JAAFR INTERNATIONAL RESEARCH JOURNAL
JOURNAL OF ADVANCE AND FUTURE RESEARCH
JAAFR.ORG | ISSN : 2984-889X
An International Open Access, Peer-reviewed, Refereed Journal

UPI ADOPTION AND FINANCIAL INCLUSION IN KERALA

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Abstract: The steep rise in the uptake of the Unified Payments Interface (UPI) has transformed the manner in which households, consumers, small businesses and financial institutions avail and engage with digital financial services within the Indian context. Kerala is an especially relevant research environment for this transformation due to its combination of high bank penetration, high awareness of digital payments, and comparatively developed digital infrastructure. This paper explores the role of UPI adoption in contributing to financial inclusion in Kerala based on secondary data collected from primary authoritative sources such as the Reserve Bank of India (RBI) and National Payments Corporation of India (NPCI) as well as associated research literature which evaluates the evolution of financial inclusion in India. The analytical approach taken here considers the theoretical links between UPI adoption and access, usage and quality aspects of financial inclusion, and uses Kerala state-level UPI payments profiles, the national RBI Financial Inclusion Index (FI-Index) and formal and informal surveys to illustrate the transformation that has occurred within the Kerala financial inclusion. The evidence demonstrated shows that UPI is indeed a major driver of transformation within the payments landscape. At the same time, it maintains that relying solely on UPI is not sufficient to achieve full financial inclusion. Problems such as digital literacy, security risks, the cost of smartphones and internet access, the exclusion of vulnerable groups, and the need for consumer protection remain significant challenges. The paper concludes by offering recommendations for making financial inclusion in Kerala, driven by UPI, more inclusive, secure, and sustainable.

IndexTerms - Unified Payments Interface (UPI), Financial Inclusion, Digital Payments, Fintech, Kerala, Digital Financial Services, Financial Literacy, Banking.

INTRODUCTION

The digital transformation of financial services has raised a new priority of extending financial inclusion beyond simply getting a bank account to efficiently, cost-effectively and responsibly using that account and other services. It was during this phase that the digital payment ecosystem played such an important role in bringing customers into formal financial services and so much so that, over a period, it was the original intention behind the rationale of a 0.25% UPI rate in original intentions of creation now has been borne out by the good of customers of small ticket,

P2P, as well as merchants in transacting an additional 50%. This is now an integrated part of the country's digital financial system.

That's not all to the impact of the UPI. Inactive accounts do not contribute much to inclusiveness. They utilize your existing bank account and leverage all the financial services your bank can already deliver to help you with making and receiving payments, transfer money, pay bills, settle with merchants, and perform many other tasks that make managing finances easier. Noted the Reserve Bank of India (RBI) Digital payments, can enable further financial inclusion and inclusive growth as it generates data which can lead to further offering of Credit, Savings, Wealth Management, Collection and Insurance products. Kerala is a particularly good place to study this association. The state has a well-developed banking sector and can boast of good financial inclusion levels and digital payments literacy. Though it's an assorted collection of urban, semi-urban, rural, coastal, plantation, and tribal communities, the level of digital knowledge and capability ranges broadly. Therefore, a good degree of infrastructure and awareness will not necessarily result in benefits trickling down to every community.

So, there is value in studying the adoption of UPI in Kerala, not only to document how much of it has been adopted, but to investigate how it may help get more people into the formal financial sector. Official data has this to say about this change. As per NPCI data, in August 2025, Kerala registered 399.48 million UPI transactions worth 56,071.45 crores. During that month, the state accounted for 2.00 per cent of the country's volume of UPI transactions and 2.26 per cent of the aggregate value of those transactions. Nationwide UPI transactions were also growing in the time period; NPCI stated 24,508.96 million transactions (29,82,355.95 crore) in August 2026. The data clearly reflects that UPI is no longer a fringe, niche, digital payments application but has rather become embedded in our everyday money ecosystem. As such, the paper studies the adoption of UPI and its impact on financial inclusion in Kerala, based on secondary data. In order to establish such association the paper does not establish causation out of total available data. It rather links up different aspects of uptake of UPI with different aspects of financial inclusion. This is because the RBI's FI-Index is a national-level indicator and not a Kerala-specific one. This paper makes a comparative analysis of the national FI-Index against the Kerala-specific UPI data and explains the Kerala situation from the comparative assessment.

