

Tracking India's Digital Finance Transformation and Shift Towards a Cashless Economy

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ABSTRACT

This seeks to analyse the growth and performance of India's online payments and e-money ecosystem, focusing on key enablers like the Unified Payments Interface (UPI), digital wallets, mobile banking, and fintech innovations. This study has used secondary data collected from RBI macroeconomic indicators and different publications. Through data analysis and trend evaluation, the study highlights the increasing trend of internet and smartphone usage, the rise of real-time transactions, and the evolving regulatory landscape. While the progress is notable, challenges such as digital literacy gaps, cybersecurity risks and infrastructure constraint persist. UPI has become the cornerstone of India's digital payment environment. In the year October 2024 worth ₹23.49 lakh crore, UPI crossed over 16.5 billion transactions marking a year-on-year growth of 45% from the previous year. By the second half of 2024, accounted for 89% UPI total digital payment volume, with platforms like Paytm, Google Pay, and Phone Pe dominating the market. In other side UPI leads in transaction volume, digital wallets and cards still play a role, contributing 11% to digital payments as of July 2024. However, their share is gradually declining as UPI's dominance increases. Towards cashless economy India's shift is evident in the exponential growth in UPI transactions, the digital payments increasing adoption in public services, and initiatives aimed at Inclusive finance. While Barriers like cybersecurity threats and merchant fee need for structures remain, the overall trajectory indicates a strong move towards a digital-first financial ecosystem. Public transportation systems are increasingly adopting digital payments. For instance, the Karnataka State Road Transport Corporation's Chamarajanagar division recorded over ₹3.2 crore in UPI transactions within five months of implementing a cashless system. Similarly, Nagpur Division of Central Railway achieved the highest share of QR code-based transactions across its zone, accounting for 22.10%. This paper concludes by assessing India's readiness for a fully digital financial future and outlines key recommendations to sustain and enhance the momentum of its cashless journey.

Keywords: - Cashless Economy, Digital Payment, E-Money, Growth, Transaction

JEL Code- E-42, E-51, G-21, O33

INTRODUCTION

The rise of a cashless economy has become a transformative force in global finance, fundamentally altering how transactions are carried out and redefining the very concept of money. This shift challenges conventional financial practices, reshapes consumer habits by

influencing their spending behaviours and methods, and unlocks vast opportunities for both businesses and governments in an era driven by technological advancement, digital innovation, and global connectivity. At its core, this transformation marks a significant change in how individuals manage their financial affairs. Unlike traditional economies that rely heavily on physical currency, a cashless system centers around electronic payment methods for most, if not all, retail transactions. Embracing cashless solutions not only simplifies daily life but also enhances the transparency and legitimacy of transactions. This, in turn, plays a crucial role in reducing corruption, curbing illegal financial activities, and fostering overall economic development. The cost associated with printing and shipping currency notes has decreased too (Joshi, 2018). Because of the growing popularity of electronic commerce (Becirovic, 2014) and online purchasing (Aggarwal & Kapoor, 2020; Sarangi, 2022), new requirements for easy and secure payment methods have emerged. Since cashless transactions and economic growth are favourably correlated (Tee & Ong, 2016; Ong & Chong, 2022), a cashless society can result in systematic advancement (Goyal, 2021). This is due to the fact that while a cashless economy could facilitate transparent, efficient, and quick transactions, there are numerous practical issues with its widespread adoption, particularly the security concerns that present a significant obstacle (Gaba & Nagpal, 2017). Furthermore, reduced tax evasion, sponsorship of terrorism, money laundering, costs of money printing, and the like, are among the main advantages of a cashless economy (Kaur, 2019). However, the core purpose behind promoting a cashless system is to tackle the issue of black money. Additionally, the ideal method to transition to a cashless economy is to digitalize all transactions, encourage the usage of plastic money, and encourage individuals to form strong digital transaction habits (Agarwal, 2019). To enhance convenience, speed, and efficiency in everyday financial dealings, tools such as credit cards, debit cards, mobile payment applications, and online transfers have become the foundation of this evolving economic model.

