

TRENDS AND PROGRESS MADE BY INDIAN BANKS IN ADOPTION OF TECHNOLOGY: A CASE STUDY OF HDFC BANK

Dr.Rupinder Katoch*

Abstract

Keywords:

National Electronic Fund
Transfer(NEFT);
Real Time Gross
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Mobile Banking;
Automated Teller
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Internet Banking;
Point of Sale(POS);
Immediate Payment
System(IMPS);

Indian Banking sector has adopted many technological innovations to provide improved services to the customers. Various studies undertaken from time to time have concluded that the changes that new technologies have brought to banking and their impact on officers, employees, and customers of banks are enormous. Thus in view of the growing utilization of technology, this study has analyzed the trends and progress made by Indian banks in adoption of technology by taking a number of parameters like installation of Automated Teller Machines, issuance of Debit and Credit Cards , outward debits and inward credits through NEFT, RTGS and mobile banking. This study is carried out with the help of secondary data like Bank level annual reports and Reserve bank published reports on payment and settlement systems and information technology in Indian banks. The observations based on FY 2015 to FY 2017 authenticate that technology adoption by Indian banks in general and HDFC in particular has registered robust growth with both volumes and values growing at rapid pace.

Introduction

Technology is the driving force behind the success of every Industry in India. The banking sector in India is not an exception to that. Banking industry in India is flourishing by focusing on technological innovations. Indian banks are deploying technology to take their services to the next level. Technology intensive solutions have helped banks to increase their revenue by expanding their customer base, bringing in cost efficiencies and managing risk effectively. Also, the advancements in technology have brought mobile banking, internet banking, card based delivery system, RTGS, NEFT services to the fore. The banking sector is laying greater emphasis on providing improved services to their clients and also upgrading their technology infrastructure, in order to enhance the customer's overall experience as well as give banks a competitive edge. Major technology adoptions in India are as follows:

Table 1: Major technologies adopted by Banks in India (Acholiya & Keshari, 2013)

AUTOMATED TELLER MACHINE (ATM) TECHNOLOGY	ATM technology has replaced human tellers in banks. People can withdraw cash and ask their balance by inserting their visa card in to the machine. It provides 24-hours cash withdrawal facilities using debit/ credit cards, fast cash, fund transfer, Personal Identification Number (PIN) change, mini-statement request etc.
INTERNET BANKING TECHNOLOGY	With the help of internet banking technology, customers who have access to internet, can conduct routine banking transactions from wherever they are. They can make account balance enquiry, fund transfers, bills payment, loan repayments, statement requisitions, prepaid card recharge, pay credit card dues, view credit card statement or check balance Internet banking has been widely accepted internationally, both as a medium of delivery of banking services and as a strategic tool for business development. It is fast catching up in India as more and more banks have entered the field of internet banking. India can be said to be on the threshold of a major banking revolution with net banking having already been unveiled.
POINT OF SALE	It is an electronic machine which can sense a special plastic card that is

(POS) TERMINAL	encoded with information on a magnetic slip. Customers can make payments through these terminals for purchases of goods and services by means of credit/debit cards. For customer convenience Reserve Bank of India has also permitted cash withdrawal facility using debit cards issued by the banks at PoS terminals. There are online payment gateways or third party service providers called intermediaries to accept card payments.
CREDIT CARD TECHNOLOGY	It is a special plastic card which when linked linked with credit accounts ,provide access to ATM or POS terminal wahich can be located anywhere either at merchant outlet, restaurant, 5 star hotels, or hospitals etc. customer can have 24-hours cash access through ATM, POS, and can make payments within the sanctioned limit to to merchant against purchase of goods and services, availing cash advances, withdrawal of cash from ATM, SMS banking, internet banking etc.
DEBIT CARD TECHNOLOGY	This special plastic card is linked with deposit accounts and provides access to ATM or POS terminal. Customer can have 24-hours cash access to his savings or current account through ATM and POS terminals,. With the help of debit cards, balance enquiry, mini statement printing in ATM, cash withdrawal from ATM, fund transfer to linked accounts of respective customer, payment of utility bills, deposits, purchase of goods and services through POS terminal, transaction details, etc can be made.
MOBILE BANKING TECHNOLOGY	Mobile banking is of nascent stage in India .It was first launched by HDFC bank in India and by Union Bank of India amongst nationalised banks. In mobile banking, mobile phones are used to conduct banking transactions and this is generally done through SMS, USSD or various mobile banking application or apps available in the banking industry.Mobile banking has greatly increased and in the near future would overtake internet banking transaction.
NEFT	In November 2005, in order to facilitate one to one fund transfer amongst individuals and corporates, a more secure system was introduced. Under this system there are batch settlements at hourly intervals, so real time transfer of funds are made. This system also provides unique features like

	accepting cash for originating transactions, initiating transfer requests without any minimum or maximum amount limitations, receiving confirmation of the date / time of credit to the account of the beneficiaries, etc., are available in the system.
REAL TIME GROSS SETTLEMENT (RTGS) SYSTEM	Under this system there is no waiting period for the payment transaction to be made. It is an electronic fund transfer mechanism whereby funds are transferred from one bank to another on a "real time" and on "gross" basis. "Gross settlement" means there is no netting and transaction is settled on one to one basis. Payments one processed are final and irrevocable. This system was introduced in 2004 and settles all inter-bank payments and customer transactions above ₹ 2 lakh.
IMMEDIATE PAYMENT SERVICE(IMPS)	This service is managed by National Payment Corporation(NPCI) and was introduced in 2010. It is instant real-time inter-bank electronic funds transfer system in India which offers an inter-bank electronic fund transfer service through mobile phones. This service is available 24/7 throughout the year including bank holidays.It is built upon the existing National Financial Switch network.

