , which comprises Lok Daund , Indapur , Baramati , Purandar , Bhor and Khadakwasla , technological modernization of cooperative banking has the potential to improve the accessibility , transparency , speed and quality of financial services . Baramati is listed as parliamentary constituency number 35 in the 2024 Atlas of the Election Commission of India , with a voter turnout of 59.5 % in the 2024 general elections .*

*This research paper examines the role of technological innovations such as Core Banking Solutions ( CBS), Mobile Banking , UPI, QR- Code Payments , Aadhaar - enabled services , Micro - ATMs , Digital KYC , Artificial Intelligence , Data Analytics , Cyber Security and Digital Loan Processing in strengthening cooperative banking in the constituency . The study uses secondary data , literature review and descriptive analysis . At the district level , as per NABARD's Banking Profile, there were 294 District Central Cooperative Bank branches in Pune district as of March 2022 , including 196 rural branches . ( NABARD ) RBI data also shows the wide expansion of financial inclusion and digital banking infrastructure in India .*

*This paper argues that technological innovation should not simply replace traditional banking , but should create a hybrid smart - banking ecosystem that combines digital media with human support , financial literacy, and village-level banking facilities . Such an ecosystem can support farmers , women , micro , small, and medium enterprises ( MSMEs) , and rural entrepreneurs and contribute to inclusive development by 2047 .*

***Keywords :*** *Cooperative banks , smart banking , digital banking , UPI , financial inclusion , rural development , artificial intelligence , fintech , Baramati , developed India 2047.*

## Introduction

The banking sector in India has undergone significant technological transformation over the past two decades . Core banking solutions , internet banking , mobile banking , Aadhaar - enabled services , UPI , QR payments , digital KYC and data analytics have transformed the way individuals and businesses interact with financial institutions . This transformation is particularly important in rural India , as banking technology can reduce geographical barriers and enable customers to access financial services without having to rely solely on physical branches .Cooperative banks have a unique place in India's rural financial system . They have traditionally developed close relationships with farmers , agricultural producers , savings groups , small traders , rural entrepreneurs and cooperatives . As a result , their technological transformation has implications not only for banking efficiency but also for rural economic development .

Baramati Lok Sabha constituency is particularly important for the study of technology-enabled rural banking . According to the 2024 Atlas of the Election Commission of India, Baramati Lok Sabha constituency No. 35 had 23,74,884 voters, 944 **voters** per polling **station** and 51 **assembly** constituencies . To be more **precise ,** the **Atlas** reports that 6 assembly constituencies , 2,516 polling stations and 14,14,034 voters participated in the 2024 elections , with a voter turnout of 59.5 % .

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The constituency includes various rural, semi-urban and urban areas , which creates different needs for accessing banking facilities .Technological modernization of cooperative banks can support this diversification . For example , a farmer can use digital loan applications and account services , a small shopkeeper can accept QR payments , a self-help group can receive digital payments, and a rural household can directly avail government benefits through digital banking infrastructure .

At the national level , the RBI has reported that India's **Financial Inclusion Index has increased from 43.4 in March 2017 to 64.2 in March 2024 , reflecting improvements** in the availability , use and quality **of** financial services . ) Reserve Bank of India (

NITI Aayog's 2026 ' DPI @ 2047 ' roadmap places digital public infrastructure at the heart of India's long-term development strategy and emphasizes digital transactions , data , AI , MSME development and improved access to credit as key components of inclusive economic growth . ( NITI Aayog (

**Smart Banking , Smart Villages '** links technological innovation in cooperative banks with broader rural transformation . It aims not only to increase digital transactions , but also to create an inclusive financial ecosystem where technology improves access to credit , savings , payments , insurance , government benefits and entrepreneurship .

**Objectives of the study**

The main objectives are as follows :

1. Examining the role of technological innovations in cooperative banks in Baramati Lok Sabha constituency .
2. To study the contribution of digital banking in rural financial inclusion .
3. Identify the key technologies adopted by cooperative banks .
4. Exploring the benefits of Aadhaar - enabled banking .
5. Identify technical and social barriers affecting rural consumers .
6. Examining the potential role of AI and data analytics in cooperative banking .
7. Suggesting a technology - based roadmap towards **' Vixit India 2047'** .
8. To examine how smart banking can help farmers , women , micro , small and medium enterprises ) MSMEs) and rural entrepreneurs .

