

UPI Dominance and the Changing Card Market: An Empirical Study of India's Payment Evolution

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Abstract

The paper studies the transformative growth of digital payments in India with the help of data made available by RBI. The paper explains the evolution from historical milestones to modern-day digital finance trends, highlighting pivotal moments. The policy decisions by India that propelled India into the digital payment vanguard. The paper utilises chart representations, the study provides a meticulous examination of the adoption, growth, and implications of digital payments in India. For the purpose of analysis, multiple regression has been employed. This analysis addresses the dominance of UPI, the steady rise of Credit Cards, and the declining usage of Debit Cards, along with the growth in payment infrastructures.

Keywords: Digital Payments, UPI (Unified Payments Interface), Credit Cards, Debit Cards

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I. INTRODUCTION

In recent years, digital payments have taken the world by storm, fundamentally transforming the way financial transactions are conducted (Hu et al., 2020). This transformation has paid ways in an era of unparalleled convenience and efficiency, making financial interactions a seamless part of our daily lives (Laura Di Pietro et al., 2015). Consumer perceptions toward these digital channels are also important, as highlighted in earlier studies on behaviour and adoption (Di Pietro et al., 2015). Nowhere is this paradigm shift more evident than in India (Vijayakumar, 2023), a nation with an ever-expanding network reach and remarkably affordable cellular rates across the length and breadth of the country (Das, 2023).

India's uprise in the realm of digital payments has been nothing short of spectacular, forcing it to the vanguard of global leadership in this domain (Groenfeldt, 2019). At the heart of this revolution are farsighted initiatives such as "Digital India" and the phenomenal "Indian Stack" (Dixit, 2023). These initiatives have not only provided the infrastructure but have also fuelled a cultural shift towards digital financial interactions. The growth of digital payments is, at its core, fuelled by technological advancements, customer convenience strategies, and regulatory reforms. Previous studies identified many issues concerning the adoption of digital systems, including security, fraud and general consumer adoption attitudes (Dahlberg, Guo & Ondrus, 2015).

An important element behind India's recent uprise is the digital payment ecosystem instead of a single payment model. The Economic Survey of 2020-21 shows that UPI transactions grew due to the expanding role of digital payment infrastructure, including payment digitisation which is becoming a part of everyday financial activity (Government of India, 2021).

In the span of just a few years, digital payments have become a crucial part of the Indian way of life (Kayastha, 2023). The ease of making payments from anywhere and anytime, without the need to carry around physical cash or cards, has made digital payments highly attractive to Indians. They permeate every facet of daily transactions, from purchasing vegetables from street hawkers to acquiring milk from local kirana shops, from securing film tickets at the local theatre to booking flights and hotels for vacations. Indians have embraced digital

payments with such fervour that the very thought of reverting to a time without them may invoke a sense of unease.

But it's important to remember that this was not the situation a decade ago. A decade ago, financial services provided through the internet were only available to the higher section of the society. It was not that there was any barrier by the regulator, but that the cost was too high for many in society to bear. This changed, even so, in a relatively short period of time. Thus, what were the catalysts that torched and accelerated this meteoric rise in the adoption of digital payments in India over the last ten years?

This research plans to decipher the complex factors and forces that have driven this remarkable shift toward digital payment. By going deep into the data and trends, we aim to shed light on the pivotal junctures and policy decisions that have propelled India into the vanguard of digital payment adoption. In this study, we examine digital payments as they evolve, are adopted, and have ramifications in India's economy through careful analysis. As a result, we believe our research will contribute to a more in-depth debate on the future of financial transactions in this digital age by contributing to the larger discussion.

II. OBJECTIVE

To find out the current monthly trend in major digital payment methods in India, with reference to UPI, debit cards and credit cards.

To examine if the growth pattern of UPI and credit cards is associated with a decline in debit card transactions,

To study the growth of digital payment infrastructure such as POS terminals and UPI QR codes in India.

III. LITERATURE REVIEW

The landscape of the Indian financial sector has changed dramatically ever since digital payments became available throughout the nation. The change was not something that was achieved overnight but was a work of many years which gradually over a period of time modified the behaviour and preferences of Indian citizens.

Indian cashless payment infrastructure dates back to 1980 when the Central Bank of India introduced the first credit card to the country (Shanker, 2020). However, being cashless doesn't mean it was digital, as the internet itself began its journey in 1983 (McLean, 2022). Thus, before the widespread usage of the Internet, credit card transactions operated within a closed-loop system. This system involved consumers, merchants, and card issuers, exchanging carbon copy slips (*When Were Credit Cards Invented?*, 2023). This model was soon to be disrupted with the launching of the internet to the public. By enabling real-time transactions between merchants and customers, a more efficient exchange of information can be achieved. Moreover, it also granted more secure transactions, as physical documents were not switched.

