

A Study on the Growth of Digital Payments in India Pre-COVID-19 and post-COVID-19 Using AI Techniques

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Abstract—This research paper primarily aims at implementing a comparative study regarding the development of digital payment service growth in both pre-COVID-19 and post-COVID-19 eras within the country of India. The financial year for the pre-COVID-19 era has been taken as FY 2018-19 & 2019-20, whereas for the post-COVID-19 era, it includes 2020-21 to 2024-25. This paper also discusses the development and implementation of prominent digital payment options used for paying various services and other commodities like Unified Payments Interface, Immediate Payment Service, National Electronic Fund Transfer, Cards, and other electronic payment options. The research and subsequent report will be based on data collection from existing publications such as the Reserve Bank of India (RBI) and National Payments Corporation of India (NPCI), as data provided by research carried out by individuals may contain biased views. On this score, major emphasis will be placed on the importance of increased numbers/value in digital payment transactions.

A heightened use of digital payment systems during the post-pandemic period compared to that during the pre-pandemic period. This is essentially because of the presence of smartphones in society, widespread availability of internet connectivity, and altered consumer behaviors due to the pandemic. The pandemic has thus accelerated the transition toward cashless modes of payments.

The findings have provided valuable inputs as far as the evolution of digital finance is concerned in the context of India, as well as its contribution towards enhancing efficiency and productivity with regard to transactions. It has recommendations in regard to policies that will foster the growth of digital payment systems.

Index Terms—Digital payments, Transaction volume, Smartphone penetration, Internet connectivity, Cashless economy.

I. Introduction

Digital payments are very important in the country, especially in the past ten years, due to the growth in technology and the support of the government. The most popular digital payment options are UPI, BHIM, and IMPS, which enable people to make money transactions in an efficient, simple, and affordable manner. UPI has become the most popular payment system, allowing people in cities, towns, and villages to make transactions efficiently.

The COVID-19 pandemic has further promoted the use of digital payments in the country. During the pandemic, people preferred to make payments digitally rather than using cash, which is not a very safe

payment method compared to digital payments. This has led to a sharp increase in digital payments in the country, allowing new users to make use of online payment systems.

Digital payments, particularly UPI, are becoming very popular in the country, outperforming other payment options, including IMPS, BHIM, and card payments. The growth of UPI has been possible due to the growth in smartphones, the JAM Trinity, the removal of MDR charges, and the availability of better internet services, which has led to the expansion of digital payments to the poor in the country.

The future of digital payments in the country is very bright, especially in the coming years, as the government is planning to introduce Artificial Intelligence, which will improve the services of fraud detection, customer service, face payments, and voice payments, which will make the payment system easier, efficient, and accessible to people in the country. UPI is likely to introduce new payment options, including credit card payments, offline payments, and international payments in the coming years.

In conclusion, the country is moving towards a cashless economy, which will be efficient, safer, and more accessible in the coming years.

II. History of Digital Payment and Banker

Digital payments and banking have evolved from cash and paper methods to fast electronic transactions. The journey began with the first electronic transfers and ATMs, then moved to card payments in the 1980s, internet banking in the 1990s, and mobile wallets in the 2010s. In India, UPI launched in 2016 and made instant bank-to-bank payments easy through smartphones. Today, digital banking supports quick, secure, and cashless transactions for people and businesses.

III. Scope of the Study

The research examines the growth of digital payments in India before and after COVID-19 by assessing the financial years of 2018-2019, 2019-2020, and 2020-2021 to 2024-2025 and concentrating on the various systems of UPI, IMPS, NEFT, and cards and other systems. Using secondary data from RBI and NPCI, the study assesses the volume and value of the transactions, and analyses the impact of the pandemic on the rapid growth of transactions due to increased use of smartphones and the internet, and a change in consumer behaviours towards a cashless economy. AI assists in forecasting.

IV. Need of the Study

This study analyses the growth of digital payments in India during COVID-19, specifically FY 2018-2020 vs FY 2020-2025. It uses strategically unbiased data from the RBI and NPCI. It analyses the increased digital payment adoption through the influence of the internet, smartphones, and the behavioural shift of consumers towards cashless payments during the pandemic. The study's findings provide

recommendations for policies aimed at increasing efficiency and financial inclusion, as well as addressing the potential future use of AI in digital payments.

V. Benefit of the Study

Using AI to analyze the growth of digital payments in India since COVID shows an astonishing increase in UPI payment adoption. Payment transactions jumped from 2.34 lakh crore in FY 2018-19 to 22.19 lakh crore in FY 2024-25. This surge can be attributed to the increase in smartphone usage and government subsidies. The JAM (**Jan Dhan-Aadhaar-Mobile**) trinity strategy outlines the benefits for policymakers focused on the intricacies of financial inclusion and AI-integrated fraud deterrence. The future will see payment methodologies evolve with the use of biometrics and voice recognition, further enhancing the efficiency of cashless economies.

