

Survey study

UPI as a Catalyst for Rural Empowerment and Financial Inclusion in India

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Abstract

This study is structured as a formal empirical case study following systematic observational trial design principles, examining UPI-driven financial inclusion as an intervention across rural and semi-urban populations in India. The research treats UPI adoption as a measurable intervention and financial inclusion as the primary outcome, adhering to the cause-and-effect logic central to clinical trial methodology. A sample of 416 respondents was recruited across geographically diverse settings - rural, semi-urban, and urban - using stratified sampling to ensure demographic representativeness, a procedure analogous to participant stratification in multi-site clinical trials. The study employed a validated five-point Likert scale instrument across five constructs: Service Quality, Digital Trust, Usage Satisfaction, Continued Usage, and Financial Inclusion. Instrument reliability was confirmed through Cronbach's Alpha values ranging from 0.83 to 0.89, consistent with psychometric validation standards applied to patient-reported outcome measures in clinical research.

Keywords: Unified Payments Interface, Digital trust, Service quality

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About study

The case study dimension of this research focuses on two distinct community groups - Self-Help Groups (SHGs) and rural agrarian communities in Gujarat - treated as bounded cases for identifiable intervention exposure (UPI adoption), measurable behavioral outcomes (financial inclusion and usage continuance), and contextual factors (digital literacy and infrastructure availability). This approach follows Yin's [1] case study methodology, wherein real-world phenomena are examined within their natural operating context. Primary data collection, instrument design, and hypothesis testing were conducted in a sequenced, phase-wise manner analogous to the staged protocols of observational clinical studies. Outcome measurement followed a clearly defined hierarchy: financial inclusion served as the primary outcome variable, while user satisfaction and continuance intention functioned as secondary outcome measures. Regression analysis was employed as the inferential tool to establish causal relationships and quantify effect sizes, revealing that the model accounted for 46% of variance in financial inclusion ($R^2 = 0.46$) providing robust evidence of UPI's intervention effect on underserved populations. The geographical comparative analysis between rural and urban subgroups further strengthens the case study design, functioning as a natural control-versus-treatment group comparison. Findings confirm that rural populations - who depend on UPI as their primary financial gateway - demonstrate significantly stronger inclusion outcomes than their urban counterparts, for whom UPI is merely supplementary. Collectively, the methodology and findings of this study satisfy the evidentiary standards of rigorous case study research and align with observational clinical trial frameworks, making the results applicable and transferable across similar developmental and financial inclusion contexts in emerging economies globally.

Executive summary

In the last decade, India has witnessed a radical transformation in its financial ecosystem, driven primarily by the Unified Payments Interface (UPI). While urban centers adapted quickly, the true test of digitization lay in the rural heartlands, where traditional banking infrastructure

was historically limited. This case study examines research conducted by Komal Naroliya and Dr. Anil Sharma, which explores how service quality, digital trust, and user satisfaction serve as the primary drivers for integrating rural populations into the formal economy. By analyzing data from 416 diverse respondents, the study reveals that UPI is not merely a payment tool but a fundamental pillar for community empowerment and sustainable development.

The problem: the rural access gap

Financial inclusion is defined as the accessibility and usage of affordable, timely financial services for underserved populations. In many developing economies, including India, the "last-mile" delivery of banking services has remained a persistent challenge. Rural areas often suffer from a lack of physical bank branches, leading to a heavy reliance on cash-based systems and informal, often predatory, lending networks [2]. This reliance on cash limits the ability of small-scale farmers, rural entrepreneurs, and Self-Help Groups (SHGs) to participate in the broader economy. Without a digital footprint, these individuals struggle to build credit histories, access government subsidies efficiently, or engage in secure savings practices. The introduction of UPI sought to bridge this gap by offering a real-time, low-cost, and interoperable transaction platform that operates on the ubiquitous mobile phone.

The technological solution: UPI and digitization

The Unified Payments Interface (UPI) has revolutionized the delivery of financial services by reducing transaction costs and increasing efficiency. Unlike traditional banking, which may require physical travel and extensive paperwork, UPI allows for instant peer-to-peer and peer-to-merchant transactions. For the rural economy, the implications are profound. UPI facilitates micro-transactions, which are essential for small-scale vendors and farmers who handle low-value, high-frequency trades. Furthermore, it serves as the backbone for Direct Benefit Transfers (DBT), ensuring that government financial assistance and subsidies reach the intended beneficiaries directly into their bank accounts. This system minimizes "leakage" and corruption by removing intermediaries, thereby building significant trust in the formal financial system.

Theoretical framework: the mechanics of adoption

To understand why users in rural India choose to adopt and - more importantly - continue using UPI, the study utilizes several established academic models:

- **SERVQUAL model:** This framework evaluates service quality through dimensions like reliability, responsiveness, and ease of use. In the context of UPI, service quality is the baseline requirement; if the app is not reliable or easy to navigate, trust cannot be established.
- **Expectation-confirmation theory:** This theory suggests that user satisfaction is the most critical predictor of whether someone will continue using a technology. If a rural user finds that UPI meets their expectations for speed and security, they are far more likely to make it a permanent part of their financial life.
- **Digital trust:** This reflects the user's confidence in the security and integrity of the digital system. For a population that has historically relied on physical cash, moving to a "transparent" digital system requires a high degree of confidence that their personal information and funds are safe.

Research methodology: measuring the impact

The researchers employed a quantitative and empirical research design to validate these theories. They collected primary data from 416 respondents across a spectrum of geographic locations, including rural, semi-urban, and urban areas in India.