The shift towards computerisation in India (WeSchool, 2017) gained momentum in 1988 when an RBI committee, chaired by Dr. C. Rangarajan, advocated for adopting computers in banking. Banks first began accepting information technology, only deploying single personal computers and then transitioning to Local Area Network (LAN) connectivity.

This Internet transformation attained a turning point in 1995 when Videsh Sanchar Nigam Limited (VSNL) made the Internet accessible to the general public (Syngal & Deb, 2020), marking the start of an Internet era in India. In 1997, the nation received its first online banking services made available by ICICI. This introduction step set the stage for a digital banking revolution. Today, almost all major banks in India provide electronic banking services, offering customers unprecedented convenience and access to financial services.

India got a major breakthrough in the field of its financial sector in year 2009. This was the year when two major players' financial intermediaries were introduced to the nation. The first was the National Payments Corporation of India (NPCI), which was then tasked with modifying and overhauling the ATM network throughout the country. The second was the Unique Identification Authority of India, headed by Nandan Nilekani. These two organisations laid the pillars for the fintech revolution, which paved the way for more inclusive financial services.

India's digital revolution took a significant leap forward with the unveiling of inexpensive internet services. In 2016, Reliance Jio launched its services, offering 4G data at unprecedented low prices. This led to a considerable increase in the number of internet users in India, reaching over 700 million by 2020.

Affordable internet coupled with the ever-expansion of smartphones has dynamically transformed the transactional behaviour of Indians. This development marked a critical juncture for India. As smartphones aren't just communication gadgets for many Indians but also their primary and also their first computing devices, unlike in the West. For millions of Indians, the smartphone was the first device that gave them the excess and exposure to the internet. With this integration of smartphones into the day-to-day life of Indians, it has revolutionised the way these portable electronic devices are used, innately placing mobile-based payments as the preferable option for a numerous array of transactions.

The expansion is not limited to a single section of society like previous closed-loop models. It is evidenced from the NPCI-PRICE study that digital payment had attained traction from different income groups, with UPI mostly valued for its immediacy, though user awareness and ease of use require attention (NPCI & PRICE, 2021). Thus, adoption of UPI should be understood not only as a technological change but also a behavioural shift.

The shift from traditional banking practices to the modern-day banking practices of digital finance in India. The combination of affordable internet access and smartphone penetration has made using digital technology easier. Making banking services more accessible and convenient for people through them. India's financial services future is forward-looking and digitally driven due to the ongoing evolution in the field of digital finance.

IV. DATA AND METHODOLOGY

This research paper uses monthly data from the RBI database on digital payment transactions. Because this was the only period where data to be used for analysis was made available, the data for analysis is from September 2020 to December 2023. It was crucial to select a base year for the analysis, which happened the first month after RBI released the data on UPI QR codes. Monthly percentage change in digital payment methods in relation to the base month was used for trend analysis. This helps us in getting the perspective on the evaluation of digital payment methods in India over the period.

A chart illustration was used to give a graphical representation of the data. The presentation of charts are in log value with a base of 10. This made the data visually accessible for understanding to a wide audience. The utilisation of line charts effectively conveyed fluctuations present in the data, enhancing clarity and interpretability. The paper also utilises simple linear regression to understand the fundamental data fluctuations of UPI on credit and debit cards.

V. RESULTS AND FINDINGS

Monthly Growth Trends in Payment System Indicators: Volume Analysis

1. **UPI's Exceptional Rise:** UPI for the given period showed an impressive growth rate. Beginning from 18,001.67 lakh units in volume in September 2020, which increased to an impressive 1,20,202.26 lakh by December 2023. This marked for an astonishing growth of 567.73% and a CAGR of 79.36%. This extraordinary surge of the UPIs indicates an overwhelming adoption of it as a favoured payment method in India.

2. **Credit Cards' Resilience:** Despite the dominance of UPI, Credit Card usage has displayed a steady and noteworthy growth pattern. Beginning at 1,486.71 lakh units in September 2020, it progressively climbed to 3,215.00 lakh in December 2023, reflecting a substantial growth of 116.25% and a CAGR of 26.75%. This resilience showcases the continued relevance and trust in Credit Cards within the digital payment landscape.

3. **Debit Cards' Decline:** Unlike the UPI and Credit Cards, which have risen, Debit Card transactions have seen a decline in volume. Commencing at 3,507.81 lakh units in September 2020, the usage diminished to 3,507.81 lakh units in December 2023, reflecting a decline of 49.59% and a CAGR of -19.01. Indicating a tangible shift away from Debit Cards towards different payment methods.

