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3.1 INTRODUCTION

Over the last three decades, the role of banking in the process of financial intermediation has been undergoing a profound transformation, owing to changes in the global financial system. India’s banking system has seen some major financial innovations in the past decades as well as steps have been taken to promote financial inclusion, schemes that aim to take banking services to yet-to-be-banked areas. The various innovations in banking and financial sectors are ECS, RTGS, EFT, NEFT, ATM, Retail Banking, Debit and Credit Cards, free advisory services, implementation of standing instructions of customers, payments of utility bills, fund transfers, internet banking, telephone banking, mobile banking, selling insurance products, issue of free cheque books, traveller’s cheques and many more value added services.

The major impetus for financial innovation has been globalization of financial systems, deregulation, and great advances in technologies. In increasingly integrated financial systems facing higher volatilities, more competition and wide varieties of risks, financial innovation has become an essence to provide new products and strategies to suit different circumstances of time and market and to meet different requirements of participants in financial system. The present chapter is designed to analyze the growth and development of technology based services of commercial banks in India.
3.2 GROWTH OF TECHNOLOGY

The IT revolution has had a great impact on the Indian banking system. The use of computers has led to the introduction of online banking in India. The use of computers in the banking sector in India has increased many folds after the economic liberalisation of 1991 as the country's banking sector has been exposed to the world's market. Indian banks were found it difficult to compete with the international banks in terms of customer service, without the use of information technology. The RBI set up a number of committees to define and co-ordinate banking technology. These have included:

In 1984 a Committee on Mechanisation was formed in the Banking Industry (1984) whose chairman was Dr. C Rangarajan, Deputy Governor, Reserve Bank of India. The major recommendations of this committee were to introduce MICR technology in all the banks in the metropolises in India. This provided for the use of standardized cheque forms and encoders. In 1988, the RBI set up a Committee on Computerisation in Banks (1988) headed by Dr. C Rangarajan. It emphasized that settlement operations must be computerized in the clearing houses of RBI in Bhubaneshwar, Guwahati, Jaipur, Patna and Thiruvananthapuram.

It further stated that there should be National Clearing of inter-city cheques at Kolkata, Mumbai, Delhi, Chennai and MICR should be made operational. It also focused on computerisation of branches and increasing connectivity among branches through computers. It also suggested modalities for implementing on-line banking. The committee submitted its reports in 1989 and computerisation began from 1993 with the settlement between IBA and bank employees' associations.

In 1994, the Committee on technologies issues related to payment systems, cheque Clearances and Security settlements in the Banking Industry (1994) was set up
under Chairman W. S. Saraf. It emphasized Electronic Funds Transfer (EFT) system, with the BANKNET communications network as its carrier. It also said that MICR clearing should be set up in all branches of all those banks with more than 100 branches. In 1995, the Committee for proposing Legislation on Electronic Funds Transfer and other Electronic Payments (1995) again emphasized EFT system.

Networking of branches are now undertaken to ensure better customer service. Core Banking Solutions (CBS) is the networking of the branches of a bank, so as to enable the customers to operate their accounts from any bank branch, regardless of which branch he/she had opened the account with. The networking of branches under CBS enables centralized data management and aids in the implementation of Internet and Mobile banking. Besides, CBS helps in bringing the complete operations of banks under a single technological platform. CBS implementation in the Indian banking industry is still underway. The vast geographical spread of the branches in the country is the primary reason for the inability of banks to attain complete CBS implementation.

3.3 DEVELOPMENT OF TECHNOLOGY IN BANKING

Information technology is one of the most important facilitators for the transformation of the Indian banking industry in terms of its transactions processing as well as for various other internal systems and processes. The various technological platforms used by banks for the conduct of their day to day operations, their manner of reporting and the way in which interbank transactions and clearing are affected has evolved substantially over the years.

The technological evolution of the Indian banking industry has been largely directed by the various committees set up by the RBI and the government of India to
review the implementation of technological change. No major breakthrough in technology implementation was achieved by the industry till the early 80s, though some working groups and committees made stray references to the need for mechanization of some banking processes. This was largely due to the stiff resistance by the very strong bank employee unions. The early 1980s were instrumental in the introduction of mechanization and computerization in Indian banks. This was the period when banks as well as the RBI went very slow on mechanization, carefully avoiding the use of ‘computers’ to avoid resistance from employee unions. However, this was the critical period acting as the icebreaker, which led to the slow and steady move towards large scale technology adoption.