LITERATURE REVIEW

According to **Anuja Erandekar et al. (2020)**, the banking sector has experienced significant transformation over the past two decades. The rise of digital platforms has drastically changed traditional branch-based operations. Today, banks offer a wide range of services beyond just accepting deposits and providing loans. With the introduction of mobile and online banking, the nature of banking services has been fundamentally reshaped. Modern customers, valuing convenience and flexibility, now prefer to avoid physical branch visits, as banking services are accessible anytime and from anywhere. **Papadopoulos (2007)** It is generally acknowledged that new technologies in electronic money (e-money) offer creative solutions, boost convenience, and save costs, while in retail payments, they raise the prospect of a society with no need for cash. Despite its lengthy history of use, cash remains the most affordable and private alternative for small-value transactions.

Pushpa Bhatt (2019) has evaluated the market for digital payments and its many divisions. Analyzing the behaviour of these segments helps highlight potential avenues for service-oriented businesses. The digital payment industry in India has been reviewed by **Hyma Goparaju (2020)**, who referred to it as a sunrise industry because technological advancements in mobile devices and financial applications (apps) would drive the adoption of digital

payments. An analysis using Porter's Five Forces was conducted on India's digital payment sector. Key drivers of mobile app-based digital payments include widespread smartphone adoption, a robust financial infrastructure, and growing consumer enthusiasm for innovative payment solutions. **Sanghita Roy et al. (2014)** highlighted that while India's e-payment system has made considerable advancements, there is still room for improvement in its adoption, as nearly 90% of transactions continue to be conducted in cash. Their study, based on the Technology Acceptance Model, identified four key factors that could drive the growth of electronic payments: innovation, incentives, consumer convenience, and a supportive legal environment. In a separate study, **Rakesh H. M. (2014)** explored the determinants influencing consumer acceptance of internet banking in India through his paper titled "*A Study on Factors Influencing Consumer Adoption of Internet Banking in India.*" Following the demonetization event on November 8, 2016, Ashish Baghla (2018) noted that the Indian government actively encouraged digital payments as part of a broader aim to build a cashless economy. Rising levels of corruption and untraceable black money transactions made it increasingly difficult to track financial activities. To address these issues, the government launched the *Digital India* initiative to enhance governance and promote transparency in operations. Dr. Kota Sreenivasan Murthy (2019) emphasized that digital payments within India's banking ecosystem improve transparency, scalability, and accountability. In pursuit of a cashless society, the Reserve Bank of India (RBI) has been advocating for modern and efficient payment and settlement systems. **Ridam Verma et al. (2019)** explored the impact of demonetization on digital payment adoption. Their study identified several key features of digital payment systems and applied a multiple regression model to assess how these factors influence user preferences. Aniruddha Ghosh and Ashish Srivastav (2019) examined the effects of digitization on both cash and non-cash transactions, comparing data from before and after the digital shift. **B. Angamuthu (2020)** emphasized that digital payment systems offer benefits such as ease of use, transaction efficiency, and enhanced security. His analytical research focused on the growth of digital payments between 2012–2013 and 2018–2019, evaluating changes in both transaction volume and value. The study reported a 24.11% increase in volume and a 15.84% rise in transaction value over the seven-year period. Additionally, projections for 2020–2021 estimated that India would process 28,000 lakh digital transactions, amounting to over INR 15,20,000 billion.

RESEARCH OBJECTIVES

- 1) To examine the growth patterns of online payments and e-money usage in India.
- 2) To discuss current challenges and propose solutions for sustainable digital payment adoption.

METHODOLOGY

This study employs a mixed-method approach, combining secondary data analysis and qualitative review. Sources include data from NPCI, RBI, NITI Aayog, and industry reports. Trends are analysed over a 8-year period from 2017 to 2024, with key focus areas including transaction volume, user base, and rural-urban distribution. Descriptive statistics like mean and standard deviation and simple growth rate for analysis.

GROWTH IN DIGITAL PAYMENT TRANSACTIONS:

Transformation of UPI has India's digital payments ecosystem—growing rapidly and commanding 84% market share. Digital transaction volume is on a steady upward trajectory, surpassing 220+ billion annually. Market growth remains robust, though growth rate has moderated from mid-40% to mid-30% in FY 2025. Global real-time payment leadership underscores India's unique position, supported by NPCI infrastructure. The decline of non-UPI modes (e.g., cards, NEFT/IMPS) highlights UPI's dominance. Sustainability concerns loom—industry discussions include introducing a modest Merchant Discount Rate (MDR) for large merchants (0.2–0.3%) to support the ecosystem's long-term viability