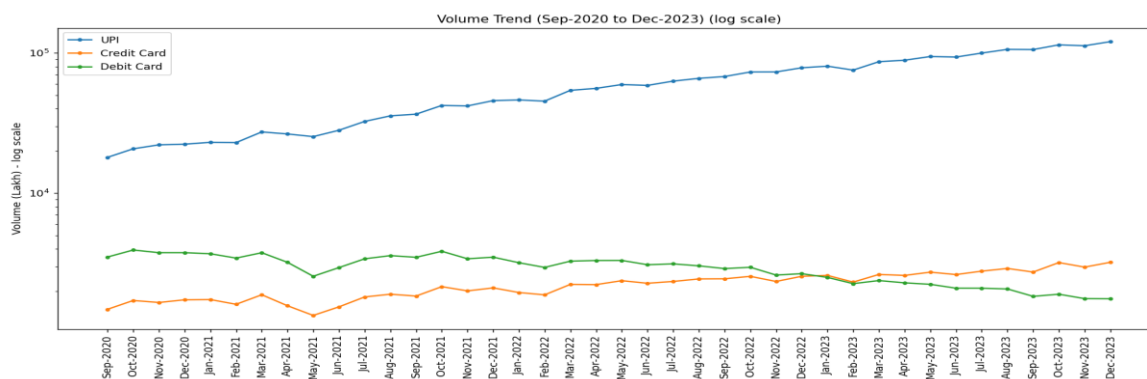


Fig 1. Payment System Indicator in Volume

Monthly Growth Trends in Payment System Indicators: Value Analysis

1. UPI's Ascendancy: The Unified Payments Interface (UPI) has grown remarkably during this period. Starting at ₹3,29,032 crore in September 2020, it rose consistently to ₹18,22,949 crore by December 2023, marking an impressive growth of 454.03% and a CAGR of 69.35%. This emphasises the significant shift towards UPI as a preferred payment method in India.

2. Credit Cards' Steady Increase: Credit Card transactions, though at a lower volume compared to UPI, have displayed consistent growth. Starting at ₹51,134 crore in September 2020, it increased to ₹1,65,119 crore by December 2023, indicating steady growth of 222.92% and a CAGR of 43.43%. Credit Cards have maintained their relevance as a digital payment method.

3. Fall in Debit Card Usage: Debit Card transactions fluctuated during the period. Starting at ₹55,366 crore in September 2020, they declined to ₹47,935 crore by December 2023, a change of -13.42% and a CAGR of -4.34%. This decline suggests a preference for other payment methods and calls for strategies to revive Debit Card usage.

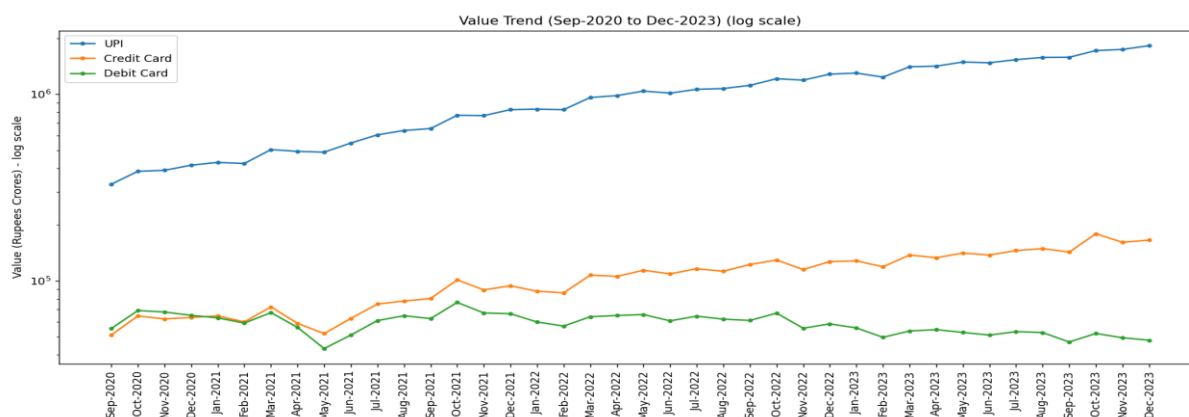


Fig 2. Payment System Indicators in Value

Monthly Percentage Fluctuations in Payment Infrastructures

Payment Infrastructure has shown a continuous increase in both the number of POS Terminals and UPI QR codes during this period. This development suggests the increasing readiness of businesses to accept digital payments in both card and UPI mode.

