10.48047/jocaaa.2023.31.04.75
ISSN: 1521-1398

A STUDY ON DIGITAL PAYMENT EXPANSION AND FINANCIAL INCLUSION IN INDIA

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Paper received: 11-11-2023 **Accepted: 23-11-2023** **Published: 21-12-2023**

Abstract

The rapid expansion of digital payment systems has transformed the financial ecosystem in India and has become an important instrument for promoting financial inclusion. The present study examines the growth of digital payments and the progress of financial inclusion in India during the period 2017–2024. The study is based entirely on secondary data collected from authoritative sources including the Reserve Bank of India (RBI), National Payments Corporation of India (NPCI) and the World Bank. Digital payment expansion is represented primarily through the volume and value of Unified Payments Interface (UPI) transactions, while financial inclusion is measured using the Reserve Bank of India's Financial Inclusion Index (FI-Index). Trend analysis, percentage growth, compound annual growth rate (CAGR), Pearson correlation and simple linear regression are employed to analyse the relationship between digital payment expansion and financial inclusion. The findings reveal a substantial increase in digital payment activity during the study period. UPI transaction volume increased from 9.15 crore transactions in 2017–18 to more than 1,300 crore transactions in 2023–24, while the RBI Financial Inclusion Index increased from 46.0 in 2017–18 to 64.2 in 2023–24. The study also identifies a strong positive relationship between UPI transaction volume and the Financial Inclusion Index. The findings indicate that the expansion of digital payments has accompanied substantial improvement in financial inclusion in India. However, digital access, digital literacy, cybersecurity and equitable usage remain important considerations for achieving deeper and more sustainable financial inclusion.

Keywords: Digital Payments, UPI, Financial Inclusion, FinTech, Digital Financial Inclusion, RBI,

10.48047/jocaaa.2023.31.04.75

India, Secondary Data

1. Introduction

Financial inclusion refers to the availability and effective use of affordable financial services by individuals and businesses, particularly those who have traditionally been underserved by the formal financial system. Access to bank accounts, payments, savings, credit, insurance and other financial services enables individuals to participate more effectively in economic activities.

India has experienced a major transformation in its financial system over the last decade. The development of digital payment infrastructure has reduced dependence on physical cash and enabled individuals to make payments through mobile phones, bank accounts and other electronic channels. Among the various digital payment mechanisms, the Unified Payments Interface (UPI) has emerged as one of the most important components of India's digital payment ecosystem.

The Reserve Bank of India has identified digitalisation of payments as an important element of India's financial development. Its Digital Payments Index, which uses March 2018 as the base period, increased from 100 in March 2018 to 445.50 in March 2024, demonstrating the rapid expansion of payment digitalisation.

UPI has played a particularly important role in this transformation. NPCI provides annual and monthly statistics covering UPI transaction volume and value, allowing the growth of UPI to be examined over time.

The expansion of digital payments is closely connected with financial inclusion because digital payment infrastructure can increase the usability of formal bank accounts. The RBI Financial Inclusion Index measures financial inclusion through three dimensions: access, usage and quality. The index increased from 43.4 in March 2017 to 64.2 in March 2024.

The World Bank's Global Findex 2021 reported that 78% of adults in India had an account, compared with 35% in 2011. It further reported that 35% of Indian adults used accounts for digital payments in 2021, demonstrating the growing importance of digital payment usage in financial inclusion.

Against this background, the present study analyses the expansion of digital payments and the progress of financial inclusion in India and examines whether a statistical relationship exists between the two.

10.48047/jocaaa.2023.31.04.75

2. Statement of the Problem

The growth of digital payments has been one of the most significant developments in the Indian financial sector. However, an increase in digital transaction volume alone does not necessarily imply complete financial inclusion. Financial inclusion requires not only access to financial accounts but also effective, regular and affordable use of financial services.

India has witnessed extraordinary growth in UPI transactions, while the RBI Financial Inclusion Index has also improved substantially. This raises an important research question: to what extent is the expansion of digital payments associated with the improvement in financial inclusion in India?

The present study therefore attempts to examine the growth of digital payments and financial inclusion and statistically assess the relationship between these two developments during the period 2017–2024.

3. Review of Literature

3.1 World Bank (2022)

The World Bank's Global Findex 2021 examined account ownership and digital payment usage across economies. For India, the report found that 78% of adults had an account and that digital payments had contributed to increased account usage. It also identified differences in digital payment usage between rural and urban populations and between men and women.

3.2 Mahesh et al. (2021)

Research on UPI highlighted the rapid expansion of the Unified Payments Interface and its role in India's digital payment transformation. UPI transaction volume increased substantially between 2016–17 and 2020–21, indicating the growing acceptance of mobile-based payment infrastructure.

3.3 Reserve Bank of India (2024)

The RBI Annual Report 2023–24 documented significant growth in India's digital payment ecosystem. The RBI reported that its Digital Payments Index increased to 445.50 in March 2024 from its March 2018 base of 100. The report also highlighted the role of digital payments in expanding the usability of bank accounts and improving financial inclusion.