VI. Research Gap

The study which we attached to this document investigates how digital payments evolved in India during the time before COVID-19 and after the pandemic through the analysis of RBI/NPCI data which shows GPI payments and UPI transactions from 2018 to 2025. The research study shows two different areas which need further exploration. The existing literature contains five studies which research how the pandemic caused changes in society but it fails to address the cybersecurity dangers which include UPI fraud patterns and the digital literacy requirements which rural areas need to access infrastructure and the international standards which exist between Alipay from China and UPI. The paper presents AI forecasts through theoretical models which lack practical applications that use LSTM for prediction purposes and machine learning techniques to identify fraudulent activities. The research paper uses UPI transaction data to present results which show growth in transaction volume and value but it fails to analyze how AI technology impacts fraud detection activities which happen after 2025 and how base system operations of RBI CBDC pilots and their impact on societal balance between genders and digital access in Tier-3 cities. The research study will use advanced AI technology which includes predictive analytics on NPCI datasets to create a model which shows how businesses will continue to grow during economic downturns. The research study needs to address these empty spaces because they will help create complete policy research results.

VII. Objectives of the study

- To Access the growth trend of digital payments in India post COVID-19.
- To investigate the future prospects of digital payments in India with AI-powered predictions.

VIII. Literature review

1. **Sahani, S., Singh, S., & Kumar, M. (2025).** “A Paradigm Shifts in Digital Payment Transactions: Payment System Before and After Covid-19 in Indian Economy” has improved digital payments, which has boosted India digital economy. Technology has altered how people and businesses transact. Transaction times and costs have decreased, and merchant volume has increased thanks to fast debit. Tax fraud has decreased and audit trails and linkages have been improved by new UPI-linked apps. India rural economy grew without any problems. The plan should provide affordable digital solutions with the use of current technology.
2. **Dr. Atul Kumar, Tadhya Parab, Stuti Shukla, Chirag Periwal, Sahil Chorasiya (2024)** “evolution of digital payments: a comparative study of pre- and post-covid trends in hybrid environments” In their study they analysed today’s fast-paced world of technological advancements, digital payments are on a roll, thanks to the ‘Digital India’ initiative for a cashless economy. Digital payments are made through online interfaces and electronic media, without the need for physical money. The government’s vision is for a faceless, paperless, and digitally empowered economy. The increasing use of the internet and smartphones has led to the widespread use of mobile wallets, Google Pay/PhonePey, and UPI, whether it’s buying from Myntra or paying bills at restaurants by scanning QR codes. This research paper employs a two-sample means test on a survey conducted on 100 finance managers in Pune to determine whether the importance of digital payments has increased significantly after the COVID era compared to before.
3. **Mohammed Fadel Arandas, Ali Salman, Syed Arabi Idid, Syaira, Yuek Li Ker (2024)** “The influence of online distance learning and digital skills on digital literacy among university students post Covid-19” in this research, based on diffusion of innovation theory, investigates Malaysian higher education students' views on the impact of compatibility, observability, relative advantage, complexity, trialability, and digital skills on digital literacy in online distance education, which has been fuelled by the COVID-19 pandemic. Correlation analysis among 524 students from six public/private universities showed that there were positive correlations for all six variables. Regression analysis also supported the positive predictors of observability, trialability, and digital skills.
4. **Ms. Anita S. Agarwal (2023)** “impact of covid 19 on digital payments in India-increased usage, problems and government support in budget 2023-24” their study investigates digital payments in India, with a focus on the effects of the COVID-19 pandemic on consumer behaviours. Consumers in India were accustomed to using cash, but with the pandemic, they turned to mobile applications such as UPI to prevent the spread of the virus

through contact with merchants. The study discusses the rise in digital payments, the difficulties in the payment process, and the socioeconomic implications. Secondary information from previous studies is included, and future possibilities from Budget 2023 are discussed. The results show a tremendous rise in the use of digital payments after the pandemic, which is significantly higher than before the pandemic.

5. **P Venkat Kamesh (2021) COVID-19 “Digital Transformation and Digital Competency”** in their paper assess the COVID-19 pandemic has affected the lives of people across the globe, leading to financial crises and a decline in GDP in developed and developing countries. The pandemic has severely affected MNCs, SMEs, and the vulnerable sections of society. Fintech has played a crucial role in countering the effects of the pandemic, providing innovative solutions to overcome difficulties. Digital payments in India have witnessed a significant rise before and during the COVID-19 pandemic due to the rapid evolution of technology, high adoption rates, and increased digital literacy. People have readily adopted finance, payment, banking, and e-commerce apps to protect their livelihoods and businesses.

