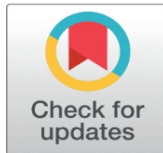
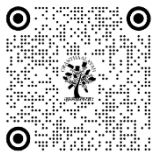


THE IMPACT OF DIGITAL PAYMENT SYSTEMS ON FINANCIAL INCLUSION: A GLOBAL PERSPECTIVE WITH A FOCUS ON INDIA

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ABSTRACT

Over the past decade, digital payment systems have grown as a strong driver of financial inclusion worldwide. Countries where formal networks in banking remain limited, platforms such as India's Unified Payments Interface (UPI) and global services like PayPal have significantly expanded access to financial tools. These innovations reduce transaction costs, overcome distance barriers, and simplify everyday payments, thereby opening up opportunities for communities that were previously excluded from the financial mainstream. This research examines how the spread of digital payment systems influences the goal of bringing more people into the formal financial sector. The analysis is based on secondary sources, real-life examples, and a review of relevant policies. The results suggest that embracing digital payment solutions does more than just boost people's understanding of finance and support small business growth; it also makes welfare programs more effective and accessible. Yet, the journey isn't without its obstacles: spotty internet connectivity, worries about personal data security, and a lack of harmonized regulations still slow things down. The study argues that with better technological foundations and thoughtful policy support, digital financial services can significantly increase financial inclusion, offering valuable lessons for other emerging economies aiming for similar outcomes.

1. INTRODUCTION

Financial inclusion refers to the ability of individuals and businesses to access and make effective use of essential financial services such as payments, saving, credit, and insurance. Access to these services is critical for improving household well-being and supporting broader economic growth. Inclusive financial systems also contribute to employment generation, poverty reduction, and the achievement of broader development objectives, including gender equality and empowerment.¹

Digital technology has transformed how people interact with financial services. Mobile wallets, QR-code payments, online banking, and peer-to-peer platforms allow transactions to happen instantly. In India, UPI has made transferring money between banks almost immediate. Globally, platforms like PayPal have enabled small businesses and freelancers to connect with international markets, bypassing some of the limitations of traditional banking.

¹<https://www.worldbank.org/en/topic/financialinclusion/overview#:~:text=Financial%20inclusion%20means%20that%20individuals,Sustainable%20Development%20Goals%20>

This paper examines the extent to which digital payment systems advance financial inclusion, with particular emphasis on the Indian experience while drawing parallels with global trends. By evaluating adoption dynamics, socio-economic impacts, and the regulatory responses surrounding digital financial ecosystems, it provides a nuanced explanation of how fintech can bridge long-standing financial gaps. The paper also highlights challenges that continue to limit digital inclusion, including unequal access to technology, concerns about online security, and delays in updating regulatory frameworks, all of which affect the long-term effectiveness of digital payment solutions.

2. RESEARCH OBJECTIVES

- 1) To investigate adoption and usage patterns of digital payment systems, focusing on UPI in India and PayPal internationally.
- 2) To investigate impacts on rural communities, small businesses, and marginalized groups, and look at how policies and regulations influence digital financial inclusion.
- 3) To evaluate the influence of policies and regulatory frameworks in advancing digital financial inclusion.
- 4) To highlight key challenges faced in expanding digital payments and to suggest ways these challenges could be addressed.

3. LITERATURE REVIEW

The IMF notes that financial inclusion is not only about access but also about the ability to use financial services effectively. Digital payments provide essential tools, secure transfers, savings accounts, credit options, and insurance², that allow individuals and businesses to participate more fully in the formal economy³. A well-functioning inclusive financial system can improve resource allocation, reduce dependence on informal credit, and enhance financial management for both personal and business purposes.⁴ By offering a range of services safely and efficiently, digital payments contribute to stronger economic outcomes and social welfare (Sarma & Pais, 2008).

