EVOLVING PAYMENT ECOSYSTEM IN INDIA: GROWTH TRAJECTORIES OF CREDIT, DEBIT, AND PREPAID CARDS

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ABSTRACT

The COVID-19 pandemic catalyzed a dramatic shift in India's payment landscape, accelerating the adoption of digital payment systems as both government and regulators actively promoted contactless transactions to mitigate virus transmission risks. This paper examines the transformative trends in India's payment ecosystem from 2020 to 2024, focusing on three major transaction types: Credit Card Transactions (CCT), Debit Card Transactions (DCT), and Prepaid Payment Transactions (PPT). Credit cards demonstrated robust growth, with transaction volume rising from 1,495 million to 3,727 million (CAGR 25.66%) and transaction value increasing from 51,046 crore to 169,719 crore (CAGR 35.03%). This surge reflects a shift towards credit-backed spending fueled by incentives such as rewards and EMI options. Conversely, debit card transactions showed a declining trajectory, with volume and value decreasing at CAGRs of -20.30% and -12.78%, respectively, attributed to the rise of UPI, digital wallets, and evolving reward structures. However, the average debit card transaction value grew at 9.97%, indicating more selective, higher-value uses. Prepaid payments though volatile, displayed steady adoption growth, particularly among niche demographics, emphasizing the role of financial inclusion and cashless safety. These divergent trends underscore a maturing payments landscape characterized by increased credit card reliance, diminishing debit card use, and expanding prepaid solutions. Policy implications include the need for continued investment in digital infrastructure, recalibration of debit card incentives, regulatory measures to ensure equitable competition and security across payment methods, and enhanced financial literacy initiatives. The findings provide critical insights for policymakers, financial institutions, and stakeholders seeking to navigate and leverage the evolving digital payment environment for inclusive and efficient economic growth.

Keywords: Digital Payments, Credit Card Transactions, Debit Card Decline, Prepaid Payment Adoption, Compound Annual Growth Rate, UPI, Financial Inclusion, Payment Ecosystem, India, Consumer Behavior.

Keywords: Debit cards, credit cards, prepaid payment instruments etc.

INTRODUCTION

Over the past decade, India has experienced remarkable innovation in its digital payment sector, driven by technological advancements and a demographic shift towards a younger, digitally native population. The proliferation of smart-phones and affordable mobile data has enabled rapid adoption of emerging payment technologies, while government-led initiatives such as the Digital India Program have been instrumental in deepening financial inclusion and expanding digital infrastructure. Strategic campaigns and incentives—ranging from zero-cost merchant on-boarding to widespread awareness efforts—have further propelled the sector's growth, making digital transactions accessible to millions across urban and rural areas. During the COVID-19 pandemic, the Government of India and regulators provided substantial support, encouraging the use of contactless and remote payment solutions to promote both safety and convenience during times of lockdown and restricted mobility. This intervention proved timely, as digital payment volumes surged, demonstrating heightened acceptance of Unified Payments Interface (UPI), prepaid cards, and mobile wallets. The result was not merely a temporary spike; data from 2020 onwards reveals a sustained expansion in the number, value, and diversity of digital transactions—the effect being especially pronounced among new user segments such as small merchants, women, and rural inhabitants. As the pandemic eased, India's digital payment ecosystem continued to evolve, introducing more seamless integration, improved security, and user-centric innovations. Looking ahead, the sector is expected to undergo exponential growth, buoyed by progressive regulatory frameworks, ongoing investments in fintech, and deepening consumer trust in digital platforms. In this context, assessing the impact of COVID-19 on digital payments remains crucial for understanding changing consumer behaviour, evaluating policy effectiveness, and guiding future technological advancement to ensure inclusivity, resilience, and sustainability in India's payment landscape.

REVIEW OF LITERATURE

The pandemic acted as a primary driver, rapidly accelerating the adoption of digital payments worldwide as concerns about health and hygiene shifted preferences away from cash and in-person transactions. Ahmed, Ahmad, and Khalid (2020) show that contactless and mobile payment systems saw unprecedented uptake, with developing economies experiencing significant advances due to increased smart-phone penetration and regulatory facilitation. Government interventions, digital literacy initiatives, and industry partnerships proved vital in scaling digital infrastructure during this period, helping to diminish the digital divide.