Banks were quite aware of technological developments elsewhere in the banking world, but it was not possible to freely use them as trade unions held strong views on mechanization. The continuous efforts of the managements for upgradations of technology in banking industry bore fruit in the wake of the award of the Dighe Tribunal in 1981, which allowed the Reserve Bank to use Mini computers in operational areas.

“Banking Industry” in India is on the accelerated path of computerization. Each bank is labouring the dreams of IT upgradation. Indian banks irrespective of their size, pattern of ownership, business mix and the like can be placed into five categories in terms of level of technology. There are banks do not have all their operations manually. There are some, which have advanced ledger-posting machines; the next category includes those having stand-alone computers either for all operations or for a part of them. In the quest to computerize 75 percent of the business, some public sector banks have done IT upgradation only at key branches.
The last lot includes possibly all foreign banks and newly established private sector banks, which have fully computerized all the operations.

3.3.1 MODERN PAYMENT SYSTEM

The Reserve Bank of India (RBI) has played a significant role in developing the payment and settlement systems in the nation from its establishment. The emergence of e-commerce has created new financial requirements that in many cases cannot be effectively fulfilled by the traditional payment systems. To recognize these needs the RBI has implemented bank computerisation project in India and providing ICT based networking facilities to the banks and financial institutions in India. Since 1991 the RBI has started ‘BANKNET’. It is the network for banking institutes other than Banknet. The ‘INFINET’ - Indian Financial Network is a satellite - based wide area network using VSAT (Very Small Aperture Terminal) technology set up in June 1999. The Centralised Fund Management System (CFMS) facilitates centralised viewing of balance and funds transfer between own accounts of a member bank maintained with the bank at different locations. In Indian banking system, ATMs also provide better alternative to traditional payment system which can be used for payment of utility bills, funds transfer between accounts, deposit of cheques and cash into accounts, balance enquiry and several other banking transactions. Apart from these facilities RBI has been enhancing the payment system by introducing modern payment system.¹

3.3.2 Magnetic Ink Character Recognition (MICR)

Traditional cheque clearance process is time-consuming and lengthy which affects value of transaction of settlement. To enhance speed of cheque clearance the RBI has started MICR cheque and MICR clearance system. Magnetic Ink Character
Recognition (MICR) is a character recognition technology adopted mainly by the banking industry to facilitate the faster processing of cheque.

3.3.3 Electronic Clearing System (ECS)

Electronic Clearing System (ECS) is a retail payment system which facilitates bulk payments, that facilitate payments from one-to-many and receipts that are from many-to-one. ECS Scheme operated by the RBI since 1996-97, helps to make payment from a single account at a bank branch to any number of accounts maintained with the branches of the same or other banks. ECS (Credit) also known as Credit Push facility facilitates the bulk payments whereby the account of the institution remitting the payment is debited and the payments remitted to beneficiaries' accounts. In this system the account of the customers of the utility company, in different banks are debited and the amounts are transferred to the account of the company.

3.3.4 Electronic Fund Transfer (EFT)

EFT System hosted and operated by the RBI, permits transfer of funds, upto Rs. 5 lakh from any account at any branch of any member bank in any city to any other account at any branch of any member bank in any other city. This system utilizes the service branches of the member banks and the nodal offices of RBI. The Reserve Bank of India acts as the service provider as well as regulator.

3.3.5 National Electronic Fund Transfer (NEFT)

The NEFT was introduced in 2005. Since its inception, the coverage of NEFT has increased. The NEFT is a nation-wide payment system facilitating one-to-one funds transfer. Under this system, individuals, firms and corporate can transfer funds
from any bank branch to any individual electronically, firm or corporate having account with any other bank branch in the country participating in the system.

3.3.6 Society for Worldwide Interbank Financial Telecommunication (SWIFT)

The automated system used to transfer fund between different countries is known as SWIFT. It helps to send or receive money worldwide. It provides a computerized network for stage transmission amongst international banks in the member countries. This technology made available the fastest banking services/facilities to customers who are engaged in international business.

3.3.7 Card Based Clearing (CBC)

Credit and Debit cards have been in use in the country for many years now. In India card fashion increasing day by day due to its convenience and utility. Many banks have been providing customized credit and debit cards to increase their business in India.