10.48047/jocaaa.2023.31.04.75

3.4 Reserve Bank of India (2024)

The RBI Financial Inclusion Index showed continuous improvement from 43.4 in March 2017 to 64.2 in March 2024. The index incorporates access, usage and quality dimensions, with usage receiving the highest weight. The improvement therefore reflects not merely the availability of financial services but also their increasing use.

3.5 Research Gap

Previous studies have extensively examined digital payment adoption, UPI growth, consumer behaviour and financial inclusion separately. However, there is scope for a focused secondary-data study examining the long-term statistical relationship between digital payment expansion and the RBI's composite Financial Inclusion Index. The present study attempts to address this gap by combining UPI transaction data with the RBI's FI-Index for the period 2017–2024.

4. Objectives of the Study

- To examine the growth and trends of digital payments in India during the period 2017–2024.
- To analyse the progress of financial inclusion in India during the study period.
- To measure the growth rate of UPI transactions in India.
- To examine the relationship between digital payment expansion and financial inclusion in India.
- To assess the contribution of digital payment expansion towards the improvement of financial inclusion in India.
- To provide suitable suggestions for strengthening digital financial inclusion in India.

5. Hypotheses of the Study

Null Hypothesis (H_0): There is no significant relationship between digital payment expansion and financial inclusion in India.

Alternative Hypothesis (H_1): There is a significant relationship between digital payment expansion and financial inclusion in India.

6. Research Methodology

6.1 Research Design

10.48047/jocaaa.2023.31.04.75

The study adopts a descriptive and analytical research design based entirely on secondary data.

6.2 Nature of Data

The study uses secondary data relating to digital payment transactions and financial inclusion indicators in India.

6.3 Study Period

The study covers the period from 2017–18 to 2023–24, with the RBI Financial Inclusion Index being measured on a March-year basis.

6.4 Sources of Data

• Reserve Bank of India

• National Payments Corporation of India

• World Bank Global Findex

• RBI Annual Reports

• RBI Payment System Indicators

• Government of India reports and publications

• Published research studies and reports

6.5 Variables

Independent Variable: Digital Payment Expansion, represented primarily by UPI transaction volume.

Dependent Variable: Financial Inclusion, measured using the RBI Financial Inclusion Index (FIIndex). The FI-Index is a composite measure incorporating access, usage and quality.

6.6 Statistical Tools

• Percentage Growth Analysis

• Compound Annual Growth Rate (CAGR)

• Trend Analysis

10.48047/jocaaa.2023.31.04.75

• Pearson Correlation

• Simple Linear Regression

7. Data Analysis and Interpretation

Table 1: Growth of UPI Transactions in India

Financial Year	UPI Transactions (Crore)	Transaction Value (₹ Lakh Crore)
2016–17	1.79	0.69
2017–18	9.15	1.10
2018–19	53.55	8.77
2019–20	125.21	21.32
2020–21	223.58	41.04
2021–22	459.50	84.17
2022–23	838.29	139.20
2023–24	1,307.85	199.89

Source: Compiled from NPCI UPI Product Statistics and RBI payment-system data.

Interpretation: The table demonstrates an extraordinary expansion of UPI transactions. Transaction volume increased from 1.79 crore in 2016–17 to more than 1,300 crore in 2023–24. The value of transactions also increased from ₹0.69 lakh crore to approximately ₹199.89 lakh crore.

Between 2017–18 and 2023–24, UPI transaction volume increased at an approximate CAGR of 128.66%. This indicates the exceptional speed at which UPI became integrated into India's payment ecosystem.

8. Trend of Financial Inclusion in India Table 2:
RBI Financial Inclusion Index, 2017–2024

Year	Financial Inclusion Index
2017	43.4
2018	46.0

10.48047/jocaaa.2023.31.04.75

2019	49.9
2020	53.1
2021	53.9
2022	56.4
2023	60.1
2024	64.2

Source: Reserve Bank of India.

Interpretation: The Financial Inclusion Index increased consistently throughout the study period. It rose from 43.4 in March 2017 to 64.2 in March 2024. The index increased by approximately 47.93% over the period, with a CAGR of approximately 5.77% between 2017 and 2024.

9. Comparison between Digital Payment Expansion and Financial Inclusion

Table 3: UPI Volume and Financial Inclusion Index

Financial Year	**UPI Transactions (Crore)**	**FI-Index**
2017–18	9.15	46.0
2018–19	53.55	49.9
2019–20	125.21	53.1
2020–21	223.58	53.9
2021–22	459.50	56.4
2022–23	838.29	60.1
2023–24	1,307.85	64.2

Interpretation: Both UPI transaction volume and the Financial Inclusion Index followed an upward trend throughout the study period. The simultaneous upward movement suggests that the expansion of digital payment infrastructure has occurred alongside increasing financial inclusion. However, this should not automatically be interpreted as proof that UPI alone caused the improvement in financial inclusion.

10.48047/jocaaa.2023.31.04.75

10. Correlation Analysis

Pearson correlation coefficient (r) = 0.946. The result indicates a very strong positive relationship between UPI transaction volume and the RBI Financial Inclusion Index. The approximate significance level is $p = 0.0013$. Since the p-value is less than 0.05, the null hypothesis is rejected.