NEED OF THE STUDY

As UPI's adoption continues to grow, however, a key question remains – is increasing adoption of digital payments leading to increased financial inclusion or is it simply a replacement of cash among the already financially included. This is particularly true in Kerala where digital payments are widely accepted and banking services are easily accessible. When digital payments are already prevalent among digitally savvy users, the next challenge will be to ensure that the benefits of such systems reach the financially/ digitally excluded.

The relationship between Digital Payments Growth and Financial Inclusion is a fact to be learned, While a lot of narrative tends to connect growth of digital payments and the financial inclusion, the relationship may not be that simple.

Access to payments systems, usage of bank accounts, 'Banking population' and financial inclusion by definition cover only a part of the wider definition of financial inclusion that also includes quality, cheapness, consumer protection,

financial literacy, insurance, savings and credit. Thus, the adoption and payment may have different implications than the definition of financial inclusion in specific cases, thus requires in depth analysis.

OBJECTIVES OF THE STUDY

1. To investigate the overall UPI adoption rate and current trend based on the secondary data procured from regulatory bodies as well as banking and non-banking financial organizations.
2. To analyse the impact of UPI adoption on the three facets of financial inclusion; access, usage and quality.
3. To analyze the role that UPI can play in improving utilization of formal financial services in the state of Kerala.
4. To figure out the significant constraints and risks that could prevent inclusive UPI adoption.
5. To recommend policies and management practices to enhance UPI led financial inclusion in Kerala.

RESEARCH QUESTIONS

RQ1: What is the extent and status of UPI usage in Kerala?

RQ2: How can the adoption of UPI are used as tool for financial inclusion?

RQ3: What type of evidence suggests that access to finance is growing as digital payments are growing?

RQ4: What are some of the barriers that could result in bad UPI adoption for every section of population in Kerala?

REVIEW OF LITERATURE

Financial Inclusion is most commonly defined as the "availability and usage of appropriate financial services by all individuals and enterprises". The broad idea can be measured by the RBI's FI-Index in three areas: access, usage and quality. This reason also makes perfect sense to study UPI by payment technology. A technology that can directly have a bearing on how easy or how usable a particular account is and on the indirect factors to other forms of inclusion. Much of the existing research on digital payments assumes that perceived usefulness, ease of use, trust, conditions of support, security and digital skills are the main determinants of adoption.

Jacobs, Jacob and Johnson (2024), who examined low-income users in India, highlight the importance of behaviour intention, perceived risk and enabling conditions in adoption of UPI. Their results are relevant for financial inclusion: low-income users could get great benefits from cheap digital payments, but they could be more vulnerable to transaction mistakes, fraud and technology issues.

Kerala-specific evidence further indicates adoption is not merely availability. On the digital usage side, the study conducted by Raj, Rajasekaran and Misha (2026) found differences in digital usage across rural and urban respondents and the role of digital usage experience, infrastructure, access and usage confidence. Such findings lend some credence to the view that inclusion is a "dynamic process in which infrastructure, capability, confidence and actual use" are entangled. The RBI analysis provides a macro-level insight into the situation.

The central bank said digital payments enhance the utility of bank accounts and that information available from digital payments can aid in the delivery of more financial services. The Reserve Bank's financial inclusion index (FI-Index) improved from 43.4 in March 2017 to 64.2 in March 2024 and is projected to increase to 67.0 in March 2025. This increase was observed in all domains such as access, use, and quality where usage contributed significantly especially in recent years. Convergence of digital payments and digital inclusion reveals the importance of having a comprehensive approach of studying digital payments as an integral part of the inclusion ecosystem, although this national index cannot be directly mapped to UPI.

