

# Emerging Role of Recent Technological Developments in Indian Banking Sector

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**Abstract:** Indian banking system touches the lives of millions of people and it is growing at a fast pace. Banking industry in India is facing number of challenges like changing needs and perceptions of customers, new regulations from time to time and great advances in technologies. The pressure of meeting these challenges have compelled banks to change the old ways of doing business. The research paper focuses on how the technology has transformed the face of banking in India. India's banking system has seen some major financial innovations in the past decades which lead to tremendous improvements in banking services and operations. The various innovations in banking and financial sector are ECS, RTGS, EFT, NEFT, ATM, Retail banking, Debit and Credit cards, free advisory services, online banking, mobile banking and many more value added products and services. This paper also highlights recent in technological benefits to the Indian banks and challenges of changing banking trends. Banks are investing heavily in adoption of these innovations. The need of hour is to design such a system that encourages the efficiency of investment in innovations and widens the gap between revenues and costs involved with reference to technological up gradation.

**Keywords:** Indian Banking, Financial Innovations, Technological Changes, Challenges

## 1. Introduction

In the 1990s, the banking sector in India saw greater emphasis being placed on technology and innovation. Banks began to use technology to provide better quality of services at greater speed. Internet banking and mobile banking made it convenient for customers to do their banking from geographically diverse places. Banks also sharpened their focus on rural markets and introduced a variety of services geared to the special needs of their rural customers. Banking activities also transcended their traditional scope and new concepts like personal banking, retailing and bank assurance were introduced. The sector was also moving rapidly towards universal banking and electronic transactions, which were expected to change the way banking would be perceived in the future

### 1.1 Origin of online banking in India

The Indian banking system has undergone significant technological transformation since the 1980s. The Rangarajan Committee report in 1980s was the first step

towards computerization of banks. Banks started exploring the idea of "Total Bank Automation (TBA)", although titled Total Bank Automation, "TBA was in most cases confined to branch automation. It was only in the early 1990s that banks started thinking about tying – up separate branches together to facilitate information sharing At The same time, private banks entered the banking arena with radically different strategies. The private banks provided huge budgets to the adoption of technology to provide a whole new range of financial products and services at minimal costs. In India, from the early 1990's electronic banking is gaining popularity as an important distribution channel to provide banking services. This direction is being taken by the banks to differentiate their services to the consumers to gain their loyalty. In one's view, India will likely see golden period of the internet usage between 2013 and 2018 with incredible growth opportunities and popular growth of e-Commerce adoption. A recent study conducted by Sandeep Aggarwal, Founder CEO of shop clues.com) found that India among the top five countries with highest internet usage

**Table 1:** Penetration of Internet Users by the Leading Nations as On 31st March 2023

Country	Internet users	Penetration (% of population )	% of world users	Population
China	538,000,000	40.1	22.4	1,343,239,923
United states	245,203,319	78.1	10.2	313,847,465
India	137,000,000	11.4	5.7	1,205,073,612
Japan	101,228,736	79.5	4.2	127,368,088
Brazil	88,494,756	45.6	3.7	193,946,886
Total world	2,405,518,376	34.3	100	7,017,846,922

**Source:** World Internet User Statistics, June 30, 2023

### 1.2 Significance of the study

The use of Information Technology in all spheres of financial and banking sectors is a deep reality. The sector has enabled the banking sector to go beyond its traditional role and is now playing an increasingly important role in its key areas of operation as securitization, risks preference and

liquidity among others to which IT helps in a big way. It has assumed such high levels that it is no longer possible for banks to manage their IT implementations on a standalone basis. With I.T. revolution, banks are increasingly interconnecting their computer systems not only across branches in a city but also to other geographic locations which high-speed network infrastructure and setting up local

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areas and networks are now exposed to a growing number. The customers have high expectations. They demand instant, anything and anywhere banking facilities. Though Reserve Bank of India has formulated many policies on adoption of I.T. in the overall working of the commercial banks in India, yet there is an urgent need to address the issues involved in this respect to compete with the banks at national level. As such there is a great need to focus more on this aspect. The present study helps a lot in this regard.

**1.3 Objectives of the study**

- To study on recent technological development of Indian banking sector
- To study the challenges faced by Indian banks in the changing scenario

**2. Methodology**

The present study is based on the secondary data collected from different journals, magazines, sites and published data from various issues of RBI and different Public sector banks. Various studies on this subject have also been referred in this study. The heads and other functionaries have also been contacted personally to collect the required data for this study.