Despite these advances, India still faces obstacles to broad financial inclusion. Rural regions, where nearly two-thirds of the population lives, face the greatest difficulties. Banking in these areas has long depended on physical branches, and this setup is far from convenient. For many people, reaching a bank means traveling long distances, spending extra money, and dealing with slow or confusing procedures. In practice, these hurdles discourage regular use of financial services. The burden is felt most by the poor and socially disadvantaged, who are already struggling to meet basic needs. Despite various government efforts to increase financial inclusion, many people still do not participate in formal banking.⁵ Financial technology, or FinTech, uses technology-driven solutions to make financial operations more efficient, accessible, and automated for users. Adoption of FinTech in rural India is multifaceted. It depends not only on the availability of mobile networks or smartphones but also on digital literacy, trust in digital financial systems, and ease of use.

4. METHODOLOGY

This study adopts a qualitative approach with a case-study framework, which allows for a detailed investigation of digital payment platforms. By focusing on specific examples, such as UPI in India and PayPal globally, the research explores patterns, impacts, and contextual factors comprehensively. Secondary sources provide reliable data, ensuring the study's credibility and reproducibility. The study makes use of different categories of secondary material:

- **UPI-related data:** Statistical releases and annual reports from the Reserve Bank of India (RBI) and the National Payments Corporation of India (NPCI), covering the years 2018–2025.

² Nabil Adel, 2024

³ United Nations, 2018

⁴ Sharma & Changkakati, 2022

⁵ Sathish & Vidya, 2025

- **Academic writing:** Peer-reviewed journal articles and books that explore digital payments and financial inclusion (Sharma & Changkakati, 2022; Sathish & Vidya, 2025).
- **Government Documents:** Digital India initiative reports, Reserve Bank of India payment guidelines, and welfare program documentation.

The data were analyzed to detect trends and patterns in digital payment adoption. This included examining transaction volumes, growth over time, and differences between urban and rural users. Insights were drawn on the factors influencing usage and the broader socio-economic impact. Comparing domestic digital payment adoption (UPI) with international experiences (PayPal) to identify patterns, best practices, and lessons learned for financial inclusion. Since the research did not involve fieldwork or human participants, ethical risks are minimal. Care was taken to rely only on verified, credible, and publicly available data. Proper acknowledgment of all sources ensures both accuracy and academic integrity.

Working with secondary data offers certain advantages as well as some unavoidable limitations. Reports and published statistics make it possible to capture broad socio-economic trends and to observe the historical development and transformation of digital payment platforms. At the same time, such material cannot always represent the subtle differences in individual behaviour or local variations that might exist on the ground. Similarly, when international comparisons are made, the data often comes in aggregated form, which restricts the ability to look at fine-grained differences between countries.

5. RESULTS

Despite these limitations, relying on secondary sources is appropriate for this study. Publicly available datasets, policy reports, and academic literature provide practical and scalable means to investigate the role of digital payment systems. Drawing on these sources helps form a well-rounded understanding of how platforms like India's UPI and PayPal globally contribute to financial inclusion. This approach also ensures transparency and allows other researchers to replicate the study. The findings are organized into three main areas: patterns of adoption and usage, socio-economic impacts, and the influence of policies and regulations on financial accessibility. Each insight is based on collected secondary data, case examples, and a careful review of existing literature.

5.1. PAYPAL - A GLOBAL OVERVIEW

PayPal has grown into a major global digital payment service, accessible via both web and mobile platforms. Even with competition from new fintech startups and big tech companies like Apple and Google⁶ PayPal continues to connect users across borders. In regions such as Africa and Asia-Pacific, where many people do not have traditional bank accounts, PayPal offers an alternative that is easy to use and fast. The platform is used by many types of businesses, from small shops and online retailers to companies relying on mobile apps. PayPal's growth is not just about convenience; its focus on security, helping merchants, and protecting consumers has built trust over time. It has also expanded services to include digital wallets and small credit options, becoming part of daily financial life while remaining user-friendly for people with different levels of digital knowledge. Unlike banks, which need branches and physical infrastructure, PayPal works entirely online. That makes it useful in places where setting up a bank is difficult. For e-commerce and app-based transactions, it's reliable, easy to use, and fast.⁷ Its steady growth over the past decade shows it adapts well to user needs and remains a key player in the global digital payments scene.