A yawning gap is still apparent in the proof. Most research to date has either explored UPI adoption by a person or financial inclusion at a higher level. Far less has been done to understand this relation, particularly within a framework that distinguishes explicitly between the adoption of a payment method and broader financial inclusion. This research addresses this gap by integrating the RBI's financial inclusion framework with UPI transaction data from Kerala, and by identifying how UPI can add to existing financial activity, not just digitise it.

CONCEPTUAL FRAMEWORK

In this paper, the framework that has been used in this paper is known as the digital financial inclusion. It has been used by considering the adoption of UPI as an outcome to have increased usage and access of the financial services and not the proxy of financial inclusion. These mechanisms influence financial inclusion in five closely related ways:

(i) lowered cost and time for a transaction; (ii) improved use of existing bank accounts; (iii) a larger base of merchants accepting payments with more payment history; (iv) greater access to payments of salaries, remittances, transfers, and disbursements; and (v) building payment transaction history to access formal financial services. The digital paths work through things like: Digital literacy; Mobile and internet availability and access; Trust; Cyber security; Consumer protection; The availability of alternative financial products.

UPI adoption mechanism	Expected inclusion pathway	Relevant inclusion dimension
Interoperable mobile payments	Lower transaction friction and easier access	Access
Frequent account-linked payments	Greater active use of formal accounts	Usage
Merchant QR/payment acceptance	Formalisation and traceability of transactions	Usage
Digital transaction records	Potential support for credit and other services	Quality / usage
Convenient low-value payments	Greater participation in everyday formal transactions	Usage
Digital literacy and security	Ability to use services safely and confidently	Quality

Table 1. Conceptual pathways linking UPI adoption with financial inclusion

RESEARCH METHODOLOGY

Research design

The research is based on a descriptive and analytical methodology through pre-existing data. It does not establish a causal relationship between UPI and financial inclusion since publicly available data from Kerala that accounts for UPI adoption and all dimensions of financial inclusion in a directly comparable manner over time, is not accessible. Accordingly, it draws an inference from the official UPI data, indicators of financial inclusion, and relevant academic resources.

Sources of data

The RBI and the NPCI RBI figures, in the form of the Financial Inclusion Index, data about awareness of digital payments, and data about policies NPCI figures about the number and value of UPI transactions at a national and state level Explanation of behaviour and mechanisms of inclusion based on academic studies Data used for the quantitative analysis – August 2025 NPCI data on the number of and value of transactions in Kerala.

Period of Analysis

The RBI FI Index can be considered to gauge evolution trends between 2017 and 2025. The current state of UPI in Kerala is considered through the data reported by NPCI at the state level (August 2025). Tracing of generic trend of UPI growth based on a national level data has been done wherever necessary. Due to varying sources for data reporting (monthly, quarterly, annually), this has not been used as as a ground for causality.

Analytical Techniques

This section provides the use of percentage, trends, and descriptive comparisons. The average value for a transaction that takes place on 01-Aug-2025 in Kerala, for this transaction can be calculated by dividing the sum of ‘Transaction value’ for a single unit by the total number of transactions. e.g. If the transaction value per cent and transaction per cent divided by total transactions per cent. This figure is descriptive only and not representative of the spending habits of individuals.

RESULTS AND DISCUSSION

Trend in Financial Inclusion

The RBI FI-Index is a good national reference point for the environment in which UPI is growing. The index was 43.4 in March 2017 (initial 2010 baseline) and stood at 67.0 in March 2025. There was no 'U' (usage) only trend - reports say access is improving, while usage and quality also improved. The index signals the growth in use is not just about opening accounts – a payment system has to also lead to usage.