The study utilized a five-point Likert scale (ranging from "Strongly Disagree" to "Strongly Agree") to measure five key constructs:

- **Service Quality (SQ):** Measuring reliability and processing speed.
- **Digital Trust (TR):** Assessing confidence in transaction safety.
- **User Satisfaction (US):** Evaluating overall happiness with the platform.
- **Continued Usage (CU):** Determining the intention to use UPI in the future.
- **Financial Inclusion (FI):** Measuring the degree to which UPI improved access to formal systems and reduced cash dependence.

To ensure the accuracy of the data, a reliability analysis was conducted using Cronbach's Alpha [3]. The results showed high internal consistency across all categories, with values ranging from 0.83 to 0.89, well above the acceptable threshold of 0.70. This statistical rigor provided a stable foundation for the subsequent analysis of how these factors interact to empower rural communities.

Initial findings: the perception of digital finance

The descriptive statistics of the study paint a highly positive picture of UPI's reception. All measured variables recorded mean values above 3.5, indicating a generally favorable perception among the 416 respondents.

One of the most significant initial observations was that Continuance Intention (CU) recorded the highest mean value of 3.97. This suggests that once users are onboarded onto the UPI ecosystem, they show strong engage.

The mechanics of influence: statistical insights

The core of the study's findings lies in the regression and correlation analysis, which deciphers the behavioral drivers of UPI adoption. The correlation results established a statistically significant positive relationship among all variables at the 1% significance level. The most profound connection identified was between user satisfaction and continuance intention [4].

The regression model provided several critical insights into the user's journey:

- **Quality to trust:** Service quality has a strong positive effect on digital trust ($\beta = 0.38$), confirming that reliability and speed are the foundational requirements for building user confidence.
- **The experience factor:** Interestingly, while digital trust is important, it is not the primary driver of repeat usage. Instead, user satisfaction emerged as the most influential predictor of continued usage ($\beta = 0.47$). This suggests that once the initial barrier of trust is crossed, the actual quality of the experience determines whether a rural user will abandon cash in favor of digital alternatives.
- **Inclusion outcomes:** The study confirms that frequent engagement with UPI significantly enhances financial inclusion ($\beta = 0.21$).

Overall, the regression model accounted for 46% of the variance in financial inclusion. This indicates that while UPI is a powerful tool, nearly half of the success in financial inclusion is directly attributable to the service quality and user satisfaction of the digital platform [5, 6].

Geographical dynamics: rural necessity vs. urban convenience

A standout feature of this research is the comparative analysis between rural and urban contexts. The study reveals a fundamental difference in the "why" behind UPI usage:

- **Urban users:** For those in semi-urban and urban regions, UPI is primarily a tool for convenience, streamlining transactions that were already possible through other formal banking methods.
- **Rural users:** In contrast, rural populations rely on UPI for essential financial transactions. In these regions, where physical bank branches may be miles away, UPI serves as the primary - and sometimes only - gateway to the formal financial system.

Because of this reliance, the impact of continued UPI usage on financial inclusion is significantly stronger in rural areas. For a village farmer, the ability to receive a payment instantly is not just a convenience; it is a transformative shift in how they manage their livelihood.

The empowerment ripple effect: socio-economic impact

The study argues that UPI's impact extends far beyond simple payments, acting as a catalyst for community empowerment and local economic development [7, 8]. By facilitating micro-transactions, UPI enables small-scale farmers and informal workers to participate in the formal economy.

Specific groups benefit in unique ways:

- **Self-Help Groups (SHGs):** UPI facilitates digital group savings and improves the transparency of financial management within these community-based organizations.
- **Rural entrepreneurs and youth:** The ease of digital payments encourages entrepreneurship and allows rural youth to participate in the broader digital economy without relocating to urban centers.
- **Direct Benefit Transfers (DBT):** By serving as the delivery mechanism for government subsidies, UPI ensures that financial assistance reaches beneficiaries directly, reducing corruption and building trust in the state's financial systems.

Environmental and systemic sustainability

A unique perspective offered by the research is the link between digital payments and environmental sustainability. The shift toward UPI supports eco-friendly financial practices in two major ways:

- **Reduction in paper currency:** Lower dependence on physical cash reduces the resources required for printing and transporting paper money.
- **Minimized travel:** Digital transactions eliminate the need for rural residents to travel long distances to physical banks, thereby reducing the carbon footprint associated with rural banking.

These factors align UPI with global Sustainable Development Goals (SDGs), proving that financial digitization can contribute to a greener, more resilient economy [9].

Strategic recommendations for stakeholders

To maximize the potential of UPI as a tool for empowerment, the researchers offer targeted implications for different sectors:

- **For policymakers:** There is a critical need to strengthen digital infrastructure in remote regions and promote financial literacy to bridge the remaining knowledge gap.
- **For agricultural stakeholders:** Integrating UPI into digital marketplaces for agricultural produce can ensure farmers receive fair, direct payments without the need for exploitative middlemen.
- **For FinTech developers:** Since user satisfaction is the strongest predictor of usage, developers must prioritize intuitive interfaces that account for varying levels of literacy and local languages.

Conclusion

The study concludes that digitization through UPI is a transformative force in India, particularly for those historically excluded from the formal banking sector. By providing an accessible, secure, and efficient platform, UPI does more than facilitate transactions - it reduces poverty, fosters income stability, and empowers communities to take control of their financial futures [10]. As digital trust and service quality continue to improve, UPI will remain a cornerstone of inclusive growth and sustainable development in rural India.

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