Review of Literature

Table 2: Findings of Various studies conducted on the adoption of Technology in Indian Banks

Bamoriya et al.(2012)	Although mobile banking is growing but there are certain issues in usage of this technology. Major problem with mobile banking is customers are resistant to adopt this technology.
Safeena, Date, & Kammani(2012)	Study concluded that majority of customers are accepting online banking because of many favorable factors. Analysis concluded that usefulness, ease of use of the system awareness about mobile banking and risks related to it are

	the main perusing factors to accept online banking system. These factors have a strong and positive
Tavishi & Kumar(2013)	This study concluded that branch banking is the more preferred by the customer followed by ATM, then Internet banking, and then credit/debit banking and less preferred is mobile banking. This study recommends that the banks should ensure higher security and create technical awareness to encourage customer to use online banking and mobile banking.
Jain,Yogesh(2013)	Yogesh Jain (2013)in his work Mobile Banking: A Study on Adoption and Challenges in Southern Rajasthan, India identified that the Information technology has basically been used under two different avenues in banking vi., communication and connectivity and other is business process.
Vimala(2015)	This study examined the impact of Information Technology (IT) adoption on the selected bank customers of Bank of India, and found that selected customer's attitude towards the adoption of the IT is positive and highly acceptable by them.

Objectives of the study

1. To identify major technology adoptions by banking sector in India to provide various e-banking services to customer.
2. To study and analyze the progress made by HDFC bank in adoption of technology.

Research Methodology:

Secondary data has been used for this paper. The information related to technology applications in HDFC bank has been taken from the website of HDFC bank and Annual Reports of the **HDFC** bank. Data released by Reserve bank of India in form of bank wise volumes in ECS/NEFT/RTGS/Mobile transactions proved to be of great help in assessment of technology adoptions in Indian Banking sector in general and HDFC bank in particular. To analyze progress made by banks in adoption of technology a number of parameters like use of Automated Teller Machines, issuance of Debit and Credit Cards , outward debits and inward credits through NEFT, RTGS details and mobile banking have been used for the three years' time period from 2014-15 to 2016-17.

Data Analysis and Interpretation:**A. An Analysis of technology adoptions by banking sector in India****Table 3: Year Wise Volumes and Values in RTGS/NEFT/IMPS/Cards/Mobile Banking/ATMs/POS**

System	Volume(Million)			Value(₹Billion)		
	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17
RTGS	92.78	98.34	107.86	929,332.89	1,035,551.64	1,253,652.08
EFT/NEFT	927.55	1,252.88	1,622.10	59,803.83	83,273.11	120,039.68
Immediate Payment Service (IMPS)	78.37	220.81	506.73	581.87	1,622.26	4,111.06
Credit Cards	619.41	791.67	1,092.11	1,922.63	2,437.02	3,307.12
Debit Cards	7,804.57	9,247.00	10,962.36	23,492.65	26,960.63	26,901.79
Mobile	171.92	389.49	976.83	1,035.30	4,040.91	13,104.26

Banking							
Number of ATMs (in actuals)	181398	212061	222475	NA	NA	NA	NA
Number of POS (in actuals)	1126735	1385668	2528758	NA	NA	NA	NA

Source: RBI

➤ Above table clearly depicts that the trend in RTGS is positive and RBI initiative to popularise this electronic mode of fund transfer is really paying off. Transactions through RTGS have been exhibiting rapid growth, not only in terms of volume but also in terms of value. The acceptance of RTGS by users can be measured by the transaction volume handled by banks on yearly basis which rose from 92.78 million in 2014-15 to 107.86 million in 2016-17. Value wise it increased from ₹ 929,332.89 billion in 2014-15 to ₹ 1253652 billion in 2016-17.

➤ NEFT system has witnessed a surge in the volume and value of transactions handled in 2016-17 with 1622 million transactions valued at around ₹120,039.68 billion, up from 1253 million transactions valued at ₹83273 billion in the year 2015-16 and 928 million transactions valued at ₹59803 billion in 2014-15.

➤ The total number of Automated Teller Machine (ATMs) installed in India by various banks have increased from 181398 in 2014-15 to 222475 in 2016-17

➤ During 2014-15, 619 million transactions valued at around ₹1922 billion were carried out through credit cards, while 7804 million transactions valued at ₹23492 billion were carried out through debit cards. However volume of transactions through credit and debit cards increased to 1092 million and 10962.36 million respectively in 2016-17 and value enhanced to ₹ 3307 billion and ₹ 26901 billion respectively during the same period.