Table-1 Global Scenario of E -Money & Digital payment

Indicator	Value
Global Digital Payments Market Size (2024)	\$9.5 trillion
E Money Transaction Volume (global)	Over 30 billion transactions annually
Global Mobile Wallet Users	5.2 billion users (Jun 2024)
Top Countries by E Money Usage	Kenya, China, India, Philippines, Ghana
CBDCs in development/ pilot phase working on CBDCs	130+ countries (98% of global GDP)
Cryptocurrency Ownership	420 million people globally own crypto

Source- 6Wresearch & McKinsey

Table-1 reflects the total transaction value of digital payments. With a projected CAGR of over 15%, the market is rapidly expanding, driven by mobile-first economies, fintech innovations, and declining cash use. Asia-Pacific, especially India and China, contributes a dominant share. E-money, typically stored-value instruments like prepaid cards or mobile wallets, is heavily used in developing nations for financial inclusion. While small in value relative to bank-based systems, its role is vital in low-value, high-volume consumer payments. Over 65% of the global population now uses digital wallets, highlighting the widespread adoption of smartphones and app-based financial services. In China and India, QR-based payments dominate retail commerce. The list reflects regions where e-money is solving systemic access gaps to update conventional fiat money, central banks are evaluating the implementation of Central Bank Digital Currencies (CBDCs). increase transparency, and compete with private digital currencies. While countries like China and India are piloting retail CBDCs, most are in early research stages. The scale (98% of global GDP) shows this is not just a trend but a global transformation. rypto adoption has crossed the threshold from niche to mainstream. Use cases vary from investment/speculation to remittances and DeFi. Ownership is concentrated in emerging economies where inflation or currency instability drives alternative asset demand (e.g., Turkey, Nigeria, Argentina).

Table-2 Use of Digital Money in India

Metric	2023 Value	2024 value	Change in One year
Registered mobile-money accounts	1.75 bn	2.1 bn	0.26 bn
Monthly active mobile-money users	—	514 m	
Mobile-money transactions	85 bn	108 bn	23 bn
Mobile-money transaction value	—	\$1.68 tn	
Total digital payment value	—	\$6.7–11 tn	
Digital wallet users	3.9 bn	4.5 bn	0.50 bn

Source- MOSPI, Govt. of India

Table- 2 reflects that registered mobile money accounts grew by 350 million accounts (20%) in just one year, reaching 2.1 billion globally. This surge reflects deeper financial inclusion, especially in Africa, South Asia, and Southeast Asia where mobile money is a key banking tool. Drivers include telco-fintech partnerships, agent network expansion, and digital onboarding (e.g., e-KYC). Mobile money transaction jumped from 85 billion to 108 billion transactions, with 27% increase. This indicates growing consumer confidence, use in P2P, bill pay, merchant payments, and even small business operations.

India has seen remarkable expansion in digital payments, with transaction volumes rising from 2,071 crore in the fiscal year 2017–18 to 18,737 crore in 2023–24, reflecting a Compound Annual Growth Rate (CAGR) of 44%. Additionally, in the first five months (April to August) of the ongoing fiscal year 2024–25, digital payment transactions have already reached 8,659 crore.

Table-3 Digital Payment transaction (Volume in Rs Crore) in India from 2017-2024

Year	Digital Payment transaction (Volume in Rs Crore)	% Annual Growth Rate
2017-18	2071	51.33
2018-19	3134	45.88
2019-20	4572	21.48
2020-21	5554	59.15
2021-22	8839	52.30
2022-23	13,462	39.18
2023-24	18,737	-----

Mean	8052.71	24.19
SD	6087.78	56.09
CAGR	2776.67	

Source: RBI, NPCI & Banks

The total value of digital transactions has increased from ₹1,962 lakh crore to ₹3,659 lakh crore, registering a Compound Annual Growth Rate (CAGR) of 11%. Moreover, in the first five months (April to August) of the 2024–25 fiscal year, the transaction value has reached a notable ₹1,669 lakh crore.