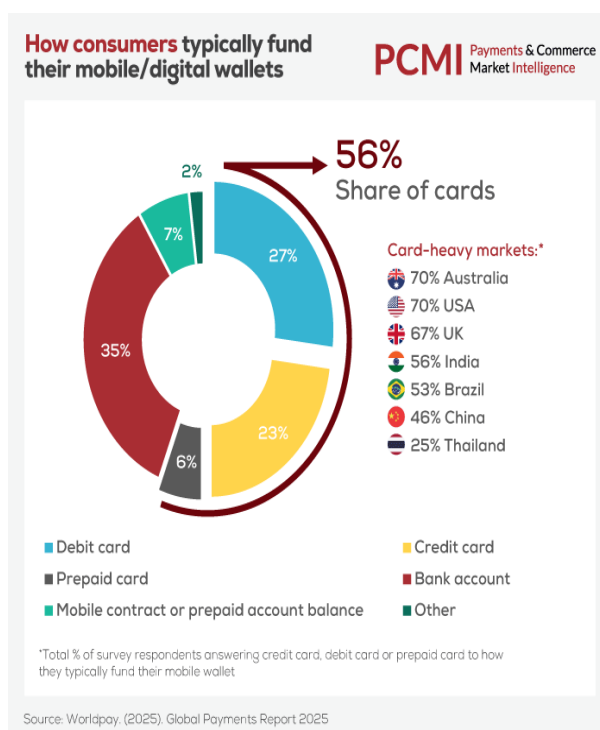
Year	Revenue (USD billions)
2010	3.5
2011	4.5
2012	6

⁶ Reiff, 2025

⁷ <https://www.infowindtech.com/how-paypal-encourages-businesses/>

2013	6.7
2014	8
2015	9.2
2016	10.8
2017	13
2018	15.4
2019	17.7
2020	21.4
2021	25.3
2022	27.5
2023	29.7
2024	31.7

Sources: [Finance App Report](#), Company data



5.2. ADOPTION AND USAGE PATTERNS

Nowadays the role of India has increased so much that it has become like an unstoppable force in the domain of Digital Payment Systems according to the International Monetary Fund's report *Growing Retail Digital Payments: The Value of Interoperability*.⁸ In 2016, India launched Unified Payments Interface (UPI) under the supervision and regulation of RBI's National Payment Corporation of India (NPCI). With the emergence of this new system, the payment system, financial transactions across the country got its seamless route by allowing smooth and instant transactions.

Languages used for programming like Java, Python and C++ were started to be used to increase efficiency and stability along with scalability and reach. Security was the primary objective so with strong encryption, multi-factor

⁸ [India's UPI Revolution](#)

authentication and real-time fraud detection mechanisms ensuring the protection of user data.⁹ With time being, UPI has grown from just a digital innovation to bring seamless and instant transactions into an integral part of India's payment ecosystem. It has transformed the way individuals and businesses handle financial transactions, offering a faster, safer, and more convenient alternative to traditional banking methods. Today, UPI is central to everyday monetary exchanges across the country, contributing significantly to India's growing digital economy.¹⁰ The amazing growth of UPI is observable in its transaction data. By October 2024, the UPIs platform was processing over 16 billion transactions per month, showcasing its capabilities and the trust amongst its users.¹¹

