RESEARCH ARTICLE

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Digital Banking in India: An Analysis of Trends, Challenges and Opportunities

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Abstract

The banking industry plays a pivotal role of promoting economic development by ensuring seamless transactions and financial within the various sectors of the economy. A revolutionary development in the field of banking sector was led by the creation of electronic banking. Fulfillment of dynamic consumer requirements through reliable methods of virtual banking handled financial transactions more efficiently.

Our study aims to analyse the key trends in e- banking in India, highlighting both the impediments and opportunities that shape its growth. A firm understanding of the changing environments becomes essential to improve the services provided by financial institutions. Our study is analytical in nature and relies on secondary data sources to explore the developments in digital banking. We examined various aspects of digital banking, providing factual understandings into the sector's efforts to enhance accessibility, security and consumer experience.

This paper looks into the difficulties faced with cyber attacks, regulation and lack of digital literacy. We also explored the possible advantages like financial inclusion, technological innovation and government support. By evaluating these aspects, the current study provides a clear perspective on the future of internet banking in India.

Keywords: Accepted Aadhaar Payments Bridge System (APBS), Credit and debit transactions, Digital Banking, Aadhaar Payments Bridge System (APBS), ATM, National Automated Clearing House (NACH), National Electronic Funds Transfer (NEFT), Prepaid Payment Instruments (PPI), Real Time Gross Elements-RTGS, UPI.

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Introduction:

A noticeable leap has been seen in Indian financial services over the years, mostly because of fast technological progress and the broad take up of many digital services. In the 21st century, digital banking made it possible for the products, processes, and day to day activities of regular banking to be reachable and provided through digital platforms. This service sort of links financial institutions with customers, giving convenience and a more tailored financial experience, in a way that feels almost smoother than before.

Back in the late 1980s, the traditional banking culture was still strong across India, even though ATM adoption was limited. After that, banks started introducing computerization on a small scale, which actually became the early sign of digitization in this sector. When the economy opened up in the 1990s, private banks began using more advanced technologies, this basically set up the base for upcoming services. Then in the late 1990s, ICICI bank came forward with Digital Banking operations for the first time so that its customers could complete banking transactions from their own place of comfort.

Moving into the early 2000s, there was a more

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major turn, mainly because electronic transfer methods like NEFT and RTGS were introduced. In the 2010s, a mobile revolution wave arrived, and it was also the time when mobile banking applications rose quickly, helped by the availability of low-cost mobile internet. The introduction of Aadhar played a key role in improving the financial inclusiveness of payment systems. Afterward, there was less cost, better convenience, and more easy access, so the system could serve huge numbers of people and organizations across India.

Around the same period, the establishment of the Unified Payment Interface (UPI) supported the whole payment process, making it simpler, less time consuming and easier to use. To help areas that were still under served, the government-initiated programs suc

Literature Review

Pooja Yadav et al. (2023) carried out a descriptive study on the transitioning of traditional banking to digital banking. Emphasizing on the expansion of modern technologies in the financial sector along with its influence on a cashless economy accompanied by paperless transactions. The study also discusses recognizing the obstacles such as cyber security risk to technological infrastructure constraints denoting it as a chance for creativity and cooperation to overcome these problems to achieve the full potential of digital banking in India.

Sharma S, Sharma R, Kayal G, and Kaur, J. (2022) examined the behavioral intention behind the adoption of major digital banking channels by analyzing seven bivariate relationships, including cost, facilitating conditions, perceived security, perceived ease of use, perceived usefulness, self-efficacy and innovativeness, within a global framework. Using a meta-analysis approach, the study proposes that even geographical location is instrumental in creating heterogeneity across global contexts. The researcher's findings suggest that global strategists should consider location specific variations when developing international policies and introducing new digital products.

P. Revathi (2019) investigated the digital banking challenges that prevent its wide usage in India. The author identified customer hesitation stemming from unfamiliarity with digital platforms and underlying concerns related to safety and confidentiality of financial data. Revathi further identified critical issues like absence of transparency in service charges, persistent technical glitches resulting in a general decline of customer trust. It also highlighted the necessity for banks to address these specific issues to establish greater confidence and facilitate a smoother transition to digital banking.