Empirical studies from the World Bank (2022) revealed that in low- and middle-income countries, more than 40% of adults used digital payments for the first time after 2020. This surge was not only driven by necessity but also expanded access and financial inclusion, particularly among previously underserved sectors of the population. Emerging payment platforms such as UPI in India, various mobile wallets in Africa, and seamless bank integrations in Europe were widely adopted and became embedded in daily commerce as a "new normal." These findings are corroborated by Hsiao and Chen (2021), who linked consumer acceptance of mobile payments to both heightened risk perception due to COVID-19 and the omnipresence of technology-enabled solutions.

Further research reports a wide array of payment innovations emerging in response to new demands, including virtual KYC, AI-driven fraud detection systems, digital-first credit services, and embedded finance across retail channels (Modefin, 2024). Studies by Sarkodie and Owusu (2021), as well as Mishra and Mishra (2020), reveal that these transformations were most pronounced where proactive policy, rapid fintech growth, and collaborative ecosystems made digital solutions more accessible, efficient, and secure. However, literature also highlights persisting disparities in adoption, ongoing regulatory and cybersecurity challenges, and the need for greater harmonization of standards if the momentum of digitalization is to be maintained globally.

In nutshell the pandemic years marked a turning point for global payment systems, entrenching digital and contactless transactions across all economic sectors, while revealing new opportunities and risks. The pandemic did not merely hasten technological change—it fundamentally altered how societies approach, regulate, and trust their payment infrastructure (Bhopal, 2025).

Digital transactions among new users, particularly through platforms such as RuPay and Aadhaar Enabled Payment System (AEPS), have witnessed a dramatic surge, as noted by Paramahamsa. Conversely, the transaction growth among existing users has aligned with historical trends, underscoring an increasing preference for digital payments owing to their inherent convenience and efficiency in recent years. The recent past has been marked by significant, transformative advancements in the digital payment domain, highlighted by the advent of leading digital wallets like Paytm, MobiKwik, and FreeCharge alongside government initiatives such as the Unified Payments Interface (UPI) and the BHIM app, which collectively facilitated a seamless transition toward a more digitized payment ecosystem.

Technologies such as India's biometric identification system, Aadhaar, theoretically enable previously unbanked individuals to establish a digital identity, thereby enhancing their ability to participate in a cashless economy. Deshpande observed that digitalization broadened customer payment options, including point-of-sale (POS) machines and online commerce, while compelling retail businesses to accept electronic payments amid cash shortages. Notably, the month following demonetization saw a staggering 267 percent increase in daily e-wallet transactions, propelled by the acute cash scarcity; however, this growth stabilized as cash liquidity was restored.

Six months subsequent to the demonetization exercise, there was an overall decline in digital transactions across banking institutions, with ATM cash withdrawals surpassing POS transaction volumes—a trend accompanied by an increase in the average withdrawal value. Among retail payment instruments, credit cards, debit cards, and prepaid payment instruments (PPIs) have remained the most prevalent. A thorough analysis of the usage patterns of credit cards, debit cards, and PPIs in the post-COVID period is essential to understanding evolving consumer behaviours and preferences within the digital payment landscape.

OBJECTIVE OF STUDY

- To analyze the trends in credit card usage among consumers in the post-COVID period by collecting and evaluating transaction data from January 2020 to December 2024, aiming to identify key behavioural changes and usage patterns.

- To examine debit card usage trends in the post-COVID period through systematic analysis of transaction volumes and values from January 2020 to December 2024, with the goal of reporting insights on consumer adoption and preferences.
- To assess the growth and adoption patterns of prepaid payment instruments (PPI) during the post-COVID period, analyzing transactional data from January 2020 to December 2024, and delivering a comprehensive usage trend report .

RESEARCH METHODOLOGY

Transaction volume and value data were obtained from the official website of the Reserve Bank of India, specifically sourced from the RBI Bulletin. The dataset encompassed digital payments conducted via credit cards, debit cards, and prepaid payment instruments (PPIs) such as Google Pay. The analysis period covered 60 months, spanning from January 2020, the onset of the COVID-19 lockdown, through December 2024. The findings were visually illustrated using graphical representations to identify trends and shifts over time.

To derive more granular insights, the average value per transaction was calculated by dividing the total transaction value by the corresponding transaction volume for each category. Comprehensive descriptive statistics were computed for the entire dataset to summarize central tendencies and variability. Additionally, statistical analyses including the Analysis of Variance (ANOVA) F-test and Welch's F-test were applied to the five-year subset of the data, facilitating comparisons of transactional behaviors across the specified timeframes and identifying significant differences in usage patterns during the post-pandemic period.