Year	FI-Index
2017	43.4
2018	46.0
2019	49.9
2020	53.1
2021	53.9
2022	56.4
2023	60.1
2024	64.2
2025	67.0

Table 2. RBI Financial Inclusion Index, 2017–2025

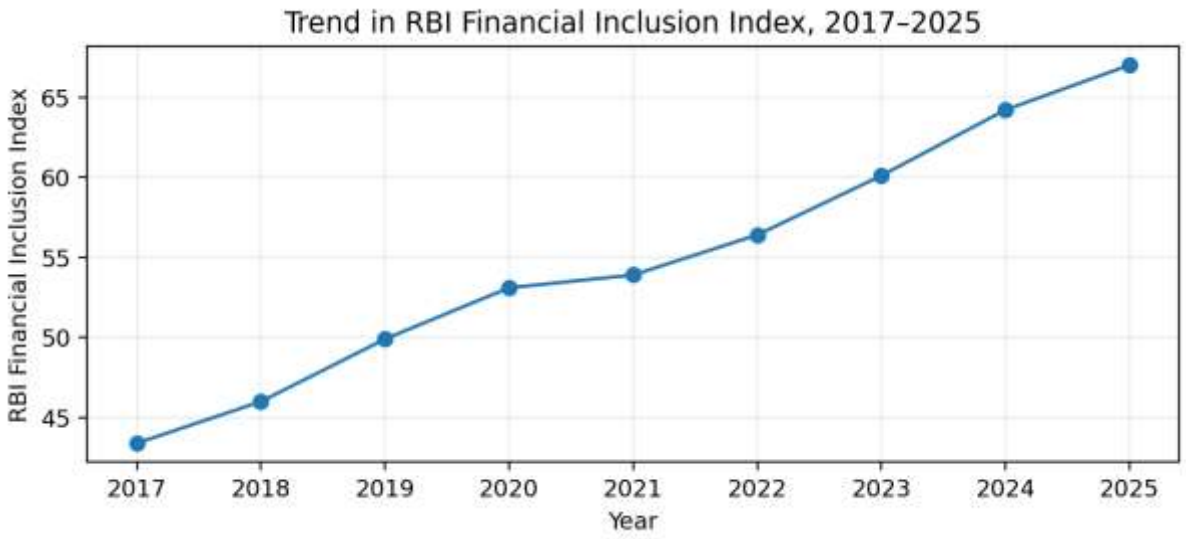

Figure 1. Trend in RBI Financial Inclusion Index, 2017–2025

However, the increase in FI-Index should not be interpreted as that UPI solely caused the uplift. There are other factors which affect FI-Index, such as, expansion of bank accounts, government schemes, credit availability, insurance and pension, financial literacy and inclusion, digital payment infrastructure and more. However, the rapid expansion of digital payments during the same period indicates that digital payment infrastructure plays a critical role in the increasing levels of consumption and access.

UPI Adoption in Kerala

As per August 2025 state-wise data of NPCI, the number of UPI transactions in Kerala were 399.48 million and its value stood at 56,071.45 crore. The state constitutes 2.00 per cent of the volume of all UPI transactions nationally, and 2.26 per cent of the total value of all such transactions. When the reported value has been divided by the reported

volume, it totals up to roughly 1,404 per transaction. This shouldn't be seen as the average sum paid by a single user, since the total at the state level consists of a range of transaction types, users, and merchant categories.

Indicator (August 2025)	**Kerala**	**Share / derived measure**
UPI transaction volume	399.48 million	2.00% of India
UPI transaction value	₹56,071.45 crore	2.26% of India
Derived value per transaction	≈ ₹1,404	Descriptive calculation

Table 3. Kerala's UPI position in August 2025

Kerala is significant as the volume share is higher than its value share. This implies that the mean value of the transactions reported by the state is higher than the national mean value for the given month. Total figures at the state level, however, are not very useful in explaining the difference because of possible sources of explanations could be the nature of transactions, such as merchant payments, transfers and high value transactions, etc. and these explanations would need transaction data to be verified.

Digital-Payment Awareness and the Kerala Context

There is some more data from the Reserve Bank of India (RBI) survey on Kerala's digital-payment scenario. Seventy-seven per cent of consumers across the country are aware of digital payments, however in Kerala this rises to 85.1 per cent. While high awareness levels are always a good sign, these should not be confused with usage; especially safe and sustainable usage. Financial inclusion does not imply simply opening an account but also knowing how to use the services, building confidence and access to complaint resolution.