Sharma and Piplani (2017) analyzed the increasing acceptance of digital banking in India. In their study they suggested ways to improve digital services based on the problems faced by Indian banks. They examined how transactions happen across different online payment systems using secondary data. This study helped the researchers in identifying challenges and opportunities that banks can improve in their digital services.

Rachna Kalsan (2020) study focused on the impact of digital banking on adult users in India and its association with the rise of mobile phone usage. This research identifies that customer expectations are shifting towards digital services, with a growing preference for e-banking solutions.

Objectives

- To examine the digital banking trends in India.
- To understand the challenges of digital banking.
- To assess opportunities in the Indian digital banking system.

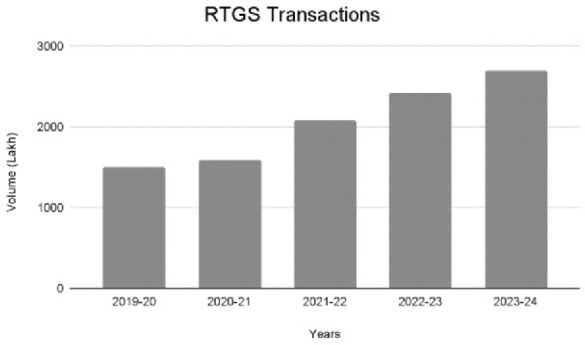
Methodology

This research is based solely on secondary sources. The data has been gathered over a period of five years (2020 to 2024). Data sources are RBI bulletins, journal articles about digital banking, and related websites.

Trends in Digital Banking in India

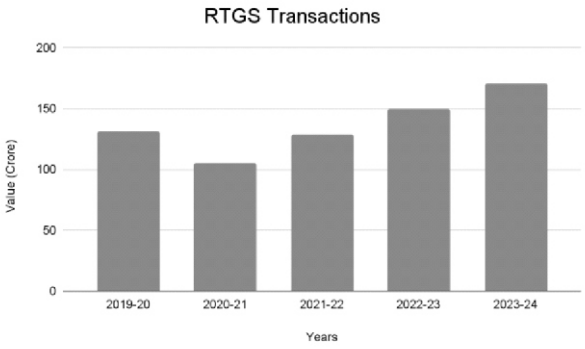
Real Time Gross Settlement-RTGS

Established by the Reserve Bank of India, The Indian RTGS system, became operational on 26th March 2004. In RTGS, transfer of fund takes place electronically. This is meant to facilitate high-value transfers, and the minimum transfer limit of this system is 2 lakhs.



Source: Official website of RBI

Figure 1: RTGS Transactions (Volume)



Source: Official website of RBI

Figure 2: RTGS Transactions (Value)

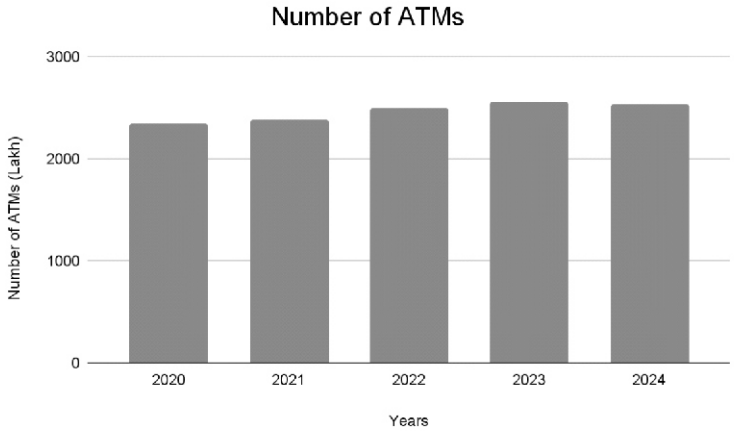
Figure 1 indicates that the average annual growth in RTGS transaction volume over five years is 16.06%. This volume consistently increased each year: 5.63% in 2020-21, 30.58% in 2021-22, 16.75% in 2022-23 and 11.29% in 2023-24.