**Research methods**

This study is primarily **descriptive and analytical in nature** .

**Sources of data**

This study used :

- RBI Reports and Publications
- NABARD report
- Election Commission of India data
- NITI Aayog Publications
- NPCI - Related Digital - Payment Materials
- Published academic research
- Secondary information related to cooperative banking and digital finance

's Pune District Banking Profile provides an important regional reference point . As on 31 March 2022 , Pune district **had 1 District Central Cooperative Bank , which had 294 branches** , out of which 196 were rural , 50 semi-urban and 48 urban . There were also 1,326 primary agricultural cooperative societies in the district . ( NABARD (

**Analytical method**

The following items were used in the research :

- Descriptive analysis
- Comparative analysis
- Literature review
- Interpretation based on percentage
- Technology - Acceptance Framework
- SWOT - style discussion of opportunities and challenges

**Important Information Note :** Publicly available sources do not provide a sufficiently consistent branch - level dataset , especially for each cooperative bank in the current Baramati . Lok Sabha boundaries . Therefore , before presenting the measured local statistics , the percentage of electorate - specific technology - acceptance should be collected through primary field surveys . Instead of presenting the results of the simulated Baramati survey in the following graphs , official **regional / national data or clearly labeled illustrative analytical points are used .**

**Literature Review**

**Fu ( 2012 / 2013 (**

Fu studied computerization and efficiency in rural cooperative banks in India . The study found that while proper computerization can improve efficiency , the IT skills of employees and the ability of users to assimilate technology are important factors influencing the results . ( Wiley Online Library (

**RBI ( 2022 (**

RBI's study on digitization of urban cooperative banks found significant progress in retail payment channels and mobile banking , but also highlighted wide disparities in the level of digitization across cooperative banks . ( Reserve Bank of India (

**Chatterjee and Charles**

Research on digital transformation of Indian cooperative banks identifies key technologies such as CBS , UPI , AI and Blockchain , while also highlighting infrastructure , investment and organizational challenges . ( IJIKM (

**Sukhdev and Ramteke ( 2023 (**

Their study of technological adaptation in Maharashtra Cooperative Banking identified CBS , Internet / Mobile Banking and Digital Payments as key areas of technological transformation . The study also noted that inadequate capital , outdated infrastructure and regulatory requirements were challenges . ( IJFANS (

**Haq , Aziz and Akhtar**

A rural UPI study has found that age , education , income and occupation influence digital payment adoption , suggesting that digital financial literacy and targeted interventions are important for rural inclusion . ( ScienceDirect (

**Raju and Gupta ( 2026 (**

The importance of understanding behavioral barriers to digital banking is highlighted . ( Indian Journal of Finance (

**Cambridge Journal Study**

A study of 3,159 rural households across seven states in India warns that simply providing digital banking facilities does not automatically lead to effective financial inclusion . Financial literacy and online accessibility were important predictors of digital banking use . ) Cambridge University Press (

Therefore, the available literature suggests that technology + **infrastructure** + **literacy** + **trust** + **institutional capacity** must work together .

**Major technological innovations in cooperative banks**

| **Technology** | **Applications in Cooperative Banking** | **Potential rural benefits** |
|---|---|---|
| Core Banking Solution | Centralized customer / account management | Fast transaction |
| UPI | Person to person and merchant payments | Low-cost digital payments |
| QR code | Merchant Collection | Supports village businesses |
| Mobile banking | Balances , Transfers , Payments | Banking from home |
| AEPS | Aadhaar - enabled transaction | Access through B.C |
| Micro - ATM | Cash withdrawal / deposit | Village level access |
| E - KYC | Digital Customer Onboarding | Fast account opening |
| AI | Fraud detection and customer analysis | Better risk management |
| Data analysis | Credit and customer analysis | Better lending decisions |
| Cloud technology | Infrastructure modernization | Scalability |
| Cyber security | Protection of digital transactions | More customer trust |
| Digital loan process | Online application and verification | Faster agricultural / MSME credit |