Therefore, Kerala itself is faced with a peculiar policy problem. In a demographically 'digitally aware' state, the emphasis should now move towards improvement of quality of use, as opposed to adoption. This could entail supporting groupings including the elderly, the low-income household, persons with poor digital skills, rural residents and vulnerable populations in general, to be able to employ digital payment systems without undue risk of transaction failures, frauds or exclusion.

How UPI Can Deepen Financial Inclusion

First, UPI makes small payments less costly and timely. The urgent need to send and receive money instantly for families and small business owners, instant transfers can decrease the use of cash and make accounts more useful.

Secondly, UPI increases the usage of bank accounts. This hits at the usage side of financial inclusion.. The divide between "accounts" and actual use of those accounts is at the very heart of true inclusion.

Third, UPI facilitates QR code payments for merchants. Digital payments enable small businesses to accept payments without requiring the physical infrastructure typical of card payments. Acceptance through digital channels could formalise inform al and semi-formal businesses.

Fourth, digital payment history can be a valuable input for financial service providers.

A second benefit the RBI highlights is the availability of real-time data on sellers' business, cash flow and buying trends that digital payments can provide, which could be used to offer credit and other services. The profit may not solely be in the payment.

Fifth, UPI can lead to greater convenience in the task of money transfers and regular household transfers. The high proportion of remittance and migration related economy in Kerala makes the ability to move money with ease even more relevant, even though the effect on remittance patterns are yet to be studied.

Lastly, UPI can help in delivering and receiving the digital financial services from both the public and private sectors. When integrated with bank accounts, a proper educated level of financial literacy, and strong consumer protection, digital payments can potentially open the door to a bigger financial ecosystem.

Barriers to Inclusive UPI Adoption

However, the adoption of UPI will not completely bring about financial inclusion. The first barrier is digital competence. Users may have a bank account and a smart phone but be unsure about how to authenticate them, remember a PIN, detect fraud or resolve a dispute. The second barrier is technical reliability, ie access to the internet, device availability or transaction failures. The third is cyber security and fraud risk. A payment system might be easily accessible but still cause exclusion if the most vulnerable users are most at risk.

A further fear is a digital divide in a digitally literate state. Individual characteristics, such as age, income, education, disability, job, place of residence and family support, influence access to digital financial services. Infrastructure may differ across regions, between urban and rural areas, or in isolated locations. Women and older digital users face a different set of experiences around digital capacity and digital independence. This is why policy should promote assisted and inclusive digital finance, instead of assuming access will be equal by design through smartphone ubiquity.

The third barrier is more conceptual than tangible: Use of UPI is only a subset of financial inclusion. Someone who uses UPI a lot might have very poor insurance, savings, access to cheap credit or very poor financial resilience. Policy should be aimed at making UPI part of a broader financial inclusion framework.

CRITICAL DISCUSSION

All the evidence points to a cautiously optimistic take on the impact of UPI adoption on financial inclusion.

The large number of UPI transactions in Kerala, the good levels of awareness among digital payments, and other national improvements in financial inclusion indicators in India imply that digital payments is a crucial channel for accessing formal financial services. But that cannot be taken as evidence that adoption of only UPI results in better financial inclusion in Kerala.

There are three important differences to consider. To take them one by one, first, just because the UPI is present does not necessarily mean that it is used frequently. Secondly, digital payments usage may not necessarily translate to complete financial inclusion. Third, just because we observe a correlation in aggregate data over a period of time does not suggest a causal link between UPI usage and financial inclusion.

The central contribution of this paper is analytical, not causal. It, then, situates the UPI moment in the context of financial inclusion, and its access, usage and quality. It indicates that the way forward for Kerala's digital finance policy should be depth, quality and resilience. A mature digital payment infrastructure can't just be measured in terms of its volume of transactions; rather, whether there is minimal risk to vulnerable groups accessing digital services, whether merchants can derive from formal infrastructure, whether users can avail of a wider range of financial services and whether consumers can get adequate redress if things go awry.