Table-4 Digital Payment transaction (Value in cores) from 2017-2024 in India

Year	Digital Payment transaction (in Rs Lakh Crores)	% Annual Growth Rate
2017-18	1982	25.23
2018-19	2482	18.98
2019-20	2953	1.59
2020-21	3000	0.70
2021-22	3021	11.06
2022-23	3355	9.06
2023-24	3659	-100.00
Mean	2921.71	-4.77
S. D	551.47	42.90
CAGR	0.51	---

Source: RBI, NPCI & Banks & Authors own calculations

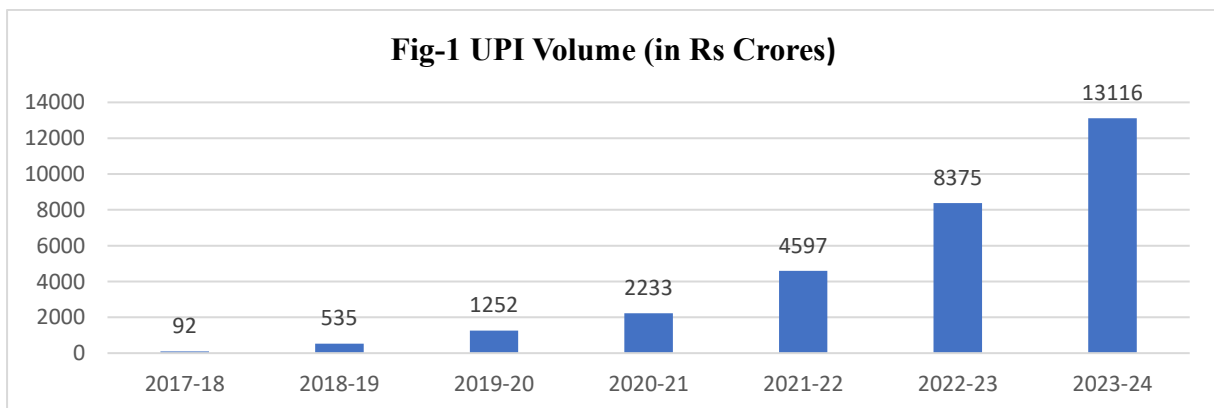
UPI's Sustained Growth:

Unified Payments Interface (UPI) continues to be the backbone of India's digital payment landscape. It has transformed the way digital transactions are conducted, with UPI transaction volumes rising dramatically from 92 crore in FY 2017–18 to 13,116 crores in FY 2023–24, reflecting a remarkable CAGR of 129%, although the overall CAGR stands at 0.51. In the first five months (April to August) of FY 2024–25 alone, the transaction volume has already reached 7,062 crore. UPI's widespread adoption is largely driven by its user-friendly experience, supported by an expanding network of banks and fintech partners, making it the most popular real-time payment option for millions across the nation.

Table – 5 UPI Volume (in Rs Crores) from year 2017-2024 in India.

Year	UPI Volume (in Rs Crores)	% Annual Growth Rate
2017-18	92	481.52
2018-19	535	134.02
2019-20	1252	78.35
2020-21	2233	105.87
2021-22	4597	82.18
2022-23	8375	56.61
2023-24	13116	-----
Mean	4314.29	119.79
S. D	4828.04	176.39
CAGR	2169.67	----

Source: RBI, NPCI & Banks & Authors own calculations



UPI transaction value has expanded significantly, rising from ₹1 lakh crore to ₹200 lakh crore, driven by a robust CAGR of 2169 %. The percentage annual growth rate is 119. 79 % which is quite significant.

Table – 6 UPI Value (in Rs lakh Crores) from year 2017-2024 in India.

Year	UPI Value (in Rs Lakh Crores)	% Annual Growth Rate
2017-18	1	800.00
2018-19	9	133.33
2019-20	21	95.24
2020-21	41	104.88
2021-22	84	65.48

2022-23	139	43.88
2023-24	200	-100.00
Mean	70.71	163.26
S. D	74.81	290.83
CAGR	32.17	

Source- RBI, NPCI & Banks & Authors own calculations

UPI: P2P and P2M Transactions (by Volume in crore) for Aug 2024

In August 2024, Person-to-Merchant (P2M) transactions accounted for 62.40% of the total, with 85% of these involving amounts of ₹500 or less. This reflects the strong trust that citizens place in UPI for conducting low-value payments.

Global Expansion of UPI and Rupay:

India's digital payments revolution is now making a global impact. UPI and RuPay are swiftly expanding internationally, facilitating smooth cross-border transactions for Indians residing or traveling overseas. Currently, UPI is operational in seven countries—UAE, Singapore, Bhutan, Nepal, Sri Lanka, France, and Mauritius—enabling Indian users and businesses to send and receive payments across borders. This global outreach is set to enhance remittance inflows, promote greater financial inclusion, and strengthen India's position in the global financial ecosystem. According to the ACI Worldwide Report 2024, India accounted for approximately 49% of all real-time payment transactions worldwide in 2023.