In Figure 2, The average annual growth in RTGS transaction value from 2020 to 2024 is 8.22%, but this growth fluctuated. Specifically, a decrease of 19.48% is seen in 2020-21, followed by increases of 21.84% in 2021-22, 16.55% in 2022-23 and 13.97% in 2023-24.

ATM or Automated Teller Machine

Introduction of ATMs or Automated Teller Machines in India was done in the later years of 1980s. An ATM allows customers to perform transactions on their banking account without dealing directly with the bank employees. ATM

systems include such features as money transfers , withdrawals, deposits, and inquiry about account's balances.



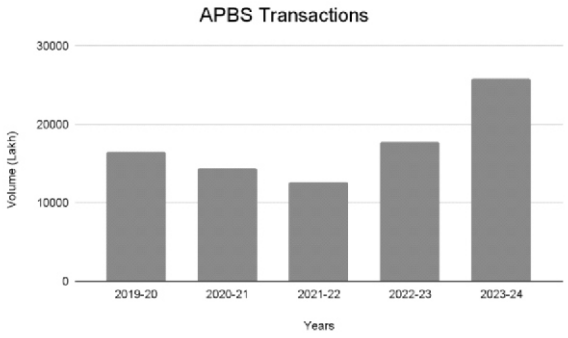
Source: RBI

Figure 3: Number of ATMs

In Figure 3, over the span of five years, there is a meagre fluctuation ATMs number. During the first three years, there is a slight increase of 1.81% in 2021, 4.46% in 2022 and 2.44% in 2023, followed by a decrease of 0.74% in 2024.

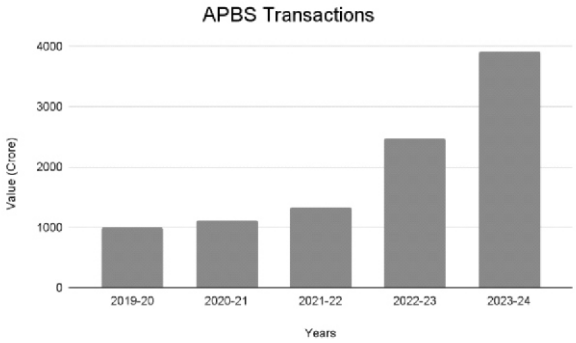
Aadhaar Payments Bridge System (APBS)

The APBS, is a novel payment channel, was developed by NPCI. The system uses Aadhaar number as the main identification parameter to facilitate payments from the government to its target beneficiaries. The scheme holds great importance in the delivery of various social benefits, grants, and pensions to a large populace especially those residing in rural areas.



Source: Official website of RBI

Figure 4: APBS Transactions (Volume)



Source: Official website of RBI

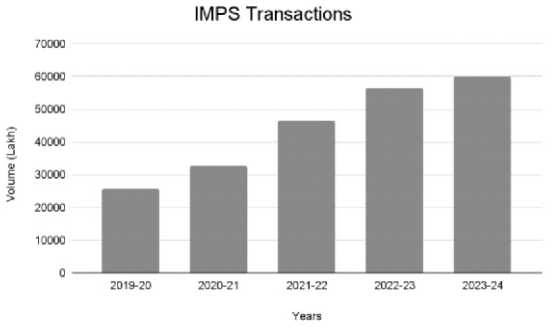
Figure 5: APBS Transactions (Value)

In Figure 4, over the five-year period, the number of ABPS transactions volume fluctuated significantly. A downward trend is seen in the first two years, with a decrease of 12.76% in 2020-21 and 12.52% in 2021-22. However, this trend reversed in the following years, with a sharp increase of 41.84% in 2022-23 and 45.17% in 2023-24. Overall, the average annual change over the period resulted in a 15.43% increase.

In Figure 5, the APBS transaction value over the five-year period was a consistent increase in values each year, with varying growth rates. The increase was 12.07% in 2020-21, followed by a 20.13% rise in 2021-22. A significant jump occurred in 2022-23, with an 85.64% increase and growth remained high at 57.85% in 2023-24. On average, the annual increase was 43.92%, indicating strong overall growth.