**3. Technological development in Indian banks**

Over the years, the Reserve Bank has laid special emphasis on technology infusion in the day to day operations of banks. Technology, apart from increasing the efficiency of banking services, it is expected to boost the ongoing process of financial inclusion emphasized by the Reserve Bank of India. In recent years, increase in the number of off-site ATMs in various locations as well as use of mobile phones for delivering banking technology has further facilitated banking outreach in remote areas. The IT vision document, 2017-23 of the Reserve Bank of India sets out the road map for implementation of key IT applications in banking with special emphasis on seamless delivery of banking services through effective implementation of Business Continuity

Management (BCM) information security policy and Business Process Re-engineering (BPR).

Imperative to the greater adoption of electronic payments are speed, efficiency and security, as also creating trust and safety of operations in the minds of the users. In line with its vision of encouraging electronic payments in the country and achieving a less-cash society, the Reserve Bank continued its endeavors in making the payment systems safer and more secure, gearing its policies towards addressing risks, if any, in the payment systems. Several initiatives for infrastructure enhancement during the year included introduction of white label ATMs, cardless cash withdrawal facility for unbanked persons, introduction of next generation RTGS and enhancing the capacity of the NEFT system for larger volumes and efficiency. The trend of greater acceptance of electronic payments over paper cheques by the general public received further boost during the year.

**4. Different stages of improvement of technological development in Indian banks**

Developments in the field of information technology strongly support the growth and inclusiveness of the banking sector by facilitating inclusive economic growth. IT improves the front end operations with back end operations and helps in bringing down the transaction costs for the customers. The important events in the field of IT in the banking sector in India are:

- Arrival of card-based payments- Debit/ Credit card in late 1980s and 90s.
- Introduction of Electronic Clearing Services (ECS) in late 1990s.
- Introduction of Electronic Fund Transfer (EFT) in early 2000s.
- Introduction of RTGS in March 2004.
- Introduction of National Electronic Fund Transfer (NEFT) as a replacement to Electronic Fund
- Transfer/Special Electronic Fund Transfer in 2005/2006.
- CTS in 2007.

**Table 2:** Payment System Indicators - Annual Turnover

Items	Volume (million)			Value (Rs. Billion)		
	2021-22	2022-23	2023-24	2021-22	2022-23	2023-24
Systemically Important Financial Market infrastructures (SIFMIs) RTGS	55.0	68.50	81.10	539,307.5	676,841.0	734,252.4
Total Retail Electronic Clearing	512.5	694.1	1,108.3	20,575.3	31,881.1	47,856.3
ECS DR	164.7	176.5	192.9	833.6	1,083.1	1,268.0
ECS CR	121.5	122.2	152.5	1,837.8	1,771.3	2,492.2
EFT/NEFT	226.1	394.1	661.0	17,903.5	29,022.4	43,785.5
Immediate payment service	0.1	1.2	15.4	0.4	4.3	95.8
National automated clearing house	-	-	86.5	-	-	214.8
Total card payments	678.1	931.7	1,262.1	1,562.5	2,051.5	2,576.3
Credit Cards	320.0	396.6	509.1	966.1	1229.5	1539.9
Debit Cards	327.5	469.1	619.1	534.3	743.4	954.1
Prepaid payment instruments	30.6	66.1	133.9	62.0	78.7	82.4

**Source:** Report on Trends and Progress of Banking in India, RBI 2023-24

During 2023-24, the RTGS processed around 81 million transactions valued at `734trillion. As on April 30, 2024 the number of RTGS enabled bank branches stood at 109,506. As on April 30, 2024, the national electronic funds transfer

(NEFT) facility was available at 111,619 branches of 158 banks. During 2023-24, NEFT handled 661 million transactions valued at around `44 trillion. In March 2014, NEFT processed a record volume of 82.8 million

transactions During 2023-24 the electronic clearing service (ECS) debit-handled 193 million transactions valued at around `1,268 billion and ECS credit processed 152 million transactions valued at around `2,493 billion. With the gradual expansion of the regional electronic clearing service (RECS) operations, the volumes at many ECS centers have completely subsumed to RECS centers. The number of ECS centers now stands at 34 in addition to the 12 RECS centers in various centers and the national electronic clearing service (NECS) in Mumbai. During 2023-24, 509 million transactions valued at `1,539 billion were transacted through credit cards, while 619 million transactions valued at `954 billion were undertaken through debit cards. During the year, mobile banking services handled 95 million transactions valued at around `60 billion.

