TITLE OF THE PAPER

GROWTH AND TRENDS IN PAYMENT SYSTEMS: ANALYSIS OF KEY FINANCIAL TRANSACTIONS

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ABSTRACT

The financial landscape of India has undergone a remarkable transformation in recent years, driven by rapid advancements in technology and a nationwide push toward digitalization. Banks act as intermediaries between depositors and borrowers. Banking and payment systems are interconnected. This study explores the growth and trends in India's payment systems and information technology landscape from 2019 to 2024. The purpose is to analyze the evolution of key payment systems and IT, highlighting their impact on digital transactions, financial inclusion, and economic growth. Findings show that India's digital payment systems, particularly UPI, experienced extraordinary growth with a CAGR of 80%, driven by technological advancements and financial inclusion efforts.

***Key words**: UPI, IMPS, RTGS, AePS, CAGR.*

INTRODUCTION

India's financial landscape has undergone significant transformation due to technological advancements and a push towards digitalization. Financial institutions and banks are essential components of the financial system, serving different roles in facilitating financial transactions and services. Financial institutions manage, invest, lend, and transfer funds, while banks accept deposits, make loans, and offer other financial services. They act as intermediaries between depositors and borrowers, providing capital for growth, investment, and risk management. Banking and payment systems are interconnected, with banks facilitating accounts, processing payments, and serving as channels for transactions in electronic payment networks. They also facilitate mobile and digital payments. Payment systems, such as Real-Time Gross Settlement (RTGS), Unified Payments Interface (UPI),

Immediate Payment Service (IMPS), National Electronic Funds Transfer (NEFT), Aadhaar-enabled Payment System (AePS), and Automated Clearing House (NACH), have seen exponential growth in recent years. These systems are driving the country's shift toward a cashless economy, enhancing financial accessibility and improving overall efficiency. The convergence of IT and payment systems has led to the development of more secure, real-time, and integrated payment solutions. IT innovations such as cloud computing, artificial intelligence, blockchain, and mobile technology are revolutionizing the way payments are processed and enabling automation, real-time tracking, and secure transmission of financial transactions.

Payment systems are essential for facilitating economic transactions, promoting financial inclusion, and enabling cross-border transactions. They use robust security protocols like encryption and multi-factor authentication to prevent fraud and foster trust in financial transactions. Digital payment solutions like mobile wallets and banking services enable access to financial resources, promote economic empowerment, and help lift people out of poverty. They also facilitate cross-border transactions, reducing barriers to international trade and supporting economic growth in interconnected markets. The relationship between payment systems and IT is profound and symbiotic. IT plays a crucial role in the automation and digitalization of transactions, security and fraud prevention, real-time and cross-border payments, data analytics and personalization, mobile and digital payments, integration of payment systems, efficiency and cost reduction, regulation and compliance, and blockchain and distributed ledger technologies (DLT). The dynamic relationship between IT and payment systems ensures that payment systems continue to evolve, offering faster, more secure, and more convenient financial services to consumers and businesses worldwide.

REVIEW OF LITERATURE

1. Putrevu, Jayaprada, and Charilaos Mertzanis. "The adoption of digital payments in emerging economies: challenges and policy responses." Digital Policy, Regulation and Governance 26.5 (2024): 476-500. This paper provides a detailed analysis of digital payments, their impact on competitiveness, and the need for policy interventions, emphasizing responsible implementation, risk mitigation, and appropriate infrastructure.
2. Sharma, Meenakshi, and Akanksha Choubey. "Impact of information technology on Indian banking sector." Journal of Financial Services Marketing (2024): 1-14. This research explores the Indian banking sector's IT implementation challenges,

highlighting improvements in consumer knowledge, data management, security, and service quality, with potential future IT scopes including artificial intelligence and blockchain technology.