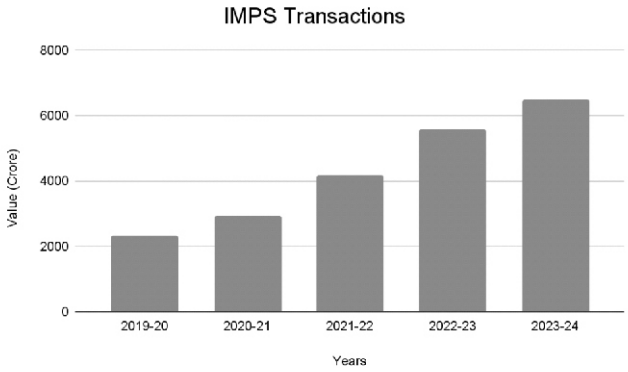
Immediate Payment Service (IMPS)

The Immediate Payment Service (IMPS) is a real time inter-bank fund transfer system which works round the clock. It is an initiative of NPCI in India to provide instantaneous transfer of fund from one account to another through cell phones, internet banking, or ATMs.



Source: Official website of RBI

Figure 6: IMPS Transactions (Volume)



Source: Official website of RBI

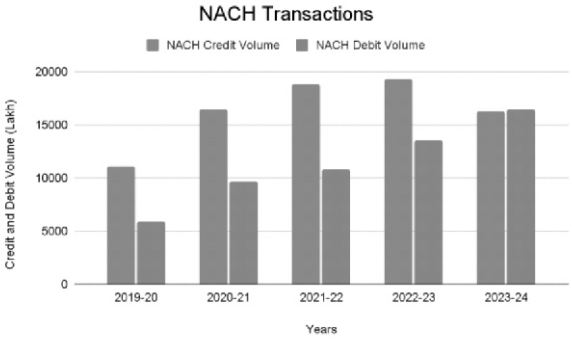
Figure 7: IMPS Transactions (Value)

In Figure 6, the IMPS transaction volume over the five-year period, there was a steady increase in values each year, though the rate of growth varied. There was an increase of 27.11% in 2020-21 followed by the highest increase occurring in 2021-22, with a 42.22% rise. Growth slowed to 21.25% in 2022-23 and further to 6.23% in 2023-24. On average, the annual rise during this period was 24.20%, indicating overall positive growth but with a declining growth rate in recent years.

In Figure 7, the volume of IMPS transactions over the five-year period, there was a consistent increase in values each year, though the growth rate varied. There was an increase of 25.84% in 2020-21 followed by the highest increase occurring in 2021-22, with a 41.80% rise, followed by 33.91% in 2022-23. Growth slowed to 16.30% in 2023-24, indicating a declining trend in the rate of increase. On average, the annual growth during this period was 29.46%, reflecting strong overall expansion despite a slowdown in the most recent year.

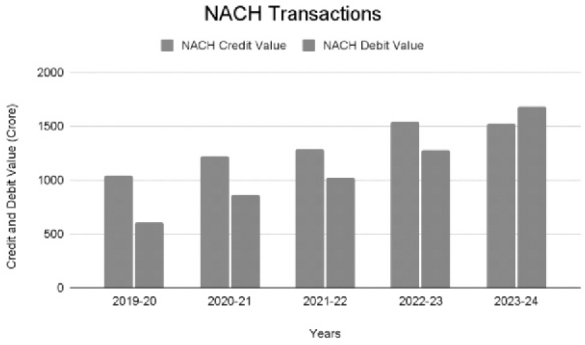
National Automated Clearing House (NACH):

The NACH system stands as the evolution of the ECS system, as it is an upgraded clearing process. The NPCI has introduced this system as a clearing system capable of handling a large volume of low-value transactions made on a recurring and frequent basis and which will provide credit and debit facilities for corporates, banks and financial institutions.