Decision: H_0 is rejected.

Interpretation: There is a statistically significant and very strong positive relationship between digital payment expansion, represented by UPI transaction volume, and financial inclusion during the study period.

11. Regression Analysis

A simple linear regression was performed with Financial Inclusion Index as the dependent variable and UPI Transaction Volume as the independent variable.

Estimated regression equation: FI-Index = 49.626 + 0.0120 (UPI Transaction Volume) R^2

= 0.895.

Interpretation: The R^2 value indicates a strong statistical association between UPI transaction volume and the FI-Index within the sample. The positive regression coefficient indicates that an increase in UPI transaction volume is associated with an increase in the Financial Inclusion Index. However, the result should be interpreted cautiously because the analysis uses only seven annual observations and both variables exhibit strong upward time trends.

12. Major Findings

- Digital payments have expanded rapidly in India during the study period.
- UPI transaction volume increased from 9.15 crore transactions in 2017–18 to approximately 1,307.85 crore transactions in 2023–24.
- UPI transaction value increased substantially, reaching approximately ₹199.89 lakh crore in 2023–24.
- UPI transaction volume recorded an exceptionally high CAGR of approximately 128.66% between 2017–18 and 2023–24.

10.48047/jocaaa.2023.31.04.75

- The RBI Financial Inclusion Index increased from 46.0 in 2017–18 to 64.2 in 2023–24.
- The digital payment ecosystem expanded considerably faster than the composite FI-Index.
- Pearson correlation produced a coefficient of approximately 0.946, indicating a very strong positive relationship.
- The correlation was statistically significant at the 5% level.
- Regression analysis produced an R^2 of approximately 0.895, indicating a strong statistical association within the sample.
- Digital payments have become an important component of India's broader financial inclusion process.
- Financial inclusion cannot be attributed exclusively to digital payments because it also depends on banking access, financial literacy, credit availability, insurance, pension services and government initiatives.

13. Suggestions

- Strengthen rural digital infrastructure through improved internet connectivity, mobile network
- coverage and reliable payment infrastructure.
- Improve digital financial literacy with practical training on UPI usage, fraud prevention, privacy and secure authentication.
- Strengthen consumer awareness regarding phishing, fake QR codes, fraudulent payment requests and other digital-payment risks.
- Encourage small retailers, street vendors and micro-enterprises to adopt digital payment facilities at low or minimal cost.
- Give special attention to rural populations, low-income households, elderly users and people with limited digital literacy.
- Design digital financial services to accommodate users with limited technological knowledge and different linguistic backgrounds.
- Improve grievance-redressal mechanisms for digital payment users.
- Focus on affordable, secure, accessible and beneficial digital financial services rather than transaction volume alone.

10.48047/jocaaa.2023.31.04.75

14. Conclusion

The study examined digital payment expansion and financial inclusion in India using secondary data for the period 2017–2024. The findings demonstrate that India experienced extraordinary growth in digital payment activity, particularly through UPI. At the same time, the RBI Financial Inclusion Index showed a consistent upward movement.

UPI transaction volume increased dramatically during the study period, while the Financial Inclusion Index improved from 43.4 in March 2017 to 64.2 in March 2024. The statistical analysis identified a very strong positive relationship between UPI transaction volume and financial inclusion. This supports the view that digital payment expansion has accompanied the deepening of financial inclusion in India.

However, the findings should not be interpreted as establishing that digital payments alone caused improvements in financial inclusion. The FI-Index incorporates multiple dimensions and is affected by several financial-sector and socioeconomic factors. Furthermore, the statistical analysis is based on a relatively small number of annual observations, and both variables show strong time trends.

Overall, the study concludes that digital payment expansion has become an important component of India's financial inclusion process. Continued investment in digital infrastructure, financial literacy, cybersecurity, consumer protection and inclusive access will be essential for ensuring that the benefits of India's digital financial transformation reach all sections of society.

15. Limitations of the Study

- The study is entirely based on secondary data.
- The study period is limited to 2017–2024.
- The study primarily uses UPI transaction volume as the indicator of digital payment expansion.
- Financial inclusion is represented by the RBI Financial Inclusion Index, which is a composite measure.
- The number of annual observations available for correlation and regression analysis is limited.
- The study does not directly examine individual-level differences in digital payment usage.

10.48047/jocaaa.2023.31.04.75

- Correlation and regression results indicate statistical association and should not be interpreted as definitive evidence of causality.
- Other factors influencing financial inclusion are not individually modelled in the present study.

16. Scope for Further Research

Future studies may extend the present research by examining state-wise differences in digital payment adoption and financial inclusion. Separate studies can investigate the rural–urban divide, gender differences, digital financial literacy and cybersecurity concerns.

Future research can incorporate multiple digital payment indicators such as UPI, IMPS, NEFT, mobile banking and card payments rather than relying primarily on UPI. More advanced econometric techniques can also be employed using longer time-series data.

A comparative study between India and other emerging economies would further contribute to understanding the role of digital payments in financial inclusion.

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