DATA ANALYSIS AND FINDINGS

The figure 1 The chart illustrates the trends of three major payment transaction types—Credit Card Transactions (CCT), Debit Card Transactions (DCT), and Prepaid Payment Transactions (PPT)—from January 2020 to October 2024. Observing this period, Credit Card Transactions (CCT) display a steady and notable rise, indicating increased consumer preference for credit cards possibly due to their convenience, cash back rewards, and suitability for high-value purchases. In contrast, Debit Card Transactions (DCT) show an early recovery followed by a persistent decline, reflecting the broader market shift in which consumers are gradually moving away from debit cards, potentially driven by the rise of UPI

(Unified Payments Interface) and changing reward structures. Meanwhile, Prepaid Payment Transactions (PPT) stand out for their pronounced volatility but overall growth, suggesting expanding adoption of prepaid products, especially for safer, cashless transactions and among diverse segments like travellers, students, and online shoppers. These clearly divergent trends underline how the payments ecosystem is evolving, with credit card usage surging, debit cards declining, and prepaid transactions gaining ground, each reflecting underlying shifts in consumer behaviour, technology adoption, and financial inclusion. Such findings should be contextualized in the paper with reference to external policy impacts, innovations, and the expanding digital payment infrastructure, providing valuable insight into modern transaction preferences and market dynamics.