Source: Official website of RBI

Figure 8: NACH Transactions (Credit and Debit Volume)



Source: Official website of RBI

Figure 9: NACH Transactions (Credit and Debit Value)

In Figure 8, the volume of NACH transactions over the five-year period, credit volume and debit volume showed different growth patterns:

- Credit Volume saw the highest increase in 2020-21 (48.33%), followed by a slower rise in 2021-22 (13.93%) and 2022-23 (2.66%). However, in 2023-24, it declined by 15.73%, leading to an overall average annual increase of 12.30%.

- Debit Volume experienced strong growth throughout the period. The highest rise was in 2020-21 (65.11%), followed by consistent increases in 2021-22 (11.50%), 2022-23 (25.55%) and 2023-24 (21.65%). An average annual increase of 30.95%.

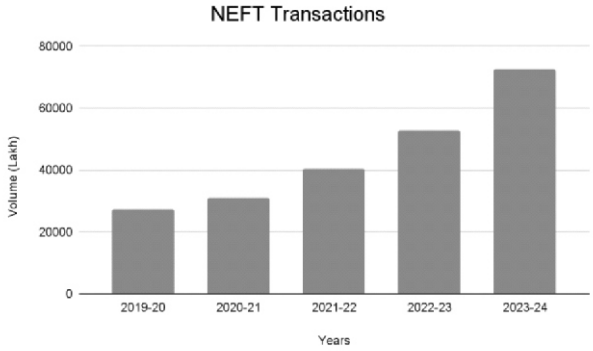
In Figure 9, NACH transactions values over the five-year period, credit value and debit value showed different growth patterns:

- NACH credit value showed moderate growth, there was an increase of 17.30% in 2020-21 followed by the lowest in 2021-22 (5.36%) and the highest increase in 2022-23 (20.30%). However, in 2023-24, it declined slightly by 1.08%, leading to an overall average annual increase of 10.47%.

- NACH debit value consistently grew each year, with the highest rise in 2020-21 (42.63%) and steady increases in 2021-22 (19.10%), 2022-23 (24.70%), and 2023-24 (31.13%). This resulted in an average annual increase of 29.39%, indicating strong and consistent growth.

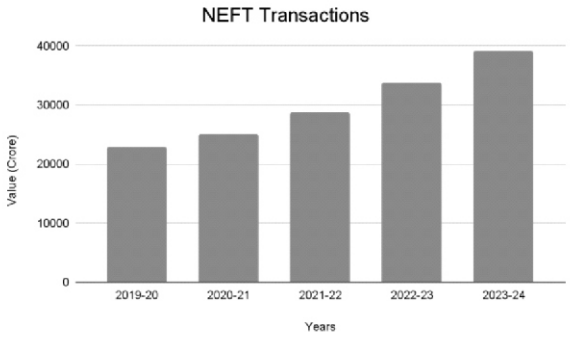
National Electronic Funds Transfer (NEFT)

The National Electronic Fund Transfer (NEFT) service is an electronic method for transferring funds in India and is supervised by the Reserve Bank of India (RBI). In essence, NEFT is a national-level electronic fund transfer scheme that helps carry out transfers from one to another person in India and provides a more secure way compared to conventional methods of transferring funds.



Source: Official website of RBI

Figure 10: NEFT Transactions (Volume)



Source: Official website of RBI

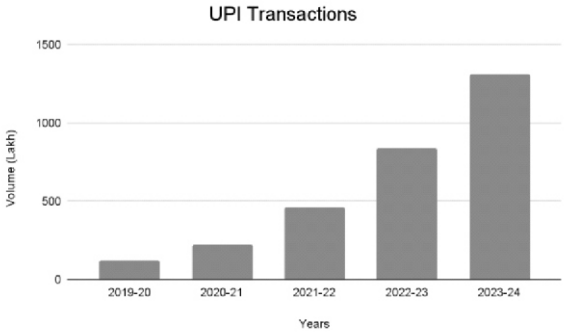
Figure 11: NEFT Transactions (Value)

In Figure 10, NEFT transaction's volume was over the five-year period, Volume consistently increased each year. The smallest rise was in 2020-21 (12.69%), followed by significant increases in 2021-22 (30.65%), 2022-23 (30.79%) and the highest growth in 2023-24 (37.45%). On average, the annual increase was 27.89%, indicating strong and accelerating growth.