This is where banks can play a vital role by providing UPI-powered value added services like savings, credit, insurance, wealth management to the target group along with responsible lending and data security. For government and regulators, this involves expanding access to financial education, awareness of fraud, ways to address complaints and digital access to the widest possible audience. For Fin Techs, this involves designing their offerings to be simple and accessible for people with low literacy and the elderly. For researchers, this involves developing district and individual level datasets to test the causal effects articulated in this paper.

POLICY IMPLICATIONS

1.Enhance digital financial literacy. Education should promote good practices to use UPI safely, PIN and authentication management, identifying scams, online privacy, transaction checking, and how to lodge complaints.
2. Help to get merchant acceptance everywhere.SMEs, micro-enterprises, and small entrepreneurs can be assisted in adopting trustworthy QR payment acceptance and simple digital bookkeeping.

3. Foster trust through good cybersecurity and consumer protection. Quick fraud reporting, accessible dispute resolution mechanisms and multilingual awareness campaigns are essential in creating and strengthening consumer trust.
4. Prioritize digitally underserved segments. The elderly, low-income households, individuals with disabilities, and those living in underserved areas should be prioritised for assisted digital and accessible digital financial services.
5. Combine UPI with wider inclusion Banks and Fin Techs need to leverage the scope for payment relationships to learn how to build sustainable, responsible access to savings, insurance, pensions and appropriate credit, rather than simply increasing transaction count.

6. Create monitoring indicators that are relevant for Kerala. At the state level, dashboard would keep track of usage of UPI and account, merchant adoption, digital literacy, frauds, complaint redressal and others financial products.
7. Assist in responsible data use. Transaction data can enable financial innovation, but going forward, consent, privacy, transparency and responsible data use should remain the backbone of financial inclusion.

LIMITATIONS AND SCOPE FOR FUTURE RESEARCH

The primary data limitation is the absence of a publically available, Kerala-specific dataset that directly compares UPI adoption to all the relevant financial inclusion dimensions. RBI FI-Index is a national index and cannot be used to estimate Kerala-specific impact coefficient. NPCI data at state level give amount of transactions, they don't breakdown who is using them, what's the socio-economic profile of users, or what financial impact it has. However, there are some differing timescales regarding when information is compiled and released which prevent direct statistical analysis from year to year using these figures alone.

Thus, future research should gather primary data at the district and/or individual level across Kerala, integrated with administrative/transaction data where ethically and legally feasible. Finally, structural equation modeling could examine whether digital literacy, trust, and perceived security mediate the UPI adoption and financial inclusion relationship. Panel studies could look at differences across districts, rural versus urban centres. Further research could be extended to look at particular segments like women, elderly, micro-businesses and migrant households and to what extent UPI helps to promote financial inclusion.

CONCLUSION

UPI has become an integral part of India's digital financial architecture and could catalyse greater financial inclusion when combined with a broader ecosystem of bank accounts, financial literacy, acceptance by merchants, consumer protection and access to diversified financial products. UGPI value in Kerala for August 2025 - 399.48 million transactions valued at 56,071.45 crore, demonstrates platform popularity. Also, don't forget about the 85.1% buyers awareness reported in the RBI digital currency survey, proving that the digital economy will make profits. Simultaneously, the study stresses that adopting UPI should not be equated with financial inclusion. The growth of the RBI FI-Index from 43.4 in 2017 to 67.0 in 2025 indicates huge improvement in the state of financial inclusion in India. But, it is driven by many factors and UPI's contributions should not be overestimated. So, the correct statement is: "UPI enables financial inclusion, but it is not enough to achieve complete financial inclusion."

More accessible, safe and meaningful interaction with the digital payment eco system needs to be on the agenda in Kerala, apart from the ubiquitous usage and awareness of UPI. With the ability to build financial literacy, ensure that a robust framework, a responsive grievances redressal mechanism, and fair access to a product suite covering savings, credit, insurance and pension are provided when digital payments are supplemented, UPI can lead towards a more robust and thriving inclusive formal financial system. The paper provides a theoretical and evidence-based foundation for this endeavour.

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