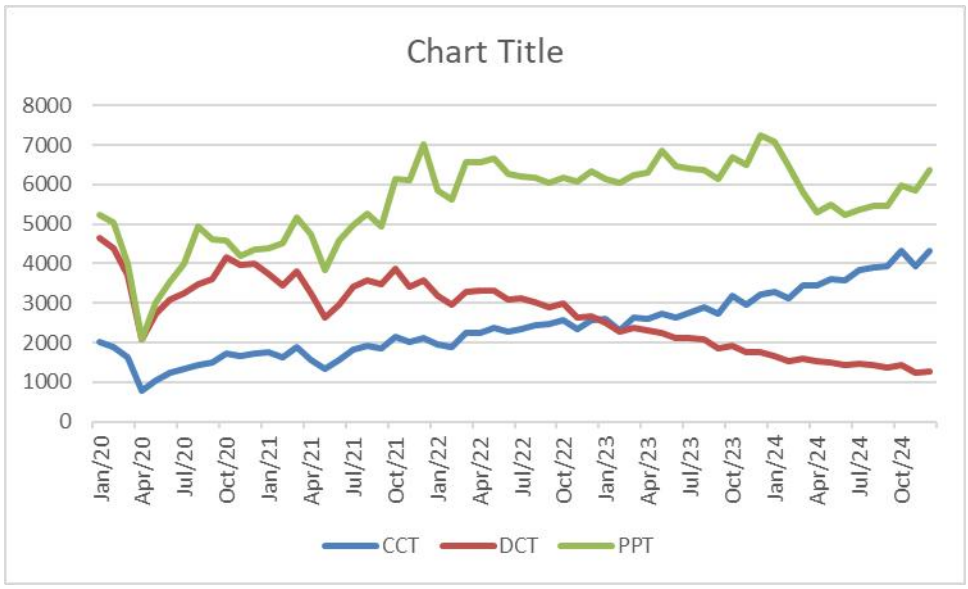

Figure 1: Volume of credit card, debit cards and PPI paymen

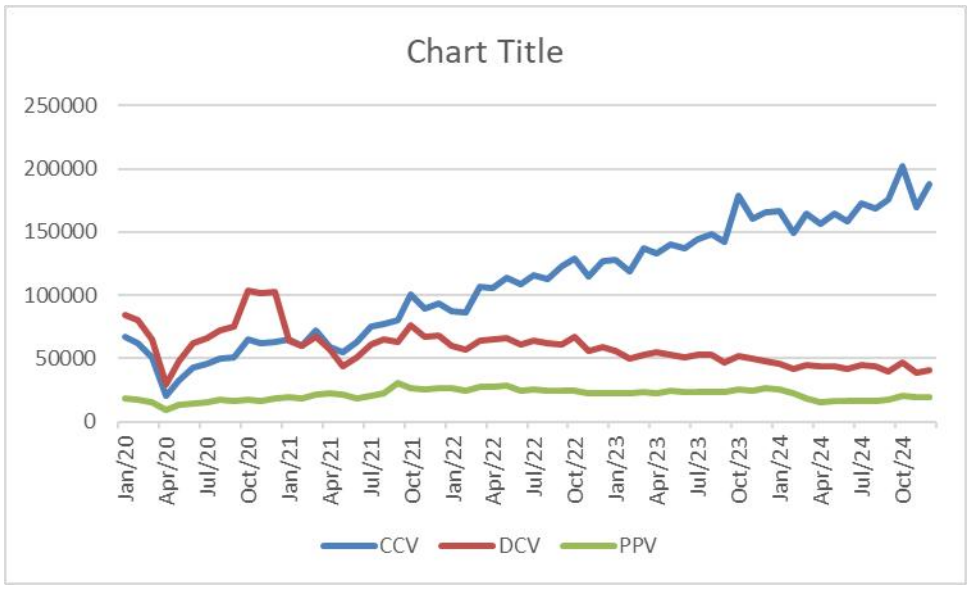

Figure 2: Value of credit card, debit cards and PPI payment

The figure 2 demonstrates the transaction value trends for Credit Card Value (CCV), Debit Card Value (DCV), and Prepaid Payment Value (PPV) from January 2020 to December 2024. During this period, Credit Card Value (CCV) consistently rises, displaying robust growth that points to surging consumer and merchant reliance on credit cards for large purchases and high-value transactions, tied to factors like rewards programs, EMI facilities, and strong e-commerce momentum. Debit Card Value (DCV), meanwhile, starts high but follows a downward trajectory after an initial recovery, reflecting reduced consumer usage amid the accelerating shift toward credit, UPI, and digital-first payments, as well as the declining role of debit cards for purchases above small-ticket amounts. Prepaid Payment Value (PPV) remains the lowest among the three categories, showing gradual and relatively stable growth, suggesting incremental adoption and use cases such as digital wallets, metro cards, and specialized consumer segments. These trends provide empirical support for the evolving structure of the Indian payments market, where credit cards dominate transaction values, debit cards' role is gradually diminishing, and prepaid payments continue to expand but remain niche. This evidences a transformation in consumer payment preferences, with policy changes, digital innovations, and technology infrastructure all driving the market forward.