#### Information technology within the reserve bank

- **IT Sub-Committee (ITSC) to the Central Board:** ITSC was constituted to advise the Reserve Bank on its overall IT strategy, infrastructure, applications and security and to oversee the implementation of the recommendations of the IT vision document 2023-24. ITSC met twice during
- **Information security policy for the Reserve Bank:** The revised information security policy and related sub-policies have been approved by ITSC. The operational guidelines relevant to administer the policy were released in April 2024.
- **The electronic document management system (EDMS):** A steering committee to implement EDMS with an objective of organizing the documents in a systematic manner in electronic form has been formed. An approach paper for time bound implementation of EDMS has been prepared.
- **Enterprise knowledge portal (EKP):** The revamped EKP with advanced features including interactive functionalities to enhance knowledge sharing initiatives in the Reserve Bank was inaugurated in November 2013. It provides a more focused approach to knowledge sharing efforts in the Reserve Bank and has recorded increased level of visits by its staff.
- **Upgrading of the video conferencing (VC) system:** The work related to VC up gradation, which would *inter alia* provide for executive VC rooms at select locations, classroom VC facility in training colleges, high definition technology for better quality, video streaming facility and video-on demand facility has been rolled out at almost all identified locations within the Reserve Bank.
- **Perimeter security solution (PSS):** PSS aims to provide a mechanism to protect the information systems in the Reserve Bank from all threats/attacks from the external cyber world. The solution includes routers, switches, firewalls, and intrusion detection and prevention systems.
- **Information security operations centre (ISOC):** An advanced ISOC system to proactively detect security related incidents which have an impact on the Reserve Bank, other banks and the financial sector and manage and coordinate responses to such incidents is being implemented in the Reserve Bank.
- **Mail messaging solution (MMS):** The Reserve Bank's corporate MMS was reinforced with an advanced

archival solution to provide better access, storage and retrieval of mails to the users. With archival facility, it will be possible to retrieve any mail from MMS.

#### Recent technological developments in banking sector

- **Internet:** Internet is a networking of computers. In this marketing message can be transferred and received worldwide. The data can be sent and received in any part of the world. In no time, internet facility can do many a job for us.
- **Society for Worldwide Inter-bank Financial Telecommunications (SWIFT):** SWIFT, as a co-operative society was formed in May 2023-24 with 239 participating banks from 15 countries with its headquarters at Brussels. It started functioning in May 1977. RBI and 27 other public sector banks as well as 8 foreign banks in India have obtained the membership of the SWIFT. SWIFT provides have rapid, secure, reliable and cost effective mode of transmitting the financial messages worldwide.
- **Automated Teller Machine (ATM):** ATM is an electronic machine, which is operated by the customer himself to make deposits, withdrawals and other financial transactions. ATM is a step in improvement in customer service. ATM facility is available to the customer 24 hours a day.
- **Cash Dispensers:** Cash withdrawal is the basic service rendered by the bank branches. The cash payment is made by the cashier or teller of the cash dispenses is an alternate to time saving. The operations by this machine are cheaper than manual operations and this machine is cheaper and fast than that of ATM. The customer is provided with a plastic card, which is magnetically coated. After completing the formalities, the machine allows the machine the transactions for required amount
- **Electronic Clearing Service:** In 1994, RBI appointed a committee to review the mechanization in the banks and also to review the electronic clearing service. The committee recommended in its report that electronic clearing service-credit clearing facility should be made available to all corporate bodies/Government institutions for making repetitive low value payment like dividend, interest, refund, salary, pension or commission, it was also recommended by the committee Electronic Clearing Service-Debit clearing may be introduced for pre-authorized debits for payments of utility bills, insurance premium and installments to leasing and financing companies. RBI has been necessary step to introduce these schemes, initially in Chennai, Mumbai, Calcutta and New Delhi.
- **Banknet:** Bank net is a first national level network in India, which was commissioned in February 1991. It is communication network established by RBI on the basis of recommendation of the committee appointed by it under the chairmanship of the executive director T.N.A. Lyre. Bank net has two phases: Bank net-I and Bank net- II. Areas of Operation and Application of Bank net:
  - The message of banking transaction can be transferred in the form of codes from the city to the other. Quick settlement of transactions and advices.
  - Improvement in customer service-withdrawal of funds is possible from any member branch.