3.3.8 Real Time Gross Settlement (RTGS)

RTGS is a system used for large value clearances operated since 2003; the minimum amount to be remitted through RTGS is Rs.1 lakh. There is no upper ceiling for RTGS transactions. It facilitates to the settlement of transactions on a gross basis. This system ensures settlement of payments with no credit risk involved. It is therefore, essentially a system for settlement of large - value and time - critical payments. The system facilitates Inter-bank as well as customer payments. In India all bank branches are not RTGS - enabled because only core banking (CBS) enabled bank branches can extend this facility.
3.3.9 Cheque Truncation System (CTS)

In addition to operational efficiency, Cheque Truncation has several benefits to the banks and customers which includes introduction of new products, re-engineering the total receipts and payments mechanism of the customers, human resource rationalization, and cost effectiveness, etc., Cheque Truncation thus is an important efficiency enhancement initiative in the Payments Systems area, undertaken by RBI. Cheque truncation is settlement of clearing transactions on the basis of images and electronic data without the physical movement of the instruments. The clearance cheque is truncated at the presenting bank itself.\(^2\)

3.3.10 On Line Tax Accounting System (OLTAS)

A measure aimed at providing better facilities for the government tax collection and for tax payers was the introduction of the On line Tax Accounting System (OLTAS) with a network of various banks authorized for collection of tax receipts. The Reserve Bank and the Tax Information Repository at the National Securities Depository Ltd. (NSDL) are also part of the OLTAS. Data is captured from the channels submitted by tax payers tendered at the designated bank branches and transmitted electronically to the repository. The OLTAS works in a fully secured environment, with data being transmitted using encryption facilities and digital signatures for enhanced security. The system, in live operations from July 1, 2004 has been performing well. The income tax challan form has also been simplified and has been made into a single copy challan.

3.4 CROSS SELLING

Liberalization, Privatization and Globalization jointly have transformed the entire Indian banking system. The liberalization of the financial sector and banking
sector reforms have exposed the Indian banks to a new economic environment that is characterized by increased competition and new regulatory requirements. As a result, there is a revolution in every sphere of activities of the banks in India, innovation, and intensification in new technologies escorts to increase in the customer expectations and there is a major shift from product-centric approach to customer-centric approach. People do not just demand more from their banks but they also receive more. Banks are striving hard for retaining the old customers than acquiring new ones in the era of intense competition. And one of the main customer retention strategies is to cross sell more and more financial products to the customers.3

3.5 TECHNIQUES OF E-CRM

Banks’ modern technology can develop innovative customer solutions to attain growth and profitability within the framework of sound risk-management practices. Techno-savvy banks are tapping into online services to initiate a new era in relationship management to create one to one relationships as well as one to many relationships to enhance their competitive advantage. Recent developments in critical areas of IT have changed the way banks are managing their customer relationships. The following are some of the latest e-CRM techniques used by banks in offering new products and services to its customers. The following techniques are used by Indian banks.4

3.5.1. AUTOMATED TELLER MACHINES (ATMS)

Automated Teller Machine is a computerized telecommunications device that provides the customers of a financial institution with access to financial transactions in a public space without the need for a human clerk or bank teller. In most of the modern ATMs, the customer is identified by inserting a plastic ATM card with a
magnetic stripe or a plastic smartcard with a chip that contains a unique card number and some security information, such as an expiration date or CVC (CVV). Security is provided by the customer entering a personal identification number (PIN). Using an ATM, customers can access their bank accounts in order to make cash withdrawals (or credit card cash advances) and check their account balances. An ATM is a machine that can deliver cash to the customers on demand after authentication. This service is made available 24 hours a day, 7 days in a week and 365 days of the year through ATMs.

3.5.2. INTERNET BANKING – E-BANKING

The introduction of Internet has brought the concept of ‘Anytime - Anywhere Banking’. Internet banking or online banking refers to the conduct of financial transactions by the customers with the help of a secured websites operated by the bank. Thus, most of the banks nowadays have websites, which not only provide banking-related information but also facilitate online transactions, such as bank account inquiry, payment of utility bills, credit card bill payment, status inquiry and online shopping. Internet banking and associated transactions are much cheaper compared to rendering services through physical branches (i.e., brick and mortar form). In Internet or Online banking, information is transmitted and received in electronic form since Internet is a network of very large number of computers. Based on interviews from four banks in Hong Kong noted that basic transactions and securities trading are the most popular types of operations that customers carry out on Internet banking. The banks have been riding high on the technological wave of Internet banking and at the same time discouraging physical banking transactions by levying additional charges at physical branches. Thus, due to investment in technology and its adoption by different banks, growth has been witnessed in the field
of Internet banking in different parts of the world. Net banking means carrying out banking transactions through the Internet. It comprises a variety of projects that aim to improve not only the bank’s efficiency, but customer service levels as well. E-Banking programme allows customers to use the Internet for basic functions in corporate and retail banking and credit cards. Thus the technology has completely eliminated the need for branch.