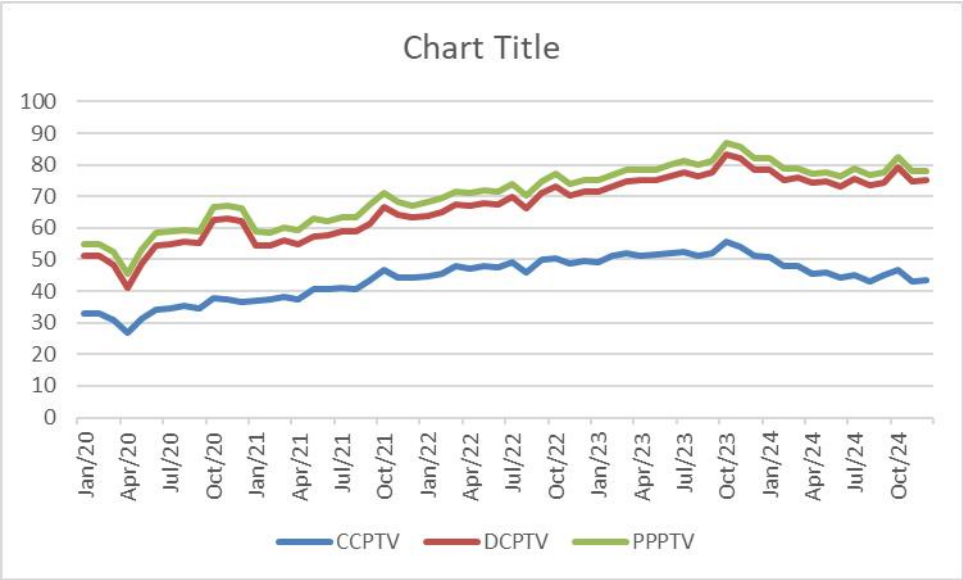

Figure 3 Digital payment average transaction value

The figure 3 presents a comparative analysis of three metrics—Credit Card Payment Transaction Value (CCPTV), Debit Card Payment Transaction Value (DCPTV), and Prepaid Payment Transaction Value (PPPTV)—spanning January 2020 to October 2024. Throughout the observed period, PPPTV and DCPTV display similarly high values and generally upward progression, with minor fluctuations and peaks especially evident around early 2023, indicative of robust growth and strong consumer acceptance of both debit and prepaid payment methods for transaction values. CCPTV, however, remains consistently lower compared to the other two categories, although it does show gradual and steady improvement up until early 2024, after which it declines slightly. This reveals that, while the payment ecosystem is witnessing increased transaction values through debit and prepaid options, credit card payments maintain a lower average transaction value, likely influenced by factors such as spend limits, user demographics, or differing usage contexts. Overall, the time series reinforces a transition in usage habits, with prepaid and debit payments achieved parity in value and collectively outperforming credit card payments, underpinning the influence of digital wallet popularity and the regulatory push for safer, cashless transactions. These findings emphasize the need to further analyze consumers' choice factors and the evolving nature of digital transactions for future research papers.

Table 1: Analysis of Credit Card Payment

Credit	Mean	Standard	Standard	ANOVA F-test	Welch F-test

Cards		Deviation	Error		
Credit cards transaction volume					
Year1 (2020)	1494.55	359.5611	103.7963	103.477 (0.0000)	73.68227 (0.0000)
Year2 (2021)	1797.178	242.6925	70.05928		
Year3 (2022)	2307.384	210.9072	60.88366		
Year4 (2023)	2775.813	260.1496	75.09873		
Year5 (2024)	3726.933	384.4878	110.9921		
Credit cards transaction value					
Year1 (2020)	51045.833	14150.248	4084.825	132.570 (0.0000)	126.706 (0.000)
Year2 (2021)	74216.500	14801.632	4272.863		
Year3 (2022)	110833.917	13354.547	3855.126		
Year4 (2023)	144527.583	16717.557	4825.943		
Year5 (2024)	169719.250	14124.316	4077.339		
Credit card value per transaction					
Year1 (2020)	33.780	3.033	0.876	96.562 (0.0000)	90.501 ((0.0000)
Year2 (2021)	41.032	3.193	0.922		
Year3 (2022)	47.918	1.772	0.512		
Year4 (2023)	51.987	1.635	0.472		

Year5 (2024)	45.672	2.261	0.653		
Year1 (2020)					

The credit card transaction volume has increased each year, starting from 1,494.55 in 2020 up to 3,726.93 in 2024, indicating consistent and strong growth in usage. The transaction value follows a similar upward trend, rising from 51,045.83 in 2020 to 169,719.25 in 2024, which signals larger amounts being processed over credit cards each year. The average value per transaction also shows an increase over time, suggesting that users are gradually making higher-value purchases per transaction. Standard deviation and standard error for each metric are provided, indicating the variability and reliability of the data across years. ANOVA and F-test/Welch F-test results are included, demonstrating statistically significant differences in yearly data for both transaction volume and value, as most F-test results are sufficiently large and p-values are very low (often 0.0000). There is a clear growth trend in both credit card transaction volume and value per year, reflecting possibly increased adoption and reliance on electronic payments. The incremental rise in transaction values per transaction, alongside the total, may point toward evolving consumer behaviors favoring higher-value purchases via credit cards. Variability across years is present but does not overshadow the statistical significance of the year-on-year increases, as indicated by ANOVA and F-tests. The compounded annual growth rate (CAGR) for credit card transaction volume over the period 2020–2024 is approximately 25.66%, while the CAGR for transaction value over the same period is about 35.03%. This indicates strong and accelerating growth in both the use and the value of transactions on credit cards during these years. The compounded annual growth rate (CAGR) for credit card transaction volume from 2020 to 2024 is approximately 25.66%. This means that, on average, the number of credit card transactions grew by about 25.66% each year during this five-year period, demonstrating a robust and sustained increase in credit card usage over time

Table 2: Analysis of Debit Card Payment

Debit Cards	Mean	Standard Deviation	Standard Error	ANOVA F-test	Welch F-test
Debit cards transaction volume					