One of the most remarkable things about UPI is how it's helping more and more people, including those who've never used digital payments, feel comfortable with technology. Imagine, just a few years ago, many in India were hesitant to even try online banking or mobile wallets. UPI changed all that by offering a super-simple app with easy-to-follow steps, almost like texting a friend. Suddenly, sending or receiving money whether it involves pocket money, paying for groceries, or splitting a dinner bill became something anyone could do with just a few taps. At the same time, the growth of UPI has been extraordinary. Between 2018 and 2025, the volume of transactions expanded more than sixteen times, a reflection of both rapid adoption and increasing public confidence in digital modes of payment. Rural adoption rose from 15% to 65%, showing that UPI significantly enhanced financial access outside urban centers. Active users grew nearly 8 times, Over 400 million active users. Analysis of NPCI and RBI reports from 2018 to 2025 shows a remarkable growth trajectory in UPI adoption, reflecting its increasing acceptance across urban and rural India.

Year	Monthly Transactions (Billions)	Active Users (Millions)	Rural Adoption (%)
2018	0.5	50	15
2019	1.8	120	25
2020	3.5	200	35
2021	4.8	280	42
2022	6.2	340	50
2023	7.0	380	57
2024	7.8	400	62
2025	8.2	420	65

5.3. SOCIO-ECONOMIC IMPACTS

1) Survey Findings (Rural India, 2024)

- **Income Growth:** 58% of small merchants using UPI reported a 15–25% increase in monthly revenue due to digital payments.
- **Women Empowerment:** 48% of rural women users reported greater autonomy in household financial decisions.
- **Government Benefits:** 72% of recipients of subsidies via UPI reported timely receipt and improved satisfaction. It reduces dependency on informal financial channels.

2) Entrepreneurship: 63% of freelance workers in developing countries relied on PayPal for receiving international payments.¹²

3) Digital payments reduce dependency on cash, encourage formal banking, and improve financial literacy.

⁹ Shriram, Bilal, & Thangamuniyandi, 2024

¹⁰ Grover, 2024

¹¹ <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2079544>

¹² PayPal Global Users (2024 Survey)

- 4) Global comparisons indicate that both domestic-focused and international digital payment platforms play complementary roles in financial inclusion.

5.4. POLICY AND REGULATORY FRAMEWORKS

India's transition toward a cash-lite economy has been supported by policy interventions and financial inclusion programs. Initiatives such as *Digital India* and *Pradhan Mantri Jan Dhan Yojana*, along with technological innovations such as UPI and Aadhaar-linked platforms have created a robust policy and technical infrastructure that supports FinTech expansion. RBI Regulations ensure security, interoperability, and standardization. The goal of DBT is timely, direct bank deposits of social-scheme payments to eligible recipients. This approach aims to enhance efficiency, transparency, and effectiveness while removing the need for intermediaries. The beneficiary account is seeded to the bank and is validated through its Aadhaar number.¹³

Global Best Practices

- **Kenya:** M-Pesa enabled financial access through supportive mobile money regulations.
- **China:** Alipay and WeChat Pay integrated payments into daily social and commercial activities.
- **Brazil:** PIX real-time payment system expanded access to underserved populations.

6. FUTURE PROSPECTS

Implementation across states is uneven due to varying levels of literacy, internet penetration, gender disparities, and policy focus. The UPI platform has grown exponentially, with over 9 billion monthly transactions by early 2025 (NPCI, 2025), but adoption in low-income rural households remains inconsistent. Behavioral aspects such as reluctance to use technology, fear of cyber fraud, or dependence on informal financial systems further compound the issue. Socio-cultural constraints, particularly around women's access to digital assets, also serve as a key factor in shaping the digital divide.¹⁴ Cross-border payments face inconsistent rules, fees, and compliance challenges. The future of emerging digital payment technologies in promoting financial inclusion appears encouraging, with technological progress and favorable policies paving the way for greater access to financial services.

