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Research Article

Digital Transaction in Indian Payment Ecosystem- A Comprehensive Analysis

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Abstract: The augmented growth of digital transaction in Indian financial system has deeply reformed the nation economic scenery. The analysis leverages insight from research paper, banking industry report and empirical data towards highlighted trends include financial inclusion, mobile banking in driving efficiency and technology innovation that reformed the digital payment system of India. This research paper reconnoitres the impression of digital payment ecosystem from 2019 to 2024 and mainly converging on key contributors such as the Unified Payment Interface (UPI), fintech innovation and regulatory policies which accelerating financial inclusion and digital transaction growth in the system. Leveraging analysis and supported data from various report published in duration of five years, this study analysis and identifies critical drifts, disruption and opportunity in the digital payment ecosystem. The study concludes by staging applied recommendation for financial institution to endure this digital uprising.

Keywords: - Digital transformation, India Digital payment ecosystem, Technology integration, Unifies payment interface, financial inclusion, Fintech innovation.

INTRODUCTION

The advance of digital transformation in payment system has interrupted traditional financial system, particularly in developing economies like India (Kamal & Ahmad, 2025). The progress from traditional banking transaction to digital transaction banking ecosystems has been driven by increased internet diffusion, mobile adoption, and government-led initiatives such as Digital India (Imchen & Nungsangyula 2025). The technology role in driving digital payments not only inflated but it also has revolutionized India's payment ecosystem. The reserve bank of India (RBI) and national payment corporation of India (NPCI) has play important role in boosting the digital financial inclusion in Indian banking system (Verma & Kumaran 2021). Digital transformation in banking has transfigured India's payment system, positioning with the global drift of stirring towards cashless economies. Jameaba and Muyanja-Ssenyonga (2022) state that Indian banks have gradually espoused technology innovations like mobile banking apps, artificial intelligence (AI), blockchain technology, and big data analytics due to clients demand quicker, extra protected, and accessible financial facilities.

Evolution of Digital Payments in India

India's drive towards digital payments instigated with the starter of electronic banking services in the early 2000s with bank. The formation of the National Electronic Funds Transfer (NEFT) and Real-Time Gross Settlement (RTGS) systems arranged the substance for digital banking (Kumar & Shukla 2023). The dawn of mobile banking and internet banking in the late 2000s additionally enabled digital payment espousal. However, the most significant transformation occurred with the launch of the Unified Payments Interface (UPI) in 2016, which transformed peer-to-peer and merchant payments (Gochhwal & Rahul 2017).

Government directed ingenuities such as the implementation of Pradhan Mantri Jan Dhan Yojana and afterward demonetization of high currency notes in 2016 which help in accelerating the adoption towards of digital transaction (Agarwal, Sumit, et al. 2020). The primer of Aadhaar-enabled Payment Systems (AePS), digital wallet like Paytm, Phone-Pe etc, and Bharat Interface for Money (BHIM) prolonged monetary admittance. The period of COVID-19 proverb a flow in contactless financial transactions, QR-code-based payments and receipts, and amplified support on Fin-Tech solutions, congealing India's position as a spearhead in the digital payments planetary. (Singh & Malik. 2022).

Key Trends of Digital payment system in India between 2019 to 2024

- More people using UPI - UPI transactions skyrocketed during this time, reaching 10 billion transactions per month by 2024 (NPCI, 2024). User convenience has increased with the introduction of UPI 2.0 features like overdraft accounts and recurring payments.
- Buy Now Pay Later (BNPL) services, which provide customers with a variety of payment options, have gained popularity. Simpl and Zest Money, for instance, target young people who are wary of their credit.

- Extension in rural area and semi urban areas of India enhanced digital substructure which help to prolonged the influence of digital payments to semi-urban and rural areas regions, reinforced by ingenuities such as the Bharat Net program
- Paytm's Growth Trajectory - Paytm's advanced contributions, such as QR code-based on payments and incorporation with government facilities, have made it a market spearhead.
- The portion of NPCI in the implementation and success of UPI - The NPCI's initiatives to standardize digital payments and confirm low operation costs have been involved in UPI's for widespread adoption.