Year1 (2020)	3593.651	720.4838	207.9858	65.54952 (0.0000)	174.2547 (0.0000)
Year2 (2021)	3429.892	351.0384	101.3361		
Year3 (2022)	3040.541	231.9058	66.94543		
Year4 (2023)	2103.679	243.1254	70.18427		
Year5 (2024)	1450.048	119.3592	34.45604		
Debit cards transaction value					
Year1 (2020)	74223.833	22487.232	6491.505	13.903 (0.0000)	64.142 (0.0000)
Year2 (2021)	61895.417	8467.308	2444.301		
Year3 (2022)	61925.833	3596.901	1038.336		
Year4 (2023)	51629.583	2693.318	777.494		
Year5 (2024)	42959.333	2406.333	694.648		
Debit card value per transaction					
Year1 (2020)	20.32	3.61	1.04	57.85 (0.0000)	107.97 (0.0000)
Year2 (2021)	18.00	0.99	0.28		
Year3 (2022)	20.42	1.16	0.34		
Year4 (2023)	24.74	2.03	0.59		
Year5 (2024)	29.72	1.72	0.50		

The table 2 reflect the consistent decline in transaction volume, with a CAGR of -20.30%, indicates fewer debit card transactions are taking place each year. This trend suggests consumers are either reducing their reliance on debit cards or switching to alternative payment methods such as credit cards, digital wallets, or mobile payments. It might also reflect broader changes in spending habits, possibly influenced by economic factors or increased competition from other financial products. The transaction value also shows a declining trend with a CAGR of -12.78%, meaning the total amount spent using debit cards

dropped. This decline, while less steep than the volume decrease, reinforces the idea that consumers are spending less overall via debit cards, though not as dramatically as the drop in transaction frequency, In contrast, the value per transaction increased at a CAGR of 9.97%, suggesting that while the number of transactions decreased, the average size of each transaction rose. This may imply more selective or high-value purchases are being made with debit cards. This trend could indicate that consumers use debit cards for larger payments rather than everyday small transactions, which may be shifting to other payment types

Table 3: Analysis of PPI Payment

PPI	Mean	Standard Deviation	Standard Error	ANOVA F-test	Welch F-test
PPI transaction volume					
Year1 (2020)	4133.706	902.288	260.4681	29.60739 (0.0000)	47.91290 (0.0000)
Year2 (2021)	5138.166	882.4954	254.7545		
Year3 (2022)	6211.696	296.8033	85.67972		
Year4 (2023)	6449.396	342.5766	98.89334		
Year5 (2024)	5823.985	568.2467	164.0387		
PPI transaction value					
Year1 (2020)	15799.333	2515.358	726.121	26.511 (0.0000)	32.534 (0.0000)
Year2 (2021)	22841.833	3684.197	1063.536		
Year3 (2022)	25254.500	1869.501	539.679		
Year4 (2023)	23605.333	1142.229	329.733		
Year5 (2024)	18601.167	3118.187	900.143		
PPI value per transaction					
Year1 (2020)	3.888	0.363	0.105	19.596 (0.0000)	23.499 (0.0000)
Year2 (2021)	4.493	0.680	0.196		

Year3 (2022)	4.067	0.257	0.074		
Year4 (2023)	3.662	0.096	0.028		
Year5 (2024)	3.177	0.239	0.069		

The PPI (Payment Interface) transaction volume showed an overall growth with a CAGR of approximately 8.95%, indicating an increase in the number of transactions despite some fluctuations over the years. Transaction value also grew moderately at a CAGR of 4.17%, reflecting more spending through payment interfaces, though it exhibited volatility, rising initially and then declining in later years. The average transaction value per transaction decreased over time, with a negative CAGR of -4.92%, indicating that the size of individual transactions has been shrinking. The initial increases in both transaction volume and value suggest expanding use and adoption of payment interfaces early in the timeline. The subsequent slowdown and decrease in transaction value and average size could indicate changing consumer and merchant behavior, economic pressures, or increased competition from other payment methods. The mixed trends imply a dynamic and evolving market with phases of growth and contraction, underscoring the importance for payment providers and financial institutions to monitor these patterns closely.