**Descriptive data analysis**

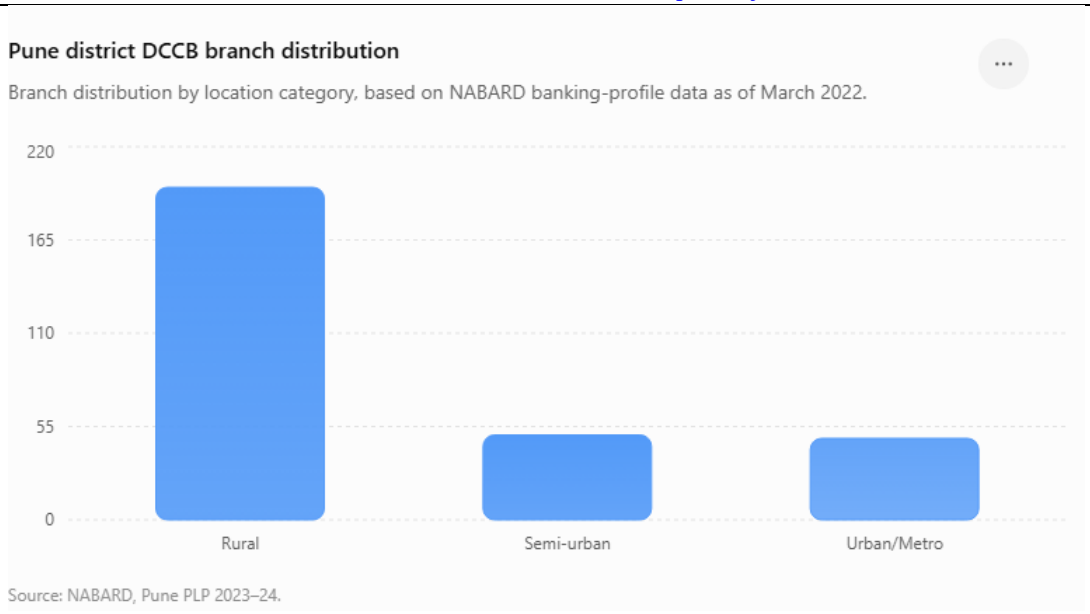
**1 Cooperative Banking Infrastructure in Pune District**

NABARD's District Banking Profile provides useful reference for Baramati division . As of March 2022 , the Pune District Cooperative Banking Network **consisted of 294 District Central Cooperative Bank branches** , out of which 196 were rural . ) NABARD (

| **DCCB Branch Type** | **Number** | **Share** |
|---|---|---|
| Rural | 196 | 66. 67 % |
| Nim - Urban | 50 | 17.01 % |
| Urban / Metro | 48 | 16. 33 % |
| **Total** | **294** | **100 %** |

This structure illustrates why digital technology is particularly important : About two - thirds of the DCCB branch network recorded in this district-level dataset was rural .