Fundamentally, progress in digital payments has been driven by the government's initiatives, intensifying smartphone saturation and increasing internet and cyber space connectivity (Wang and Zhen, 2025). Additionally, the implementation of the Unified Payments Interface (UPI) and digital wallet services has modernized payment systems which making them faster, safer, and more accessible and with innovations such as biometric authentication, artificial intelligence, and blockchain technology are heightened security and also upgraded the user experience (Dhore, Anupkumar, et al. 2023). These innovations stimulus India's financial journey toward a digital transformation and transactional economy which knowingly affecting transaction modes, financial inclusivity, and economic efficiency (Arumugam Malar, & Holmstrom, J. 2019). Moreover, the COVID-19 pandemic acting as a substance, there has been a histrionic alteration in consumer behaviour towards contactless financial transaction and ensuring the continuity of commerce even during rigorous lockdowns periods.

Objectives of the Study

- To examine the progress way of digital transactions in India between 2019 and 2024.
- To ascertain the challenges and scenarios in the emergent payment ecosystem in Indian financial system.
- To offer program and strategic commendations for sustaining the digital transformation.

LITERATURE REVIEW

Review literature on digital transactions in India (2019 and 2024)

- According to studies (Singh & Kumar, 2020), there has been a significant rise in digital payments as a result of increased smartphone usage and improved financial literacy. The Unified Payments Interface (UPI) has emerged as a dominant digital payment mode, with transaction volumes surpassing traditional banking channels (RBI, 2023). The surge in UPI transactions, fuelled by its interoperability and ease of use, is highlighted by Sharma et al. (2021) research. A study by Kumar & Sinha (2022) emphasizes the role of demonetization in accelerating digital payment adoption, revealing that cashless transactions increased by over 150% post-2016.
- A report by Jain and Mehra emphasizes the significance of real-time payment systems in enhancing financial inclusion and lowering transaction costs. Government-backed initiatives like the Pradhan Mantri Jan Dhan Yojana (PMJDY) and the Digital India campaign have significantly increased digital payment adoption (Mehta, 2021). Bose (2022) says that the Payment and Settlement Systems Act, among the RBI's supervisory guidelines, has a certified, protected, and unified transaction and operation ecosystem, making e-payment or transaction more reliable.
- According to Tripathi & Rao (2023), regulatory reforms such as enforcing Know Your Customer (KYC) standards and requiring tokenization for card transactions have significantly reduced the risk of fraud. Agarwal & Das (2024) survey that the traditions in which corporations among traditional banks and fintech companies augmented customer service and gratification. In spite of their speedy extension and enlargement, digital transactions are delayed by matters like financial fraud, data secrecy concerns, and cybersecurity threats (Chatterjee & Gupta, 2022).
- According to studies (Agarwal et al., 2023), a lack of digital literacy and resistance to technology adoption in rural areas are significant obstacles. It is difficult to make digital payments in remote areas due to the need for internet connectivity (Patil & Sharma, 2024). According to Nair & Bose's research (2023), phishing and identity holdup are becoming gradually communal methods of cybercrime in the electronic payment industry.
- Malhotra et al. (2024) discuss that the absence of a strong grievance redressal apparatus, which depresses handlers from espousing online payment modes. According to Kumar & Reddy (2023), the combination of blockchain technology and artificial intelligence (AI) has the potential to simplify digital transactions and enhance security.
- An opportunity for financial inclusion exists in the introduction of mobile banking and FinTech-based digital financial services to underserved rural areas (Rao, 2023). The outline of the Central Bank Digital Currency (CBDC) provided by the RBI further adds new dimensions to digital payments (Das, 2024). According to Rajan and Khanna (2023), open banking APIs will inspire invention by enabling seamless incorporation between banks and third-party payment providers. According to a study by Sen and Roy (2024) state that machine learning algorithms can be used to manage risk and detect fraud in real-time transactions.
- Literature Review on challenges and scenarios in the emergent payment ecosystem in Indian financial system.
- According to Wang and Zhang (2025) accentuated that how insufficient digital infrastructure system in economy underwrites to financial exclusion especially in rural zones. Technological comfiness especially in rural regions have emerged as significant barriers to the widespread adoption of digital payments in India. Similarly, Dhore et al. (2023) stated that while urban canters are rapidly embracing digital payments, rural

adoption is hampered by meagre internet connectivity and low-tech gadget penetration. Verma and Kumaran (2021) also stated that digital transformation in government services must be supported by secure and resilient infrastructures to build trust among citizens but again major concern in digital payment is cybersecurity.