6.1. TECHNOLOGICAL INNOVATIONS

AI-powered fraud detection tools examine large volumes of transactions instantly, recognizing unusual and suspicious activity with a high degree of precision. These systems adapt continuously by learning from new data and using machine learning techniques to spot irregularities, making them more effective than conventional fraud detection methods.¹⁵ Blockchain technology, on the other hand, strengthens trust, increases security, and allows transactions or shared information to be tracked more transparently. It also contributes to cost reduction by streamlining processes and creating operational efficiencies.¹⁶

6.2. POLICY RECOMMENDATIONS

- Strengthen cybersecurity frameworks.
- Implement targeted financial literacy campaigns for low-income populations.
- Harmonize international regulations for cross-border digital payments.

¹³ [Direct Beneficiary Transfer DBT : CGA](#)

¹⁴ Anchit Jhamb, 2025

¹⁵ [AI Fraud Detection in Banking with Machine Learning | Infosys BPM](#)

¹⁶ [What are the Benefits of Blockchain? | IBM.](#)

6.3. SOCIO-ECONOMIC POTENTIAL

Many developing nations continue to struggle with limited awareness and adoption of cashless transactions¹⁷. To address this gap, policymakers are encouraged to embed financial technologies into national development strategies, not only to reduce poverty but also to support progress toward the Sustainable Development Goals¹⁸. Encouraging citizens to use digital modes of payment can enhance security and convenience, while greater investment by banks and other financial institutions in financial technology may strengthen returns and broaden service delivery. At the same time, persistent dependence on informal lending and savings mechanisms—observable in both emerging and advanced economies—often stems from widespread distrust in formal financial institutions¹⁹.

7. DISCUSSION

A key challenge, however, is the persistent dependence on informal lending channels, which often stems from widespread distrust of formal banking systems. This reliance becomes more pronounced when individuals have poor credit histories, leading to difficulties in accessing loans from established banks²⁰. Since financial inclusion is closely tied to overall economic growth, banks in developing economies must diversify and expand their services to better reach underserved groups, especially rural households and SMEs.²¹ To support this process, improvements in financial literacy, stronger infrastructure, secure financial tools, and proactive local government involvement are essential. Countries such as China demonstrate how these combined measures can help ensure broader financial inclusion²². UPI demonstrates domestic success in India, while PayPal illustrates global financial empowerment. Policy support, technological innovation, and financial literacy are essential to overcome barriers such as digital divides and cybersecurity risks. Comparative insights from Kenya, China, and Brazil highlight the need for adaptive, context-specific strategies for effective digital financial inclusion.

8. CONCLUSION

This research shows that digital payment tools have become central in widening access to money-related services. Systems such as India's UPI and global platforms like PayPal make payments faster and cheaper, while also opening doors for individuals previously excluded from formal banking services, such as rural households, small traders, and women. Their spread has not only made everyday transactions simpler but also supported social goals by helping small businesses grow, improving financial awareness, and making government transfers more reliable.

At the same time, important gaps remain. Weak internet coverage, low digital skills, worries about online fraud, and differences in regulations continue to slow adoption in many areas. Overcoming these issues will require joint work: stronger infrastructure, better protection from cyber threats, clear rules for international transfers, and programs that build people's trust and confidence in using digital tools. Overall, digital payments should be seen as more than a convenience. They are part of a wider shift towards fairer access to financial resources. If supported by the right policies and technologies—such as fraud-checking systems and transparent record-keeping—they can help build financial systems that are both safe and inclusive. India's progress with UPI shows how such models can inspire other countries aiming to connect financial innovation with social and economic development.

¹⁷ M.A. Bayero, 2015, pp. 49-56

¹⁸ K. Feghali, N. Mora, P. Nassif. 2021, pp. 236-257

¹⁹ A. Lutfi, M. Al-Okaily, M.H. Alshirah, A.F. Alshira'h, T.A. Abutaber, M.A. Almarashdah. 2021, p. 6312

²⁰ P.K. Ozili. 2018, pp. 329-340

²¹ D.H. Vo, N.T. Nguyen, L.T.H. Van. 2021, pp. 36-43

²² X. Wang, G. He. 2020, p. 1668

CONFLICT OF INTERESTS

None.

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