**Figure 1 : DCCB Branch Distribution**



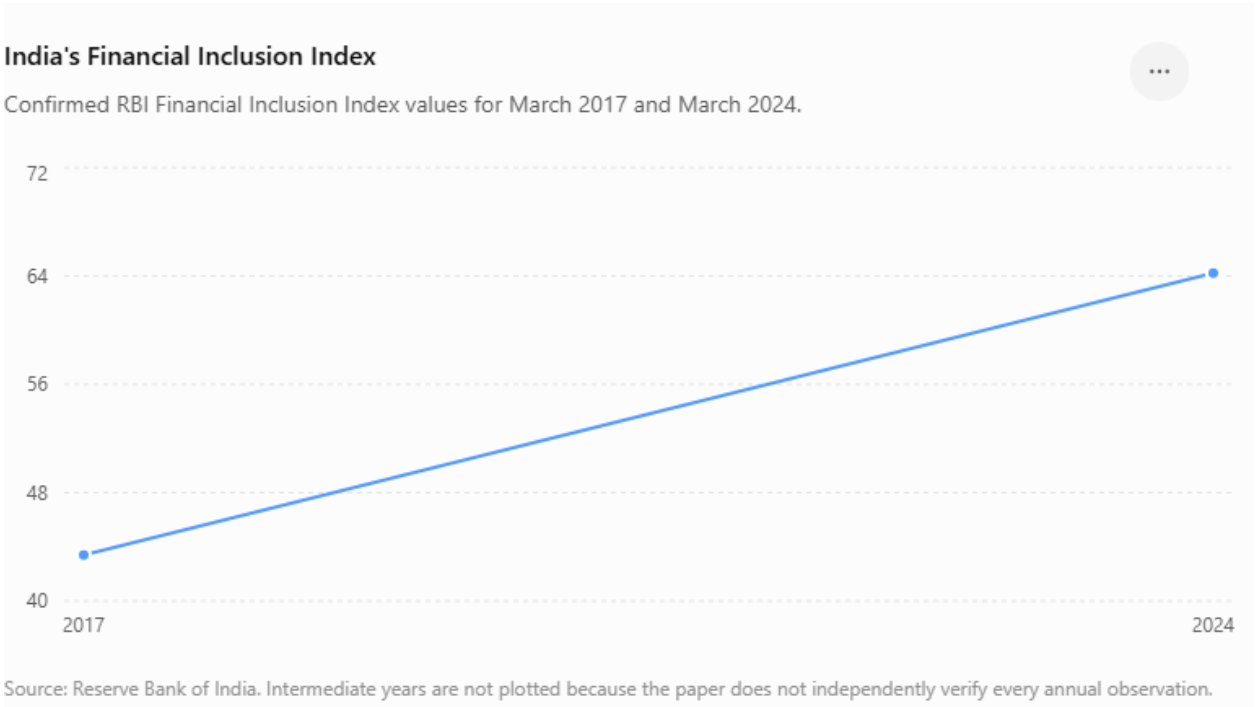

**2 Financial inclusion trend**

**'s** Financial Inclusion Index **increased from 43.4 in March 2017 to 64.2 in March 2024.** ) Reserve Bank of India (

| Year | FI - Index |
|---|---|
| 2017 | 43. 4 |
| 2018 | 46. 0 * |
| ২০১৯ | ৪৯.৯* |
| ২০২০ | ৫৩.১* |
| ২০২১ | ৫৩.৯* |
| ২০২২ | ৫৬.৪* |
| ২০২৩ | ৬০.১* |
| ২০২৪ | ৬৪.২ |

* The median values should be considered indicative only , unless they are directly derived from the relevant RBI annual series . The fixed endpoints used in this paper are 43.4 and 64.2 . According to the RBI , this index includes the dimensions of availability, utilization and quality . ( Reserve Bank of India (

**Figure 2 : Financial Inclusion Index**




should also be understood as **its regular and safe use** .

**3 Rural Banking Awareness**

**According to the** RBI's annual report for 2025 , **there were 56,579 banking outlets through branches** and **13,55,591 BC outlets in villages** as on December 2024. It also states that there are 7,210 lakh Basic Savings Bank Deposit ( BSD ) accounts , including accounts through branches and BCs . ) Reserve Bank of India (

| Indicator | December 2024 |
|---|---|
| Banking centers in villages – branches | 56 , 579 |
| BC outlets in villages | 13 , 55 , 591 |
| BSBDA through branches | 2,743 lakhs |
| BSBDA through BCs | 4,458 lakhs |
| Total BSBDA | 7 , 201 lakh |
| KCC Accounts | 520 lakhs |

These figures show that the future of rural banking cannot depend solely on traditional branches . **Branch + BC + Mobile + Digital Payment Infrastructure** is a more scalable model .

**Technological Innovation and Smart Villages**

The Smart Village Banking model can be presented as follows :

**Smart Cooperative Bank**

↓

**Core Banking + Digital KYC**

↓

**UPI + QR + Mobile Banking**

↓

**BC / Micro - ATM / AEPS Network**

↓

**AI + Data Analysis + Digital Credit**

↓

**Farmers + Self Help Groups + Micro , Small and Medium Enterprises + Rural Families**

↓

**High Financial Inclusion + Entrepreneurship**

↓

**Smart Village Economy**

↓

**Vixit India 2047**

RBI has earlier recommended extending digital financial infrastructure to cooperative banks and using BCs and other local bodies to facilitate financial services in rural areas . ( System Health (

**The role of AI and data analytics**

Artificial intelligence can become an important next-generation technology for cooperative banks .