India is quickly positioning itself as a global frontrunner in digital payments. With the international rollout of UPI and a steady increase in digital transactions, the country is setting new standards for financial inclusion and empowering its citizens economically. The Department of Financial Services remains dedicated to promoting digital payment systems that are secure, scalable, and inclusive, while actively exploring ways to strengthen India's role in the global financial arena. On July 27, the Reserve Bank of India (RBI) reported that its Digital Payments Index (DPI) rose over 13% year-on-year to reach 395.57 as of March 2023, up from 349.30 in March 2022. The index also showed a 4.79% increase from 377.46 in September 2022. The RBI noted that the DPI reflects the level of digitalisation in payment systems nationwide, with the growth driven by wider adoption and enhanced digital payment infrastructure. The rise in the index across all parameters highlights the robust expansion of both payment infrastructure and digital transaction performance throughout India.

Month & Year	DPI	AGR
March 2018	100	53.47
March 2019	153.47	13.04

September 2019	173.49	19.80
March 2020	207.84	4.76
September 2020	217.74	24.27
March 2021	270.59	12.37
September 2021	304.06	14.88
March 2022	349.30	8.06
September 2022	377.46	4.80
March 2023	395.57	12.62
March 2024	445.5	---

Table – 7: Growth of Digital Payment Index (DPI)

Source- Source- RBI, NPCI & Banks & Authors own calculations

Launched in March 2018, the semi-annual Digital Payments Index is based on five key parameters, each assigned a specific weight, to assess the reach and adoption of digital payments across India. These parameters include payment enablers (25%), demand-side infrastructure factors (10%), supply-side infrastructure factors (15%), payment performance (45%), and consumer centricity (5%). The index highlights the robust growth in digital payments, largely fueled by the widespread success of the Unified Payments Interface (UPI). Building on this momentum, the government is now focusing on expanding UPI globally. Alongside UPI, other digital payment platforms such as Immediate Payment Service (IMPS), Bharat Bill Payment System, and National Electronic Toll Collection have also contributed to the surge in adoption. The National Payments Corporation of India (NPCI), which manages UPI, is actively enhancing the platform and has set an ambitious goal of reaching 1 billion transactions per day within the next five years.

E-Rupee growth in India

India's central bank digital currency (CBDC), The e-Rupee, has seen significant growth in circulation value since its launch in 2022. By March 2025, the retail value of e-Rupee surpassed ₹1,000 crore, a substantial increase from ₹234 crore in March 2024 and a mere ₹16 crore in March 2023. This growth is attributed to the expanding user base in the retail segment, which grew to 17 major banks and 60 lakh consumers. Here's a more detailed look at the e-Rupee's growth:

(i) Initial Pilot Phase:

The e-Rupee, both for wholesale and retail transactions, began as experimental program with a limited number of banks and users in December 2022.

(ii) Retail Segment Growth:

The retail segment, initially focused on four banks and a few customers, expanded to 17 major banks and 60 lakh consumers by March 2025.

(iii) Circulation Value:

The total value of e-Rupee in circulation has increased dramatically, reaching ₹1,016.5 crore by March 2025. This represents a significant jump from ₹5.7 crore in March 2023.

(iv) Wholesale Segment:

The pilot use case in the wholesale segment was limited to settling secondary market transactions at government securities.

(v) RBI's Role:

The Reserve Bank of India (RBI) has been effectively promoting the e-Rupee and expanding its reach. Here's a structured overview of the digital payments and e-money (Digital Rupee/CBDC) landscape in India as of mid-2025.

Total digital payment ecosystem reached ~1.74 billion monthly transactions with ~₹1,738 lakh crore in volume as of July 2024. This encompasses UPI, IMPS, NEFT, cards, AePS, NACH, etc. UPI remains the powerhouse: April–May 2025 saw sequential month-on-month increases (~13.3 b to 14.0 b per month). May itself reached a record 18.68 billion UPI transactions worth ₹25.14 lakh crore, facilitated by 673 banks. Rs ratio: ~37% P2P, ~63% P2M – indicating higher merchant acceptance. Digital Rupee (CBDC): Saw sharp growth from ₹234 crore to ₹1,016 crore by March 2025—over a 4× increase in annual circulation. Key findings are as follows.