1. Continuous UPI QR Adoption: The number of UPI QR codes has consistently grown from 604.07 lakh in September 2020 to 3,170.66 lakh by December 2023, with a total growth of 424.88% and a CAGR of 66.55%. This shows the increasing favour and comfort of UPI-based payments, both by consumers and merchants alike.

2. POS Terminals' Gradual Increase: The number of POS Terminals has also exhibited a steady increase, from 44.23 lakh in September 2020 to 85.67 lakh in December 2023, with a total growth of 93.68% and a CAGR of 22.53%. This growth reflects the ongoing deployment of POS infrastructure, enabling card-based payments.

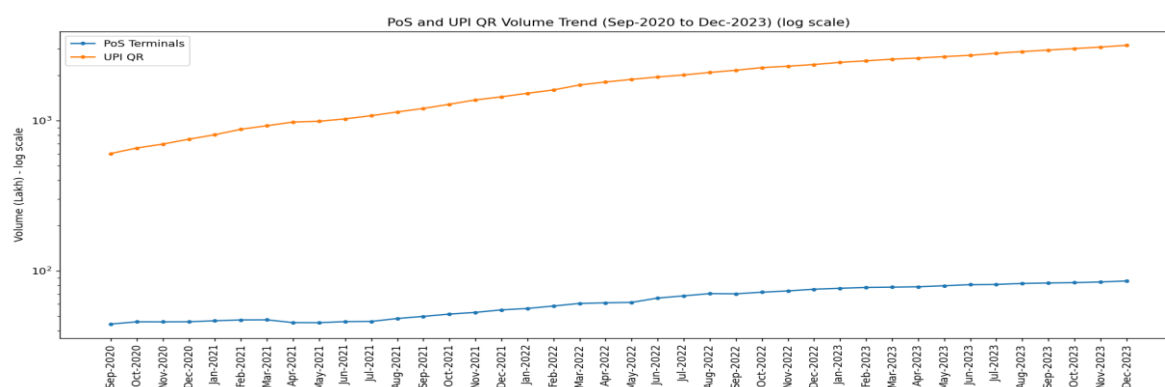


Fig 3. Payment Infrastructure Indicators

Debit Card Volume Share Vanquished by UPI and Credit Card Surge

UPI and Credit card volumes increased continuously throughout the period, and on the other side Debit card was on a decline. Thus, it may be possible that debit card share was being eaten by new digital payment methods like UPI and at the same time it might be fueling the growth of credit cards. To find out if the statement holds any truth to it, simple linear regression was employed.

The results statistically confirmed our hypothesis that an increase in UPI volume boosts the usage of credit cards. It showed an R^2 value of .923 with a positive association of 0.376, meaning a 1% rise in UPI is associated with roughly a 0.37% rise in credit card volume. On the other hand, there was a negative association between UPI and debit cards of -0.347, with an R^2 value of 0.689, implying a 1% increase in UPI causes debit card volume to decline by 0.34%.

Debit Card Value Share Crushed by UPI and Credit Card Increase

The value of UPI and Credit card transaction are continuously increasing during the period and on the other side Debit card growth was somewhat lacklustre. Thus, there is a possibility that debit card share was being taken in by other digital payment methods, i.e., UPI and credit cards. To find out if the hypothesis holds any truth to it, multiple regression was employed.

The results statistically confirmed our hypothesis that an increase in UPI value boosts the usage of credit cards. It showed an R^2 value of .959 with a positive association of 0.685, meaning a 1% rise in UPI is associated with roughly a 0.68% rise in credit card value. On the other hand, there was a negative association between UPI and debit cards of -0.106, with an R^2 value of 0.176, implying a 1% increase in UPI causes debit card value to decline by 0.10%.

VI. CONCLUSION

The journey of India into the world of digital payments is a case of rapid acceptance and transformation. This is revealed by the remarkable rise of UPI, which has emerged as a dominant force in the Indian payment landscape. This is reflected in the growth of 567.73% in volume and 454.03% in value over its base month. Credit Cards, though with lower volume, have presented steady growth, underscoring their continued relevance with a 222.92% increase in value. On the contrary, debit cards witnessed a fall in both in value and volume, showing a shift of the people in its usage towards an alternative payment method. This fall was a result of the massive surge in both UPI and credit cards.

The growth in payment infrastructure, such as POS Terminals and UPI QR codes, complements this narrative. It showcases the readiness of businesses to welcome digital payments and the convenience of UPI for consumers and merchants. The journey of India's digital payments is motivated by technological advancements, customer convenience, and regulatory reforms. The continuous evolution represents of a more accessible, efficient and secure for financial transaction system in India, with digital payments playing an important role.

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