In Figure 11, the value of NEFT transactions over the five-year period, the value steadily increased each year. The smallest rise was in 2020-21 (9.52%), followed by an increase in 2021-22 (14.30%) and the highest growth in 2022-23 (17.39%). On average, the annual increase was 14.32%, indicating a consistent growth.

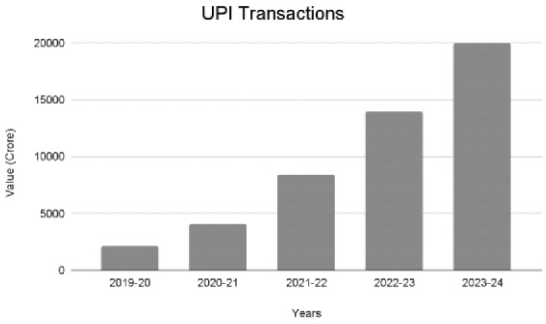
Unified Payments Interface or UPI

Unified Payments Interface (UPI) was developed by NPCI in 2016 to provide an instant payment method through which money can be transferred from one account to other immediately using mobile phones.



Source: Official website of RBI

Figure 12: UPI Transactions (Volume)



Source: Official website of RBI

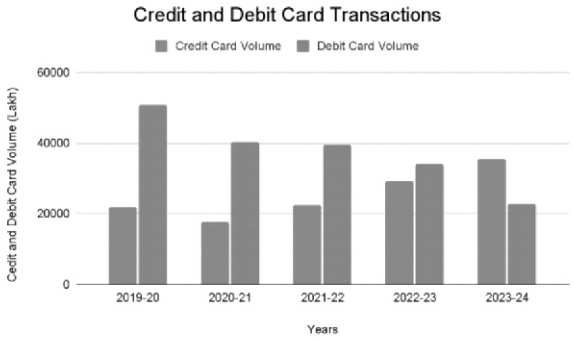
Figure 13: UPI Transactions (Value)

In Figure 12, UPI transaction's volume over the five-year period, volume showed rapid growth. Initially there was an increase in 2020-21 (78.38%), followed by the highest increase occurring in 2021-22 (105.80%), followed by a dipping increase 2022-23 (82.16%). The growth of volume slowed to 56.64% in 2023-24. On average, the annual increase was 80.74%.

In Figure 13, UPI transaction's value over the five-year period, the value showed a significant increase in 2020-21 (92.50%) and the highest growth was in 2021-22 (105.08%). On average, the annual increase was 76.66%, reflecting strong overall expansion despite a gradual decline in growth rate.

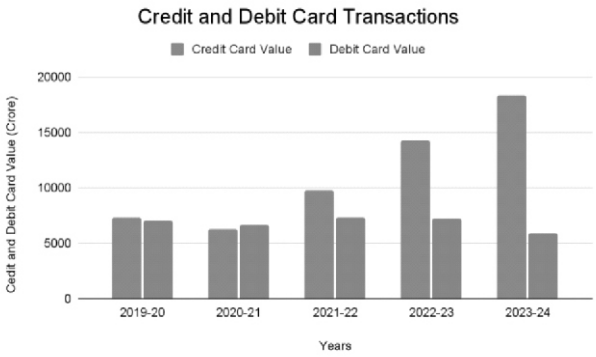
Credit Cards and Debit Cards

Debit cards as well as credit cards have become common place in modern-day transaction scenarios. Debit cards offer instant availability of funds from the customer's accounts with withdrawals being made from the available balance only. On the other hand, credit cards offer an allowance for the customers to use their credit and pay the remaining balance later. The main advantage of these cards is that they allow transactions to be made without using money.