- 1) Sustained momentum: UPI continues to scale rapidly month-to-month, reinforcing its dominance.
- 2) Merchant usage: The higher P2M proportion (63%) underscores deeper merchant adoption.
- 3) Institutional support: Addition of banks and integration with IMPS, AePS, NACH, etc., reflect structural alignment.
- 4) CBDC experiment: Though still small, the Digital Rupee's 4× growth signals gradual acceptance and trial expansion.

SUGGESTIONS FOR IMPROVING E MONEY & DIGITAL PAYMENT IN INDIA

Improving e-money and digital payments in India requires a holistic approach that addresses both technological and socio-economic challenges. Below are some suggestions to enhance the overall digital payment ecosystem in the country:

1. Improve Digital Literacy & Financial Education

- (i) Awareness Campaigns: financial institutions and Government should focus in awareness programs to educate users on how to safely use e-money platforms, digital wallets, and online banking.

- (ii) **Basic Digital Skills Training:** Introduce simple, hands-on digital literacy programs in schools, communities, and workplaces to ensure people are not intimidated by technology.

2. Strengthen Cybersecurity & Fraud Prevention

- (i) **Robust Security Measures:** As online fraud and cybercrime are growing concerns, banks and fintech companies should implement state-of-the-art encryption, AI-powered fraud detection systems and multi-factor authentication (MFA) to protect users.
- (ii) **Cybersecurity Awareness:** Regularly educate users about phishing attacks, fake websites, and safe digital payment practices.

3. Enhance Infrastructure and Internet Connectivity

- (i) **Offline Payment Solutions:** In regions with offline payment solutions (such as USSD-based payments or Bluetooth-based wallets), unreliable internet, can provide an alternative to digital payments.

4. Promote Interoperability Across Platforms

- (i) **Unified Digital Ecosystem:** Encourage seamless integration between different digital payment platforms (e.g., UPI, Paytm, Google Pay, etc.), banks, and financial institutions. This would reduce friction in cross-platform transactions and make payments more accessible to users.

5. Strengthen Regulatory Framework & Compliance

- (i) **Clear Regulations:** Government and financial regulators must ensure a transparent and robust regulatory framework that addresses digital payment security, consumer rights, and dispute resolution.

6. Incentivize Cashless Transactions

- (i) **Tax Breaks/Discounts for Digital Payments:** Offer incentives like tax reductions or discounts to consumers and businesses who choose digital payment methods over cash transactions.

7. Ensure Digital Payment Accessibility for All Demographics

- (i) **Support for Elderly & Disabled:** Develop user-friendly digital platforms with multilingual support, voice commands, and simple interfaces that can cater to elderly people or individuals with disabilities.

8. Foster Innovation in Digital Payment Solutions

- (i) **Fintech Startups:** Encourage the growth of fintech startups focused on innovative payment solutions, such as AI-based fraud detection, blockchain with secure transactions, and micro-payment systems for small-value transactions.

- (ii) Government-Backed Schemes: Initiatives like Startup India can be extended to fintech companies to encourage innovation in digital payments and e-money systems.

CONCLUSION

Online payments and electronic money (e-money) have transformed financial transactions by providing faster, more convenient, and easily accessible solutions for both individuals and businesses. They have greatly minimized dependence on cash and conventional banking systems, helping to create a more digital and inclusive financial environment. E-money, which includes digital wallets, prepaid cards, and mobile money, allows users to store and transfer value electronically. This has facilitated greater financial inclusion, especially in areas where traditional banking services are scarce or inaccessible. Online payment platforms have also facilitated global e-commerce, cross-border trade, and the growth of the gig economy. However, these advancements come with challenges, including data privacy concerns, cybersecurity threats, regulatory complexities, and the need for strong digital infrastructure. Ensuring trust and security in online transactions remains crucial for sustainable growth. In conclusion, while online payments and e-money offer transformative benefits, their continued success depends on robust security measures, clear regulatory frameworks, and inclusive access. As technology evolves, so too must the financial systems that support these innovations. Improving e-money and digital payments in India is a multi-faceted challenge that involves technological innovation, user education, regulatory frameworks, and infrastructure development. While the country has made significant strides, ensuring broad and equitable adoption of digital payment systems will require a concerted effort from the government, financial institutions, and fintech players. By addressing these challenges and implementing these suggestions, India can further accelerate its journey towards a cashless, digital-first economy.

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