IX. RESEARCH METHODOLOGY

1. Research Design

The study uses a descriptive research design, and the researcher makes use of information's sources that could be used to analysed the expansion of digital payment services financial transactions in India under two different phases:

Time Period:

- Pre-COVID-19 era: FY 2018-2021
- Post-COVID-19 Period: FY 2022-2025.

2. Data Sources

The study uses secondary data available in the public domain from these trusted sources:

- Reserve Bank of India (RBI), Monthly Bulletins, Annual Reports.
- National Payments Corporation of India (NPCI), Payment Systems Reports.
- Ministry of Finance, Government of India, Economic Survey.

3. Variables Studied

- Transaction Volume (Number of Transactions)
- Transaction Value (INR Crores)

Major Payment Methods:

- Unified Payments Interface (UPI)
- Immediate Payment Service (IMPS)
- Bharat Interface for Money (BHIM)
- Debit/Credit Card Transactions.

4. Analytical Tool

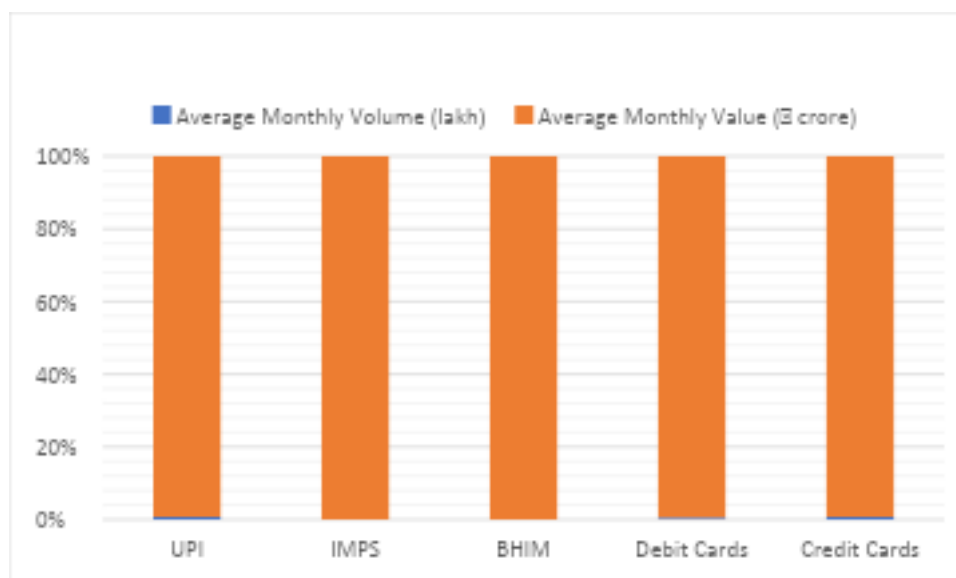
- Calculation of Compound Annual Growth Rate.
- Growth Calculation by year wise.
- Trend analysis, with graphical representation using line bar charts.

X. Data Analysis and Interpretation

This chapter offers a brief introduction to India's digital payment landscape. It analyzes the transaction patterns before There is a potential legal issue and even post COVID-19 pandemic. The information is sourced from the Reserve Bank of India and the National Payments Corporation of India for reliability. UPI Transaction Analysis (FY 2018 – FY 2025) The Unified Payments Interface (UPI) has turned into a leading factor in making payment systems in India. The following table highlights the major increase in both the number of transactions as well as the value of transactions.

| Financial Year | Transaction Volume (crore) | Transaction Value (₹ lakh crore) |
|----------------|----------------------------|----------------------------------|
| 2018-2019 | 2,34,339 | 16,38,52,285 |
| 2019-2020 | 3,43,455 | 16,23,05,934 |
| 2020-2021 | 4,37,118 | 14,14,85,173 |
| 2021-2022 | 7,19,531 | 1,74,42,498.14 |
| 2022-2023 | 11,39,476 | 4,20,86,547.87 |
| 2023-2024 | 16,44,302 | 2,42,82,875 |
| 2024-2025 | 22,19,815 | 2,86,25,840 |

Source: RBI & NPCI Reports, 2025



Interpretation:

The above table data shows an overall analysis of the “State of Digital Payments” in India for the period between 2018 and 2025, focusing mainly on developments concerning the “Unified Interface Payments” system. As per RBI and NPCI data, a huge increase can be witnessed in the adoption of UPI-based payment systems, whereby the volume of such transactions is growing exponentially year after year, From 2,34,339 Crores for the period “2018-2019” to 22,19,815 Crores for “2024-2025”.

Interestingly enough, the data for transaction values reveals that there is some sort of reporting change between FY 2021 to FY 2022. Initially, there is data for values in the hundred million scale (which may be total amounts in rupees) but later years increase to "lakh crore" scale, up to an amount of Rs. 2,862.0 lakh crore by 2024-2025. Once again, this reveals the growth path that UPI must be taking as the back bone of India's entire financial scenario that thrives in the later years of the COVID-19 period. The data reveals that UPI is no longer an emerging tech but the main contributor to payments systems in India.