Source: Official website of RBI

Figure 14: Credit and Debit Transactions(Volume)



Source: Official website of RBI

Figure 15: Credit and Debit Transactions (Value)

In Figure 14, the volume of both card transactions over the five-year period, credit card volume and debit card volume showed different growth patterns:

- Credit card volume initially declined in 2020-21 (18.98%) but recovered with consistent growth in the following years, starting with an increase of (26.91%) in 2021-22, peaking at 30.12% in 2022-23 and maintaining a 22.18% increase in 2023-24. On average, credit card volume grew by 15.07% annually.

- Debit Card Volume consistently declined each year, with the most significant drop in 2023-24 (33.12%). The overall trend was negative, with an average annual decrease of 17.23%, indicating a shift away from debit card usage.

In Figure 15, the value of both card transactions over the five year period, credit card value and debit card value showed different growth patterns:

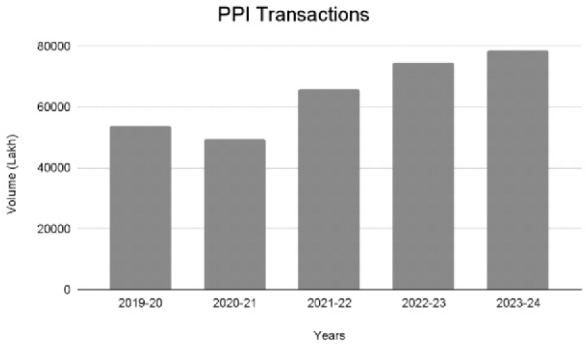
- Credit card value initially declined in 2020-21 (13.75%) but rebounded significantly in 2021-22 (54.13%) and continued growing in 2022-23 (47.41%) and 2023-24 (27.85%). On average, it increased by 28.91% per year, indicating a strong upward trend.

- Debit card value showed a declining trend with the most significant drop in 2023-24 (17.72%). Although there was a slight increase in 2021-22 (10.41%), the overall trend remained negative, leading to an average annual decrease of 3.69%.

Prepaid Payment Instruments (PPI)

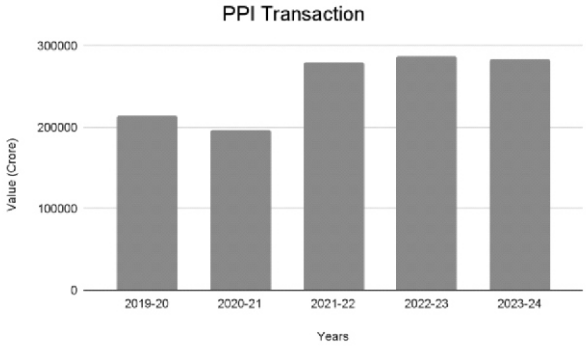
PPIs represent financial products through which consumers can buy goods and services, transfer money, pay for financial services and remit money using value stored in the financial product. PPIS

help consumers load money onto the products without having to withdraw money directly from their bank accounts. Gift cards, pre-paid cards, and mobile wallets fall under PPIs, which also help consumers avoid spending more than necessary.



Source: Official website of RBI

Figure 16: PPI Transactions (Volume)



Source: Official website of RBI

Figure 17: PPI Transactions (Value)

In Figure 16, the PPI transactions over the five-year period, volume showed consistent growth with the highest increase in 2023-24 (37.45%), followed by 2022-23 (30.79%) and 2021-22 (30.65%). The lowest increase occurred in 2020-21 (12.69%), but the overall trend remained strongly upward. On average, the annual growth rate was 27.89%, indicating steady and accelerating expansion over time.

In Figure 17, the value of PPI transactions over the five-year period, value consistently increased each year. The highest growth occurred in 2022-23 (17.39%), followed by 2023-24 (16.06%) and 2021-22 (14.30%). The lowest increase was in 2020-21 (9.52%) but the overall trend remained positive. On average, the annual growth rate was 14.32%, indicating steady and sustained expansion.

Challenges faced in Digital Banking

Cyber Security and Privacy:

India stands out among the most affected nations in terms of the incidence of cyberattacks in a global perspective. With technological advancement being adopted by the current generation, many people are transacting their affairs online leading to a great number of cyberattacks and data breaches. Consumers continue expressing their worry about their security and privacy regarding both personal and financial information. Based on a report by Kantar and the Internet and Mobile Association of

India (IAMAI) in 2024, around 13% of India's population shies away from using the internet for its privacy concern.