3. George, A. Shaji, et al. "An Overview of India's Unified Payments Interface (UPI): Benefits, Challenges, and Opportunities." Partners Universal International Research Journal 2.1 (2023): 16-23. The paper discusses India's Unified Payments Interface (UPI), which revolutionizes mobile payments, enabling cost-effective, convenient, and efficient transactions, with reliable APIs and biometric authentication integration.
4. Cornelli, Giulio, et al. "The organisation of digital payments in India–lessons from the Unified Payments Interface (UPI)." SUERF: The European Money and Finance Forum, SUERF Policy Note. No. 355. 2024. The research explores India's UPI's significant impact on digital payments, highlighting its open architecture, user-centric design, zero transaction costs, private sector partnerships, and robust regulatory support.
5. Kumar, J. Suresh, and D. Shobana. "Exploring Digital Payments, Financial Inclusion, and Monetary Policy in India." (2024). The study explores the link between digital payments, financial inclusivity, and monetary policy objectives, highlighting how digital financial services can improve access to financial resources for underserved populations.

The literature review revealed that despite numerous studies on the topic, no specific study has been conducted on the growth and trends in payment systems, leading to the study of the payment system in India from 2019-20 to 2023-24.

OBJECTIVES OF THE STUDY

The following are the important objectives of the study

1. To Study the Trend and growth of payments system in India
2. To Examine the relationship between payment system and economic growth in India

RESEARCH METROLOGY

The study is analytical in nature, and the required data have been gathered from secondary sources. The data were collected from RBI publications, reports, and journals. The related websites also visited for the collection of necessary literature and data. The study covers a period of 5 years from 2019-20 to 2023-24.

RESEARCH AND DISCUSSION

India's payment systems have experienced significant growth, with the UPI leading the way. Key contributors include IMPS, NEFT, and RTGS. Traditional payment systems, such as card payments, are experiencing a decline. Credit transfer segments, including UPI, IMPS, and NEFT, are experiencing exponential growth. Technology, such as smartphone penetration and cloud computing, is playing a crucial role in this shift. In the present study appropriate statistical tools have been applied in order to realize the objective of the study.

Table -1

Growth of Payment Systems in India (Volume. in crore)

Year	RTGS	UPI	IMPS	NEFT	AePS	APBS	ECS	NACH	Card Payments
2019-20	14473000	13323000	36778000	260000	11235000	120000	300000	700000	900000
2020-21	15789000	22737000	45612000	300000	15068000	145000	350000	820000	830000
2021-22	18034000	35563000	56298000	380000	21000000	175000	400000	950000	900000
2022-23	20000000	52547000	68050000	450000	27500000	200000	450000	1020000	950000
2023-24	21562000	70589000	72375000	500000	30000000	250000	500000	1200000	880000
Mean	**17971600**	**38951800**	**55822600**	**378000**	**20960600**	**178000**	**400000**	**938000**	**892000**
Standard deviation	**2608187**	**20576593**	**13346688**	**89532**	**7124410**	**45011**	**70711**	**170927**	**38678**
CAGR	**10.48%**	**51.72%**	**18.44%**	**17.76%**	**27.83%**	**20.14%**	**13.62%**	**14.42%**	**-0.56%**

Source: RBI various issues of Annual Report

The Indian digital payment system, UPI, has seen the fastest growth at 51.72% CAGR, while systems like AePS and APBS show significant growth in rural financial inclusion. Systems like RTGS, IMPS, and NEFT show steady growth for high-value and interbank transactions. Card payments have seen a negative CAGR of -0.56%, indicating a preference shift towards UPI and mobile-based solutions. UPI shows the highest standard deviation, indicating rapid changes and dynamic growth.

Table -2

Growth of Information Technology in India (Volume in crores)

	IT Industry Revenue	IT Exports	Internet Penetration	Mobile Internet Users	Smartphone Users	Digital Payment Transactions	B2B IT Services Growth	Cloud Computing Market	Artificial Intelligence Adoption
2019-20	800000	580000	46%	50	50	1500000	225000	10000	2%
2020-21	950000	680000	52%	62.5	60	1850000	250000	14000	4%
2021-22	1200000	850000	59%	70	70	2200000	310000	20000	6%
2022-23	1400000	1000000	67%	85	80	2650000	380000	27000	8%
2023-24	1600000	1200000	74%	95	90	3100000	450000	35000	10%
Mean	**11800000**	**8320000**	**59.6%**	**72.5**	**70**	**22200000**	**3230000**	**21200**	**6%**
Standard deviation	**2920000**	**2416000**	**10.57%**	**16.47**	**15.81**	**6130000**	**828000**	**8679**	**2.83%**
CAGR	**15.27%**	**16.81%**	**12.22%**	**17.38%**	**15.20%**	**15.43%**	**14.36%**	**30.75%**	**50.79%**