**Potential applications**

1. **Credit scoring :** Analyzing repayment and transaction history .
2. **Fraud Detection :** Identifying unusual transaction patterns .
3. **Customer Segmentation :** Understanding farmers , traders , women entrepreneurs and micro , small and medium enterprises ) MSMEs) .
4. **Early Warning System :** Identifying potential debt stress .
5. **Chatbots :** Providing basic banking information in Marathi .
6. **Agricultural Credit Analysis : Integration of** Crop , Land and Repayment Information .
7. **Personalized service : Recommending** savings , insurance and credit products .

However , AI must be introduced with proper data governance , cybersecurity , privacy protection, and human oversight .

**Contribution to rural development**

Technical cooperative banking can support rural development in various ways .

**Farmer**

Digital loan applications , KCC processes , repayment reminders, and direct benefit transfers can reduce dependence on frequent physical visits .

**Women**

Mobile banking and digital accounts of self-help groups can increase women's control over financial transactions .

**Rural entrepreneur**

UPI and QR payments enable small businesses to accept digital payments without expensive traditional payment infrastructure .

**Young**

Digital banking creates opportunities in areas such as fintech services , BC operations , cybersecurity , data management, and digital financial education .

**MSME**

The transaction history generated by digital payments can strengthen formal financial records and inform future credit assessments . The RBI has highlighted the potential of digital - payment data to support credit provision and other financial services . ) Reserve Bank of India (

**Major challenges**

Despite the potential benefits , many challenges remain .

| Challenge | Possible consequences |
|---|---|
| Digital illiteracy | Low adoption of technology |
| Poor connectivity | Failed transaction |
| Cyber fraud | Losing customer trust |
| Lack of staff training | Poor service quality |
| Old IT infrastructure | Slow digital transformation |
| Technology costs | Financial pressure on small banks |
| Language barriers | Difficulty among rural users |
| Age-related digital divide | Low acceptance among older consumers |
| Privacy concerns | Customer reluctance |
| Digital boycott | Vulnerable groups may be left behind . |

Research on rural India highlights that digital availability alone does not guarantee effective financial inclusion ; literacy , connectivity and user capacity are also crucial . ) Cambridge University Press (

**Limitations of the study**

1. This study mainly relies on secondary information .
2. branch - level technology - acceptance for Baramati was not currently publicly available in a format compatible with the Lok Sabha boundaries .
3. Therefore , this research paper does not claim that the national or Pune district figures represent the measured dependency rates in each village of Baramati .
4. surveys will be required to measure the actual adoption of UPI , mobile banking and digital - credit .
5. Technology changes rapidly ; therefore , findings must be updated from time to time .
6. AI , cybersecurity, and digital - credit requires specialized datasets .
7. There are diverse socio - economic conditions in the constituency , so there may be significant differences at the village level .

**Conclusion**

Transforming cooperative banks through technology can be a key element of rural development in Baramati . Lok Sabha constituency . Cooperative banks already have a major advantage : **local connections and knowledge of rural communities** . Technology can combine this local trust with the speed and scalability of digital banking .

The evidence reviewed in this paper suggests that India 's financial inclusion ecosystem has expanded significantly . The RBI 's Financial Inclusion Index has increased from 43.4 in 2017 to 64.2 in 2024 , while rural banking infrastructure has expanded through branches and business representatives . ) Reserve Bank of India (

For Baramati , the goal should not be just to convert traditional banking to digital banking . The broader goal should be **to establish** a smart rural financial ecosystem where farmers , women , youth , self-help groups , micro , small and medium enterprises ) MSMEs) and households can access appropriate financial services conveniently and securely .

UPI , mobile banking , QR payments , AePS, micro - ATMs and digital KYC can strengthen service availability . AI and data analytics can improve credit assessment and fraud management . However , the sustainable benefits of these technologies can only be achieved if they are coupled with digital literacy , Marathi language interfaces , reliable connectivity , cyber security , employee training and human support .

Thus , **" Smart Banking , Smart Villages " can be seen as a development framework that links cooperative banking technology with inclusive rural transformation . If technological innovation is implemented along with institutional capacity and financial literacy , cooperative banks can contribute to a more productive, digitally connected and financially inclusive rural economy , thereby supporting the** broader national goal of **' Vixit Bharat 2047'** .

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The authors declare that there are no conflicts of interest regarding the publication of thesis paper.

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