- Hussain et al. (2024) conducted a study which revealing that Indian user apprehension, perceived risk, and digital illiteracy among population are key factors inhibiting digital payment system adoption. Kamal and Ahmad (2025) emphasized that organizations must adopt strategic approaches to navigate digital disruption, including behavioural change initiatives. However, in pandemic period observed shift in user behaviour from traditional to digital. Behavioural endurance and lack of awareness about digital transaction are also critical inhibitors for adoption. Singh and Malik (2022) observed that the crisis served as a catalyst for mainstreaming digital financial transactions. However, many users adopted digital modes out of necessity rather than preference, raising concerns about the sustainability of such shifts in the post-pandemic era.
- Gochhwal (2017) argued that there is lack of interoperability between different payment platforms system and banks in India. Zubaydi and Molnár (2023) state that due to lack of standardization and evolving policy frameworks in India it endures to challenge in the digital payment ecosystem. Choudhury et al. (2025) discussed the broader implications of fintech advancements, emphasizing the growing gap between traditional banking systems and agile fintech firms in India. Regulatory apparatuses must adapt therefore to ensure financial inclusion without compromising environment systemic stability. Agarwal et al. (2020) explained that how fintech keys are driving towards financial inclusion by offering various accessible services, but this inclusion is often superficial in rural areas where digital literacy and trust in technology remain low.
- Dhore et al. (2023) stated in study that small, medium enterprises have prospective addressees of digital payment platforms in India but challenges related to transaction fees, integration costs, and lack of technical expertise create hurdle in their progress. Kumar and Shukla (2023) identified that there's potential of multimedia and innovative technologies has supporting green banking initiatives in India.

RESEARCH METHODOLOGY

This study adopts a mixed-methods approach, integrating both quantitative and qualitative research techniques to provide a comprehensive analysis of financial inclusion and technology innovation in the Indian financial system. Using datasets from reliable sources like the Reserve Bank of India (RBI), the National Payments Corporation of India (NPCI), and industry reports published by financial institutions, government agencies, and fintech companies, the quantitative component involves the systematic analysis of digital transaction volumes (Choudhury & Piyal Roy. 2025). These datasets are examined to assess trends, growth patterns, and adoption rates of digital financial services across different demographic and geographic segments.

In order to comprehend the effects, difficulties, and potential outcomes of technologically driven financial inclusion, the qualitative component of this study conducts a comprehensive review of academic literature, policy documents, and expert opinions. Insights from government policies, financial regulations, and global best practices are incorporated to evaluate the effectiveness of India's digital financial ecosystem (Yadav P & Sharma N. 2024). By combining empirical data analysis with contextual insights from scholarly research and policy frameworks, this methodology ensures a holistic and provide suggestion to based exploration of financial inclusion in India, making the study both robust and credible (Nikita, T. A., & Bhavin Bhatt. 2024).

Analysis and Finding

Exponential Growth of Digital transactions

India's digital payment transaction volume elevation from ₹12 lakh crore in 2019 to an gaged ₹90 lakh crore in 2024. This advancement was primarily driven by UPI's general espousal, which contributed 78% of the total transaction volume by 2023. The growth of digital transaction volumes in India over a six-year period, from 2019 to 2024, is depicted in the table. The below table data highlights the rapid adoption of digital payment ecosystems and the increasing reliance on cashless transactions across the country.

Table -1 Exponential growth of digital transaction 2019-2024

Year	Transaction Volume (₹ Lakh crores) (1 Lakh crore = 1 Trillion INR).
2019	12
2020	20
2021	28
2022	45
2023	67
2024	90

Sources: (R.B.I. 2024, March, Nikita, T. A., & Bhavin Bhatt. 2024)

The line graph below illustrates the growth of digital transaction in India from 2019 to 2024:

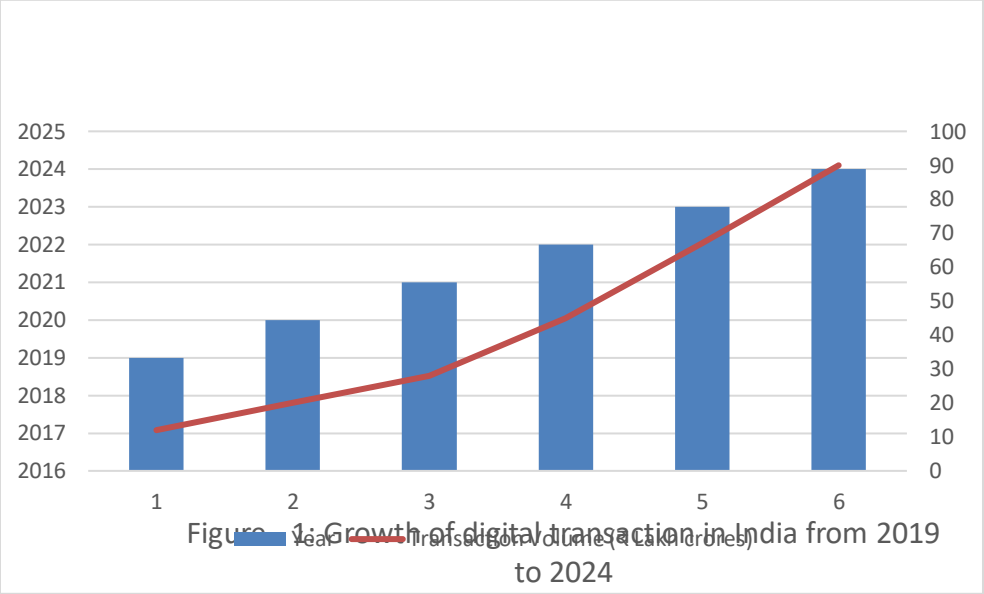

Figure - 1: Growth of digital transaction in India from 2019 to 2024

(Source - Graphical presentation of table,1**)**

Distribution of Digital Payment Method (2024)

Digital payments in India have viewed an enormous revolution, with a modification of traditional banking transactions to digital transaction (Hussain & Bhardwaj, 2024). The following below table represents the distribution of various digital payment methods in 2024, where UPI dominates the ecosystem with a contribution of 78%, followed by digital wallets, credit/debit cards, and other payment methods. The pie chart below visually represents how different payment methods are contributing to the digital ecosystem in 2024.

S.no.	Sources	%
1	UPI	78
2	Debit/Credit card	7
3	Digital Wallets	12
4	Others	3
	Total	100

Table – 2 Distribution of Digital payment method (2024)

(Sources: N.P.C.I. 2024, Mahesh, A. & Ganesh Bhat, (2021)., Hussain & Bhardwaj, 2024)

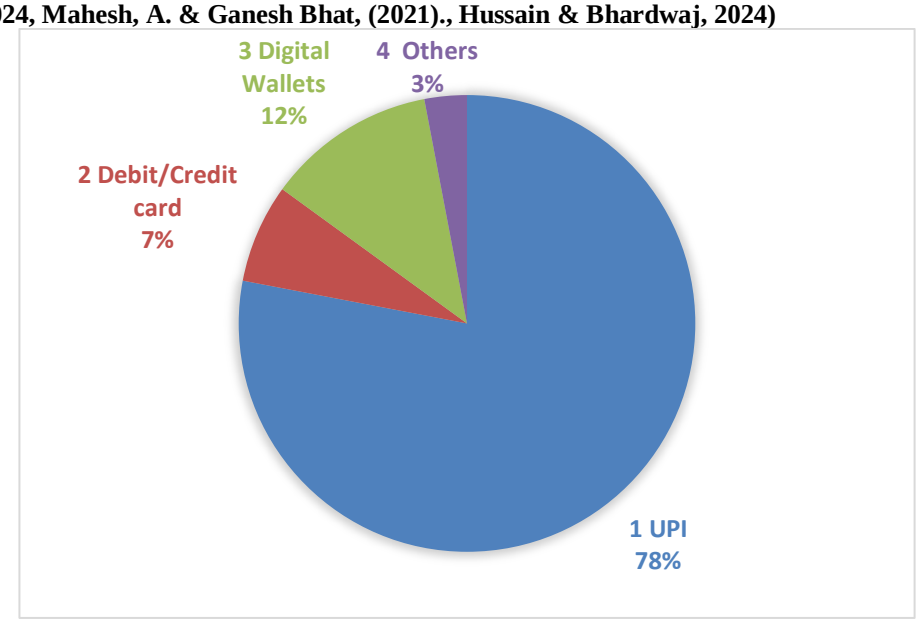

Figure - 2: Distribution of Digital payment method (2024)

(Source - Graphical presentation of table,2**)**

Technological Integration and Financial inclusion in Digital Payment

The following graphical representation illustrates the impact of technological advancements and financial inclusion efforts in India's digital payment landscape in period of 2019 to 2024:

Table 3 - Technological Integration and Financial inclusion in Digital Payment in India

S.No.	Category	Adoption %
1	Tech Adoption	30
2	Digital Banking	25
3	Market Expansion	20
4	Financial Inclusion	25

(Sources: Mathew & Abraham (2024) and Garg &Parveen Kumar. (2025))