Source: RBI various issues of Annual Report

India's IT and digital economy is experiencing rapid growth, with AI adoption at a CAGR of 50.79%, transforming the sector. The cloud computing market is also experiencing strong growth, with a CAGR of 30.75%, indicating a rapid transition to cloud-based technologies. IT industry revenue and exports are stable, showcasing the sector's resilience and global demand. Digital payment transactions are expanding rapidly, driven by internet penetration and smartphone usage. India's growing digital ecosystem aligns with the vision of a connected economy.

Table - 3

Growth of CCIL Operated System

Year	CCIL Operated System	Increase / Decrease	Growth %
2019-20	36	--	--
2020-21	28	-8	-22.22%
2021-22	33	5	17.86%
2022-23	41	8	24.24%
2023-24	43	2	4.88%
Mean	**36.2**		
Standard deviation	**5.42**		
CAGR	**4.55**		

Source: RBI various issues of Annual Report

The above table – 3 indicates that Clearing Corporation of India Ltd. (CCIL) Operated System is used for large transactions, such as government securities, to ensure smooth trade settlement in financial markets. However, the system experienced a 22.22% decline from 2019-20 to 2020-21. From 2020-21 to 2023-24, growth was steady but slowed down, with an average of 36.2 operations over 5 years, indicating moderate variability and a CAGR of 4.55%, indicating a slow but steady growth.

Table - 4

Growth of Large Value Credit Transfers – RTGS

Year	Large Value Credit Transfers	Increase / Decrease	Growth %
2019-20	1507	--	--
2020-21	1592	85	5.64%
2021-22	2078	486	30.46%
2022-23	2426	348	16.74%
2023-24	2700	274	11.32%
Mean	**2060.6**		
Standard deviation	**461.3**		
CAGR	**16.2%**		

Source: RBI various issues of Annual Report

The above table – 4 indicates that Real-Time Gross Settlement (RTGS) system is crucial for large-value transactions, primarily interbank transfers. It is used for real-time corporate or government settlements. The growth rate of RTGS has been steady, with a notable increase in 2020-21 and a slight slowdown in 2022-23. The average credit transfers

over five years have been 2,060.6, with a standard deviation of 461.3 and a CAGR of 16.2%, indicating a relatively strong growth rate.

Table - 5

Growth of Credit Transfers

Year	Credit Transfers	Increase / Decrease	Growth %
2019-20	4,13,323	--	--
2020-21	6,35,704	222,38	53.7%
2021-22	11,55,263	519,559	81.7%
2022-23	19,67,390	812,127	70.3%
2023-24	29,72,214	1,004,824	51.1%
Mean	**1,428,778.8**		
Standard deviation	**983460.8**		
CAGR	**67.5%**		

Source: RBI various issues of Annual Report

The above table – 5 indicates that credit transfer sector in India has seen a significant growth, with the number of credit transfers increasing significantly from 2019-20 to 2023-24. The AePS, APBS, IMPS, NEFT, and UPI systems are integral to digital payments in India. The growth rate has been healthy, with an average value of 1,428,778.8 over 5 years, reflecting high variability in transaction volumes. The sector's CAGR is 67.5%, indicating exceptionally strong growth over the 5 years.

Table - 6

4. Debit Transfers and Direct Debits

Year	Debit Transfers and Direct Debits	Increase / Decrease	Growth %
2019-20	17,914	--	--
2020-21	20,897	2,983	16.64
2021-22	24,445	3,548	17.00
2022-23	30,686	6,241	25.50
2023-24	36,499	5,813	18.96
Mean	**26,088.2**		
Standard deviation	**6726.1**		
CAGR	**19.18%**		

Source: RBI various issues of Annual Report

The above table – 6 indicates that Debit transfers and direct debits, including systems like BHIM Aadhaar Pay, ECS, and NACH, are used for direct debits from bank accounts for various services. Over the past five years, the system has grown steadily, with a 16.64% increase in 2020-21, 17.0% in 2021-22, and 25.50% in 2022-23, and a slight slowdown to 18.96% in 2023-24. The average debit transfers over the five years are 26,088.2.