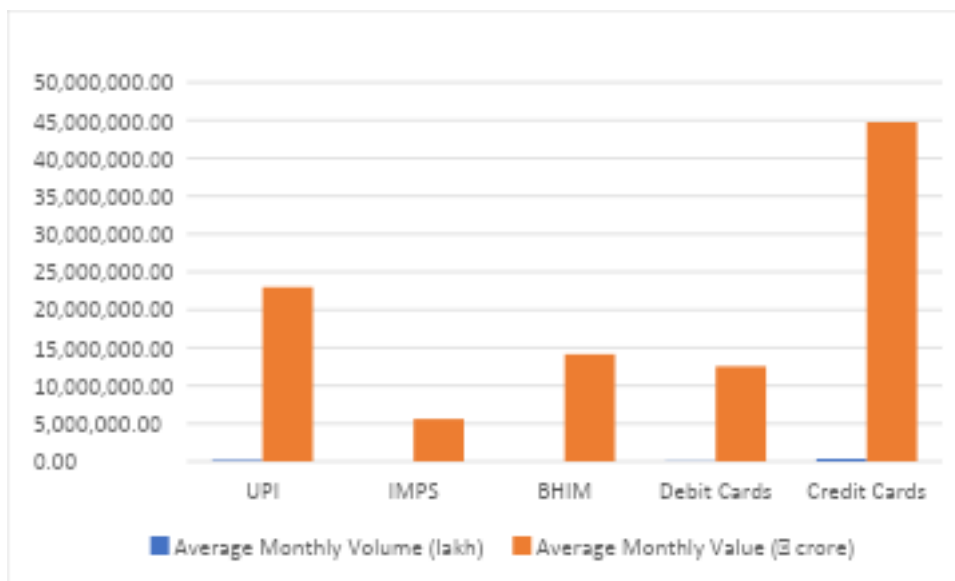
XI. Other Payment Modes Performance (2025 Data snapshot)

An analysis of data for the last nine months on additional payment systems only reinforces UPI's position.

| Payment Method | Average Monthly Volume (lakh) | Average Monthly Value (₹ crore) |
|----------------|-------------------------------|---------------------------------|
| UPI | 1,76,878.15 | 2,29,52,99,715 |
| IMPS | 3867.3 | 56,14,28,944 |
| BHIM | 981.12 | 1,41,45,330 |
| Debit Cards | 65,102.8 | 1,25,49,265 |

| | | |
|---------------------|------------|-------------|
| Credit Cards | 3,70,458.8 | 4,47,56,852 |
|---------------------|------------|-------------|

Source: NPCI Monthly Reports, January – December 2025.



Interpretation:

UPI tops the list in the context of the overall digital payment market in India in terms of average monthly volume in terms of volume size as well as volume in terms of value for the last nine months, considering an average monthly volume in terms of value of ₹2,959.7 Crore and an average monthly volume in terms of value of 167.69 Crore. BHIM comes in the second spot in the lineup. For the said payment system, the average monthly volume in terms of value is ₹1,414.3 Crore, and the average monthly volume in terms of value totals 98.67 Crore in worth of transactions. Debit Card takes the third spot in the lineup. In this case, the average monthly volume in terms of value reads ₹12.55 Crore.

XII. Conclusion

The transition of India's digital payment system from financial year 2018-19 to financial year 2024-25 is a revolutionary change in the behavioural aspect of finance among Indian society. In this particular study, it has been established that although digital financial system development has been on the rise among Indian society, it is clear that it is COVID-19 that has acted as a catalyst for making Indian society transit from cash payment transactions and move towards contactless digital payment system transactions.

At the core of these developments is the Unified Payment Interface. The growth story of the Unified Payment Interface is a technological leap to acceptability and a dominant position in the payment technology industry. The amount involved in these transactions is huge, touching a staggering 22,19,815 Crores by the end of the financial year 2024-25, compared to a paltry 2,34,339 Crores before the pandemic.

So, in a sense, his achievement has very little to do with the preferences of the consumer and a great deal to do very strongly with the strong support system he has from the policies formulated for the country in this context. The initiative taken in the form of the "JAM trinity," the abolition of the "Merchant Discount Rate," and the promotion of "QR code-based transactions" have effectively reduced the hurdles of entry into the market from a consumer's standpoint. A very high penetration of smartphones in the country, coupled with an internet connect everywhere, has ensured the democratization of the same for the low-income segment of the population with a great degree of success in the country in the long run, so much so that frictionless real-time transactions have now been the "norm" in the context of the digital finance that has been put in place in the country.

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