3.5.3. TELE BANKING / PHONE BANKING

The face of the banking industry has totally changed by the technology. Phone/ telebanking refers to carrying out banking transactions through telephone. A customer can call up the bank’s help line or phone banking number to conduct transactions.

3.5.4. MOBILE BANKING

In the simplest form, mobile banking services enable users to receive information on their account balances via SMS. Some new software enabled mobile phone to use some banking services such as fund transfers between accounts, stock trading, and confirmation of direct payments via the phone’s micro browser. Several European banks have introduced successful mobile financial services for these smart phones. Banks are one of the key players that want to preserve their position as a central payment and banking services provider in the financial market. Now banks help the customers to conduct certain transactions through mobile phone with the help of technologies like WAP, SMS etc. This helps a bank to combine the Internet and telephone and leverage it to cut costs and at the same time provide convenient to its customers.
Mobile devices may include mobile phones, PDAs, wireless tablets and any other device that connect to mobile telecommunication network and make it possible for payments to be made. The realization of mobile payments will make possible new and unforeseen ways of convenience and commerce. Mobile payments can become a complement to cash, cheques, credit cards and debit cards. It can also be used for payment of bills (especially utilities and insurance premiums) with access to account-based payment instruments such as electronic funds transfer, Internet banking payments, direct debit and electronic bill payments.  

3.5.5. CARD MECHANISM

A) Credit Cards/Debit Cards

The Credit Card holder is empowered to spend wherever and whenever he wants, using his Credit Card within the limits fixed by his bank. Credit Card is a post paid card. Debit Card, on the other hand, is a prepaid card with some stored value. Every time a person uses this card, the Internet Banking house gets money transferred to its account from the bank of the buyer. The bank never faces a default because the amount spent is debited immediately from the customer’s account.

B) Smart Card

Banks are adding chips to their current magnetic stripe cards to enhance security and offer new service, called Smart Cards. Smart Cards allow thousands of times of information storable on magnetic stripe cards. In addition, these cards are highly secure, more reliable and perform multiple functions. They hold a large amount of personal information, from medical and health history to personal banking and personal preferences. Smart card technology is now being familiarized in India.
3.5.6. WIRELESS BANKING SERVICES

Wireless banking services is an emerging trend in banking. Wireless banking service enables one to manage their accounts with GSM/GPPS WAP (Wireless Application Protocol) technology to allow access to make accounts more convenient, secure and flexible. With wireless banking service, the following operations can be performed:

- Check account balance and transaction details
- Make fund transfer to self or third party accounts
- Buy and sell foreign currency
- Trade securities
- Inquire mutual funds and securities trading a/c portfolio and account balance
- Personalized stock watch list to monitor stock price performance
- Inquire free real time stock quotes
- Inquire deposits / exchange / loan rate.

Thus with the introduction of electronic banking, banks are moving their focus of payment from the physical presence of money to the use of electronic money. Customer can perform banking transactions without having to step into the office of the branch. The bank which provides value added services and satisfaction to customers are bound to become winners in the market. By way of launching new products the banks are trying to make the “near” customer to “dear” ones.

3.5.7. POINT OF SALE TERMINAL

It consists of two key components a computer terminal that is linked on line to computerized customer information file in a bank and a plastic card with magnetically
encoded transaction that identifies the customer’s account is debited and the retailer’s account is credited by the computer for the amount of purchase.

3.5.8. DATA WAREHOUSING AND DATA MINING

This technique is used to develop and use customer data to check their profile, retention and loyalty patterns. They provide valuable inputs for retaining customers and developing products and services for the future. Thus from the above we found that the technology in banking has been used in four major ways:

- To handle a greatly expanded customer base
- To reduce substantially the real cost of handling payment
- To liberate the banks from the traditional constraints on time and place
- To introduce new products and services

3.5.9. IMPLEMENTATION OF KYC (KNOW YOUR CUSTOMER)

Regulators need to perform another balancing act when it comes to implementing know-your-customer (KYC) procedures. Clearly, KYC is a key element in the fight against money laundering and terrorist financing. KYC procedures typically require customers to present valid identification and providers to verify the documents and store copies. These requirements can present obstacles to financial inclusion in several ways. First, it may constitute an obstacle to poor people who do not have ready access to documents, especially in countries with no national ID scheme. Second, extra operational requirements may impose a higher account opening cost for banks, to the point of making low-balance accounts economically unprofitable. Finally, it may present logistical problems to rural retail outlets which do not have access to copy machines or lack stable electricity supply. For low-value accounts and small transactions, the incremental cost of KYC procedures may be
unbalanced to both the money laundering risks they maintain to address and the value of these services offered to poor people.