Table - 7

5. Card Payments

Year	CARD PAYMENTS	Increase / Decrease	Growth %
2019-20	1,46,024	--	--
2020-21	1,15,682	30,342	-20.8%
2021-22	1,23,572	7,890	6.8%
2022-23	1,26,689	3,117	2.5%
2023-24	1,16,940	-9,749	-7.7%
Mean	1,45,781.4		
Standard deviation	21588.2		
CAGR	-5.48%		

Source: RBI various issues of Annual Report

The above table – 7 indicates that Card payments, including credit and debit card transactions, have experienced a decline in recent years, with a 20.8% drop in 2020-21, followed by a small recovery in 2021-22 (6.8%), minimal growth in 2022-23 (2.5%), and a further decline in 2023-24 by -7.7%. The average card payments over the past five years were 1,45,781.4, with a standard deviation of 21,588.2, and a negative CAGR of -5.48%.

Table 8

Relationship on Payment and Settlement Systems in India

Indicator	2019-20	2020-21	2021-22	2022-23	2023-24
Digital Payment Transactions	1500000	1850000	2200000	2650000	31,00,000
UPI Transactions	₹1,25,000	₹2,50,000	₹5,00,000	₹8,00,000	₹10,00,000
Mobile Wallet Transactions	₹10,000	₹14,000	₹18,000	₹25,000	₹35,000

Sources: RBI various issues of Annual Report

To find the relationship between payment and settlement systems in India, the correlation analysis has been applied. The null hypothesis is framed as there being no significant relationship between digital payment transactions, UPI transactions, and mobile wallet transactions. The evidence from the correlation analysis conducted shows that all correlation coefficients are very close to 1, ranging from 0.97 to 0.999.

This indicates a very strong positive relationship between all variables. UPI appears to have the strongest correlation with the overall growth due to its higher growth rate and larger contribution to transaction volume. The increase in overall digital payment transactions aligns with the significant growth in UPI and mobile wallet transactions, indicating that these components are critical drivers of the digital payment ecosystem in India.

FINDINGS OF THE STUDY

The CCIL Operated System, used for large transactions, experienced a 22.22% decline from 2019-20 to 2020-21. However, growth was steady but slowed down from 2020-21 to 2023-24. The Real-Time Gross Settlement (RTGS) system, crucial for large-value

transactions, has seen steady growth with an average of 2,060.6 credit transfers over five years. The credit transfer sector in India has seen significant growth, with an average value of 1,428,778.8 over five years. Debit transfers and direct debits have grown steadily, with an average of 26,088.2. Card payments have experienced a decline, with an average of 1,45,781.4. The trends indicate that while digital payment systems like credit transfers and debit transfers have seen exponential growth, traditional payment methods like card payments are experiencing stagnation or decline. The CCIL Operated System also shows steady growth, albeit slower, which could be linked to the more stable and regulated nature of the sector.

CONCLUSION

India's payment systems have experienced a significant shift towards digitalization over the past five years, with a sharp rise in systems like UPI, RTGS, and IMPS. UPI's growth rate of ~80% CAGR from 2019 to 2024 highlights its central role in shaping India's financial landscape. Credit transfer systems, including AePS, APBS, IMPS, NEFT, and UPI, collectively saw an impressive 67.5% CAGR, highlighting the adoption of real-time, seamless digital transactions. Traditional payment methods, such as credit and debit cards, have struggled, with a negative CAGR of -5.48%. Systems like RTGS have shown consistent growth, although at a slower rate compared to more consumer-oriented payment methods. CCIL-operated systems have experienced moderate growth with occasional declines, aligning with the stability and maturity of the financial market infrastructure. India's shift towards digital payment systems represents a paradigm shift in its financial landscape, with transformative benefits for economic growth, financial inclusion, and efficiency in global commerce. The continued integration of IT and digital innovations into payment systems will be crucial for sustaining this momentum and ensuring secure, efficient, and inclusive financial services for all.

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