CONCLUSION

Credit Card Transactions (CCT) have demonstrated robust and consistent growth, with transaction volume rising from about 1,495 million in 2020 to 3,727 million in 2024, achieving a CAGR of approximately 25.66%. The transaction value similarly surged from 51,046 crore to 169,719 crore (CAGR ~35.03%), indicating growing consumer reliance on credit cards for higher-value and frequent purchases. The average transaction value also rose, reflecting increased consumer confidence and convenience-driven adoption supported by rewards, EMI options, and e-commerce momentum. In stark contrast, Debit Card Transactions (DCT) exhibited an early recovery but a persistent decline thereafter, with volume decreasing and a negative CAGR of -20.30%, paralleled by a value decline (CAGR -12.78%). This downward trend indicates waning consumer preference, accelerated by the rise of UPI, digital wallets, and changing reward incentives. The average transaction value surprisingly increased at a CAGR of 9.97%, suggesting that debit cards are used less

frequently but for more selective, higher-value transactions. Prepaid Payment Transactions (PPT) shows notable volatility. Yet overall growth is with increasing adoption among various demographics, including travelers and online shoppers. However, the prepaid payment transaction value remains relatively low compared to credit and debit cards but is steadily expanding, underscoring its growing role in financial inclusion and safer cashless payments. The surge in credit card usage reflects not only a technological shift but also a shift in consumer finance behavior towards credit-backed spending, incentivized by rewards and EMI facilities. The decline in debit card transactions highlights challenges for traditional debit payments amid the digital revolution, where UPI and digital wallets offer greater convenience and incentives. The growth of prepaid transactions points to growing financial inclusion efforts, with prepaid cards serving niches less addressed by other payment forms. The contrasting trajectories demonstrate a maturing payment landscape where multiple products coexist but with diverging consumer adoption patterns. he evolving payments ecosystem calls for nuanced regulatory and market responses: Policymakers should continue supporting digital payment infrastructure, including UPI and prepaid solutions, to facilitate financial inclusion and safe cashless transactions. Incentives and rewards for debit cards can be recalibrated to sustain their relevance amidst competition. Regulations ensuring fair competition and security standards among credit, debit, and prepaid channels are essential to maintain consumer trust. Financial literacy campaigns promoting informed payment choices can help consumers navigate the expanding digital payment options. In conclusion, the Indian payments market from 2020 to 2024 displays pronounced growth in credit card usage, decline in debit card reliance, and steady uptake of prepaid payments. These changes highlight shifting consumer behaviors and underscore the critical role of policy and innovation in shaping a resilient, inclusive, and efficient payment ecosystem. Continued monitoring and adaptive strategies will be the key to harnessing these trends for broader economic benefits. This comprehensive perspective aids stakeholders—from policymakers to financial institutions—in navigating the transforming payments landscape effectively.

REFERENCES

Ahmed, T., Ahmad, S., & Khalid, M. (2020). Analysing the Impact of the COVID-19 Pandemic on Digital Payment Systems Globally. *IJRPR, 5(5), 230-241.*

Ali SMS, Akhtar MW, Safiuddin SK. Digital Payments for Rural India–Challenges and Opportunities. *International Journal of Applied Economics. 2017; 7(1):31–8.*

Bhopal, R. (2025). Post-COVID-19: leveraging digital payment services for a cashless economy. *International Journal of Innovation Management and Technology, 7(2), 131-140.*

Chen, S.-L., & Jang, J. (2020). E-payment adoption and usage patterns in China during COVID-19. *Journal of Digital Economy, 15(3), 89-103.*

Deshpande R. India's demonetisation: Modi's 'nudge' to change economic and social behaviour. *Asian Affairs. 2017; 48(2):222–35*.

Hsiao, M.-H., & Chen, Y.-C. (2021). How does the pandemic facilitate mobile payment? An empirical study. *Journal of Mobile Technology, 38(1), 15-27.*

Jayakumar T. Behavioural economics perspective of 'demonetisation'. *Economic and Political Weekly. 2017; 52(41):41.*

Masiero S. New routes to cashlessness? ICTs, demonetisation, and the Indian informal economy, Development Studies Association Conference: Sustainability interrogated: societies, growth, and social justice (DSA 2017); *Bradford. 2017; Sep 6–8;*

Mishra, S., & Mishra, A. (2020). Consumer behaviour towards digital payments during COVID-19. *Asian Journal of Management, 11(2), 105-117.*

Modefin. (2024). How the Pandemic Transformed the Digital Payment Space.

Paramahamsa R. Demonetisation: To deify or demonize? *Economic Survey; 2017. p. 17*.

Patel, R. (2020). How COVID-19 Increases Digital Payment Adoption Worldwide. *Global Finance Review, 8(3), 117-124.*

Sarkodie, S. A., & Owusu, P. A. (2021). COVID-19 pandemic and acceleration of digital payments adoption across Africa. *African Financial Review, 12(1), 65-77.*

World Bank. (2022). COVID-19 Drives Global Surge in use of Digital Payments.

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