Fraud Cases:

There has been a remarkable increase in fraud in relation to digital banking. The report on "Trend and Progress of Banking in India 2023-24" by the Reserve Bank of India (RBI) indicated that internet fraud cases topped in 2023-24 in all banks. Out of the fraud cases recorded, private sector banks (PVBs) were reported to have the highest cases constituting 67.1 percent of all the cases. With reference to monetary loss, public sector banks (PSBs) were the biggest.

Digital Literacy and Language Barriers:

India has a considerable disparity in the level of literacy as well as access to digital facilities. In the rural setting, there are customers who are less engaged with digital facilities owing to their age. According to the report by Kantar-IAMAI in 2024, 21 percent of rural citizens have difficulty comprehending and utilizing the digital facility. Besides, provision of services in English can be a problem to those people who cannot understand or read in English.

Accessibility:

Accessing of digital banking facilities implies availability of the internet together with electronic equipment including smartphones, computers, laptops or tablets.

Technical Problems:

Banks and consumers rely extensively on digital platforms for transactions regardless of how small the amounts are. System breakdowns or bug problems at times of high traffic may lead to transaction failure and losses for banks..

Opportunities in Digital Banking

Security Technologies:

Multi-factor authentication could be used to prevent cybercrimes by requiring two or more than one credential for access purposes; biometric technologies like fingerprints, face, and irises are some of them. Another technology would be OTP, which refers to one-time passwords to facilitate transactions, password reset, and logins.

Multilingual Digital Banking Website and Apps:

Considering that there are many languages spoken in India, 121 to be precise, and 22 official languages in total according to the Eight Schedule of the Constitution, the design of websites and apps of banks must involve using several regional languages. Voice-based and chatbot communication will further help reach illiterate people.

Digital Literacy Programs:

This solution to low adoption rates might be carried out via cooperation with local NGOs, community centers or self-help groups. In rural areas, local-language speaking digital kiosks will help people familiarize themselves with the process of using online banking services.

Affordable Internet Access:

According to data obtained from the 2024 Kantar and Internet and Mobile Association of India (IAMAI) report, 16% of people living in India do not have the financial resources to access the internet. Thus, affordable packages developed by the government and private sectors would be beneficial. Furthermore, BharatNet could contribute to the expansion of broadband networks in rural territories.

Transparent Communication:

In addition to being unaffordable, another factor contributing to low adoption rates might be the lack of transparency about hidden transaction charges. That is why it is important to create greater awareness about online banking by clearly explaining its processes, benefits, and potential risks. Improving users' understanding can help them make informed decisions and use digital banking services safely and confidently.

Conclusion

Digital banking has significantly transformed the Indian banking sector by introducing innovative payment systems and banking services. Technological advancements, along with supportive government initiatives, have played a major role in modernizing banking practices across the country. Digital payment platforms such as the Unified Payments Interface (UPI), National Electronic Funds Transfer (NEFT), Immediate Payment Service (IMPS), and mobile wallets have encouraged the adoption of cashless transactions and improved the efficiency of financial services.

Despite this remarkable progress, the banking sector continues to face several challenges. Cybersecurity threats, limited digital literacy among sections of the population, and inadequate digital infrastructure in rural and underserved areas remain significant concerns. Addressing these challenges requires stronger security measures, continuous technological improvements, and awareness programmes that educate users about the safe and effective use of digital banking services. Banks should also provide clear information about the range of digital services available so that customers can select those that best meet their needs.

Looking ahead, digital banking is expected to play an even greater role in the growth of the Indian banking industry. Continued technological innovation, supportive government policies, and increased digital awareness among users are likely to make financial services more accessible, secure, and convenient. With sustained efforts to strengthen infrastructure and enhance customer awareness, digital banking has the potential to promote greater financial inclusion and improve the overall banking experience for individuals and businesses across India.

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