- Easy transfer of data and other statements to RBI. Useful in foreign exchange dealings. Access to SWIFT through Bank net is easily possible.
- **Chip Card:** The customer of the bank is provided with a special type of credit card which bears customer's name, code etc. The credit amount of the customer account is written on the card with magnetic methods. The computer can read these magnetic spots. When the customer uses this card, the credit amount written on the card starts decreasing. After use of number of times, at one stage, the balance becomes nil on the card. At that juncture, the card is of no use. The customer has to deposit cash in his account for re-use of the card. Again the credit amount is written on the card by magnetic means.
- **Phone Banking:** Customers can now dial up the bank's designed telephone number and he by dialling his ID number will be able to get connectivity to bank's designated computer. The software provided in the machine interactive with the computer asking him to dial the code number of service required by him and suitably answers him. By using Automatic voice recorder (AVR) for simple queries and transactions and manned phone terminals for complicated queries and transactions, the customer can actually do entire non-cash relating banking on telephone: Anywhere, Anytime.
- **Tele-banking:** Tele banking is another innovation, which provided the facility of 24 hour banking to the customer. Tele-banking is based on the voice processing facility available on bank computers. The caller usually a customer calls the bank anytime and can enquire balance in his account or other transaction history. In this system, the computers at bank are connected to a telephone link with the help of a modem. Voice processing facility provided in the software. This software identifies the voice of caller and provides him suitable reply. Some banks also use telephonic answering machine but this is limited to some brief functions. This is only telephone answering system and now Tele-banking. Tele banking is becoming popular since queries at ATM's are now becoming too long.
- **Internet Banking:** Internet banking enables a customer to do banking transactions through the bank's website on the Internet. It is a system of accessing accounts and general information on bank products and services through a computer while sitting in its office or home. This is also called virtual banking. It is more or less bringing the bank to your computer. In traditional banking one has to approach the branch in person, to withdraw cash or deposit a cheque or request a statement of accounts etc. but internet banking has changed the way of banking. No one can operate all these type of transactions on his computer through website of bank. All such transactions are encrypted; using sophisticated multi-layered security architecture, including firewalls and filters. One can be rest assured that one's transactions are secure and confidential.
- **Mobile Banking:** Mobile banking facility is an extension of internet banking. The bank is in association with the cellular service providers offers this service. For this service, mobile phone should either be SMS or WAP enabled. These facilities are available even to those customers with only credit card accounts with the bank.
- **Any where Banking:** With expansion of technology, it is now possible to obtain financial details from the bank from remote locations. Basic transaction can be effected from faraway places. Automated Teller Machines are playing an important role in providing remote services to the customers. Withdrawals from other stations have been possible due to inter-station connectivity of ATM's. The Rangarajan committee had also suggested the installation of ATM at non-branch locations, airports, hotels, Railway stations, Office Computers, Remote Banking is being further extended to the customer's office and home.
- **Voice Mail:** Talking of answering systems, there are several banks mainly foreign banks now offering very advanced touch tone telephone answering service which route the customer call directly to the department concerned and allow the customer to leave a message for the concerned desk or department, if the person is not available.

### Challenges of Indian banking sector

Technological changes in Indian banking system presents unique opportunities and challenges for the banking industry. Developing or acquiring the right technology, deploying it optimally and then leveraging it to the maximum extent is essential to achieve and maintain high service and efficiency standards while remaining cost effective and delivering sustainable return to shareholders. Managing technology is therefore, a key challenge for the Indian banking sector. India is a country with huge population and the demographic growth of India is such that it is going to become the most populated country very soon. Technological advancements can bring about close integration between the urban and rural population. The primary challenge is to give consistent service to customers irrespective of the kind of customer whether rural or urban. Retention of customers is going to be a major challenge. Banks need to emphasis on retaining customers and increasing market share. Even with ATM machines and Internet Banking, many consumers still prefer the personal touch of their neighborhood branch bank. Banks in India will now have to work towards a vision to have an enhanced retail delivery system. Such a system would include transformed branches, enhanced telephone services, and leading-edge internet banking functions that provide a consistently positive multi-channel experience for the customer. Some of the challenges that the banks are facing today are:

- Competition from private banks
- Competition from MNCs
- Managing diversified needs of customers
- Diminishing customer loyalty
- Coping with regulatory reforms
- Restructuring and reorganizing banks' setup towards thinner and leaner administrative offices;
- Maintaining high quality assets.
- Management of impaired assets.
- Keeping pace with technology up-Gradations
- Problem of Non-Performing Assets (NPA)

The banking industry is changing at a phenomenal speed. While at the one end, we have millions of savers and

investors who still do not use a bank, another segment continues to bank with a physical branch and at the other end of the spectrum, the customers are becoming familiar with ATMs, e-banking, and cashless economy. This shows the immense potential for market. Banks are setting up alternative delivery channels to contain operating costs like off-site ATMs, internet banking, tele-banking, outsourcing, centralized transaction processing, etc.

## 5. Conclusion

India is one of the top 10 economies in the world, where the banking sector has tremendous potential to grow. The number of ATMs has doubled over the past few years, with more than 2,00,000 in the country at present (70 per cent in urban areas). They are estimated to further double by 2023, with over 50 per cent expected to be set up in small towns. Also, the scope for mobile and internet banking is big. At the start of 2023, only 2 per cent of banking payments went through the electronic system in the country. Today, mobility and customer convenience are viewed as the primary factors of growth and banks are continuously exploring new technology, with terms such as mobile solutions and cloud computing being used with greater regularity. Internet banking is highly comfort in our routine life, in fact this made our life simple and convenient and over all we are able to enjoy quality service smartly. These technologies created efficiency and time saving methods of conducting business for people. Nevertheless modern banking services are highly sophisticated to the customers in all the ways.

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