Making transactions electronic, increases the surveillance power of law enforcement, and enhances the ability of poor people to avail financial services at lower cost. The notion of proportionate or risk-based KYC procedures is well established within the Financial Action Task Force (FATF) principles and there should be an easy, cheap entry proposition for previously unbanked people. As customer balance and transaction volumes grow, the KYC and security arrangements can be tightened progressively. For larger accounts targeting the unbanked poor, KYC verification might be outsourced to properly trained banking retail outlets, with a requirement to store records electronically only. This so-called tiered KYC approach has the advantage of not putting the full KYC barrier up-front for poor customers who are new to banking. The policy objective should be to permit immediate account opening with minimal barriers for poor people, with a progressive tightening of KYC as their usage of financial services grows.  

3.5.10. SOCIAL MEDIA NETWORK

Indian Banks have started using social media in their regular operations in various capacities and are at different stages of maturity. As of April 2013, some private banks provide regular updates on the latest offers and allow basic customer operations through popular social media sites. A large private bank in India hosted Facebook application on its secure servers allowing balance amount check, cheque book request, stop payment, etc. Some of the private banks are using their Facebook page to provide customers, exclusive offers, product details and customer care services. With a few banks taking the lead, the direction is set for other banks to offer online financial services through such platforms sooner rather than later. ICICI Bank,
HDFC Bank and Axis Bank are among the top 10 Banks with Social Media presence as per a survey by Financial Brand in July 2013. Banks in India cannot any longer survive in denying of these services. There could still be a tendency to not use Social Media. Banks thinking on these lines may have to remember that their competition is already active on Social Media, thus threatening their own business.  

3.6 TECHNOLOGY-ENABLED SERVICES QUALITY

As a pioneer in the service quality studies, Parasuraman (1985) has identified ten variables that he believed to affect the quality of service: tangibility, competence, reliability, responsiveness, courtesy, credibility, accessibility, communication, understanding customer, collaboration, and continuous improvement. Zeithaml, Parasuraman and Berry developed SERVQUAL framework in 1985. The rise of Internet-based services has changed the way firms and consumers interact. E-service is conceptualized as an interactive information service, providing a mechanism for firms to differentiate their service offering and build competitive advantage. The technology-enabled services quality, the researcher has identified seven main dimensions that would affect any service provided to users, such as accessibility, reliability, efficiency, awareness, innovation, trust and loyalty, security and privacy. These dimensions are listed below:

A) Accessibility

Accessibility refers to the ability to get on the site quickly and to reach the company whenever needed. Now banks can provide customized products easily and customers could access many services through Internet by sitting at home.
B) Reliability

Reliability is the ability to perform the promised service dependably and accurately. Correct technical functioning of the site and the accuracy of service promises, billing, and product information.

C) Efficiency

Site is simple to use, structured properly, and requires a minimum of information to be input by the customer. Thus effective and efficient services are provided to customers using e-channels.

D) Awareness

To provide better services to their customers, banks are embracing Customer Relationship Management facilitated by the availability of conducive technology.

E) Innovation

Innovations in banks are able to reduce the transaction cost and handle a large number of transactions in time. Innovation in technology is also helping banks to cross sell the products of insurance and securities firms, which help for the growth of their fee-based income in the total income.

F) Trust and Loyalty

It refers to the ability to inspire trust and confidence the customer feels in dealing with the site and is due to the reputation of the site and the products or services it sells, as well as clear and truthful information presented.

G) Security/privacy

Degree to which the customer believes that the site is safe from intrusion and personal information is protected.
3.7 SUMMARY

Banks across the country have started the process of setting up ATMs enabled with biometric technology to tap the potential of rural markets. A large proportion of the population in such centers does not adopt technology as fast as the urban centers due to the large scale illiteracy. Development of biometric technology has made the use of self service channels like ATMs viable with respect to the illiterate population. Though expensive to install, the scope of biometrics is expanding rapidly. It provides better security system, by linking credentials verification to recognition of the face, fingerprints, eyes or voice. Some large banks of the country have taken their first steps towards large scale introduction of biometric ATMs, especially for rural banking. At the industry level, however, this technology is yet to be adopted; the high costs involved largely account for the delay in adoption.
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