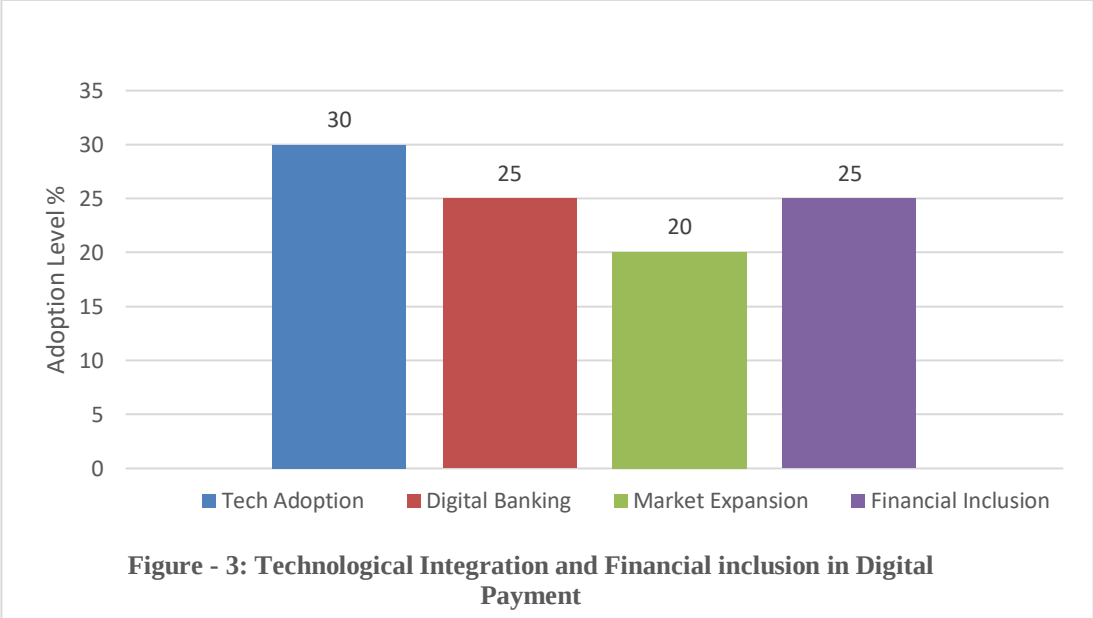

Figure - 3: Technological Integration and Financial inclusion in Digital Payment

(Source - Graphical presentation of table,3**)**

The analysis finds and discussion on the following key trends in digital transactions:

- **Exponential Growth**: Transaction volumes increased from ₹12 lakh crore in 2019 to an estimated ₹90 lakh crore in 2024.
- **UPI Dominance**: UPI's contribution to digital payments grew significantly, reaching 78% of the total by 2024.
- **Technological Integration**: Banks and fintech companies adopted AI, blockchain, and big data to enhance transaction efficiency.
- **Financial Inclusion**: Digital payment platforms extended financial services to rural and semi-urban populations

Limitation and Scope for future

A major limitation of this research study is its based on secondary data which may not reflect accurately current trends and enactment changes in digital payment ecosystem in India. Since the study follow the longitudinal approach so its finding changes inherently over the time period. The dynamic nature of innovation and changes in technology with accessibility and accordingly changes in digital transaction policies, significantly influence the user behavioural and their response pattern. Moreover, changes in other external factor of the macroeconomy also impacts the outcome, thereby limiting the consistency and generalizability of the study's conclusions across different time period.

Although, India's digital payment ecosystem is dignified for future evolution, driven by innovation such as blockchain technology and the introduction of the Central Bank Digital Currency (CBDC). Association between investors of various financial institution and fintech companies will be dynamic in addressing challenges and ensuring inclusive growth (International Monetary Fund, 2024).

CONCLUSION

Digital payment ecosystem in India serves as influential example of technology revolution in financial system and it help to improve economic efficiency. The emergence of innovative financial solutions, such as digital wallets, Buy Now Pay Later (BNPL) services, and AI-powered lending platforms, has provided users with greater accessibility to financial services (Doshi, Kinil. 2022). These innovations have not only enhanced convenience but have also empowered small businesses, gig workers, and individuals in rural areas by integrating them into the formal economy.

Regulatory frameworks have also been instrumental in shaping India's digital payments ecosystem. Policies introduced by the Reserve Bank of India (RBI) and the National Payments Corporation of India (NPCI) have

ensured a secure, inclusive, and efficient payment environment. With continued advancements, India is poised to set a global benchmark in digital financial innovation, paving the way for a cashless economy.

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