➤ There are 2528758 POS terminals in the country. To safeguard the interests of customers and to ensure that the payments made by them using Electronic/Online Payment modes are duly accounted for by intermediaries receiving such payments, directions were issued in November 2009 by RBI. Directions require that the funds received from customers for such transactions

need to be maintained in an internal account of a bank and the intermediary should not have access to the same.(RBI)

➤ As per RBI report mobile banking sees dramatic surge in India. Amount transacted in 2016-17 has risen more than fivefold from 2014-15. i.e. it has increased from Rs 171.92 million in volume in 2014-15 to Rs 976.83 million in 2016-17. Value wise it has increased from ₹1,035.30 in billion to ₹ 13,104.26 during the same period. “As customers use more smartphones and mobile connectivity improves, we will see banks trying to come up with more effective applications in the market. This will boost the number of transactions and the value involved,” said Axis Bank’s Anand.(Nair, 2017)

➤ Transactions via the Immediate Payment Service (IMPS) platform are growing at a fast pace, both in value and volume. Number of transactions has risen nearly sixfold to 506.73 million in 2016-17, from 78.37 million in 2014-15. The aggregate value of transactions in 2016-17 was ₹ 4111 billions. IMPS is gaining popularity because funds can be transferred by customers to another account instantly. Moreover, unlike the NEFT and Real-Time Gross Settlement (RTGS), which have fixed time of their operation between 9 am and 4.30 pm (6.30 pm for transactions within the same bank), the IMPS platform is available 24×7. Further, IMPS is not like NEFT and RTGS which are confined to only bank accounts. IMPS can be used by e-wallets and payment platforms as well.(Lakshminarasimhan, 2016)

B. An Analysis of technology adoptions by HDFC Bank in India(HDFC Annual Report,2016)

Technology has helped HDFC Bank to achieve its critical goals by making its operations more efficient. HDFC bank has continuously invested in technology so that better products and services can be provided to customers. The bank is operating in highly automated environment in terms of information technology and communication systems.

➤ Online connectivity of all branches enables the bank transfer funds from one branch to another speedily.

➤ ATMs provide multi branch access.

➤ International standard technologies have been acquired to build infrastructure of world class.

➤ Core Banking Softwares are open,scalable and well enabled.:

- Corporate banking Business supported by Flexcube(i-flex Solutions Ltd)
- Retail banking Business supported by Finware. (i-flex Solutions Ltd)
- The bank has been investing a lot in data warehousing, social media linkages, data analytics and mobile-based innovations.
- It has also been tying up with ecommerce merchants for direct transactions.
- Instant processing of loans digitally.
- ATMs have been used to do many things. For instance, it is increasingly using its ATM machines for communication, especially for getting across messages on new offerings.
- Customers can have access to banking services 24*7.
- HDFC Bank has sophisticated architecture and well-rehearsed Disaster Recovery set-up, so as to ensure 99.5 per cent up-time of important applications.
- Due to its initiatives on technology front it has won many awards including from Institute for Development and Research in Banking Technology (IDRBT) and Indian Banks' Association (IBA).

B(i)Mobile Banking

Table 4: Mobile Banking in HDFC bank

Year	Volume (actual)	Value (in Rs.'000)
2015	1720761	60305775
2016	6353802	104308527
2017	31550645	187801766

Source: HDFC Annual Reports

- HDFC Bank Ltd, reported more than 3 million transactions worth Rs.187 billion in2017 with 80% hike in value of transactions conducted through mobile banking.
- HDFC claims that over 75 plus transactions can be conducted on smart phone through our MobileBanking App or mobile browser

Way to Mobile Banking in HDFC(www.hdfc.com)

- **Insta Alerts –SMS&Email:** Makes the customer aware of the activities on your accounts, anytime and anywhere.
- **Phone Banking Services:** a combination of IVR and Agent offering

- **Instant transfers and recharges through Chillr App:** **Chillr** is India's first multi-bank mobile payment app that links directly to your bank account. It allows you to send money instantly from your HDFC Bank account to anyone in your phone book or to a beneficiary using his 'Account number & IFSC code' or 'UPI ID'. You can also recharge, pay bills, split bills, or request money on Chillr.
- **Ultra Cash:** UltraCash is a unique mobile payment app that gives you the freedom to shop with without your wallet in a seamless **manner**, direct from your HDFC Bank account. This **mobile-to-mobile** transaction takes mere seconds and is redefining the payment ecosystem in India. Now, you can make transactions **securely** and **conveniently!**
- **PERKS App:** it instantly connects you with your Corporate RM, Check Cibil Score, Update your employer details.

B(ii) Electronic Fund Transfers:

- **NEFT: Timings:** Monday to Friday: 6 PM, Saturday (excluding 2nd and 4th) : 6 PM
- **RTGS:** Monday to Friday: 04:00 PM, Saturday (excluding 2nd and 4th) : 04:00 PM
- **Visa Card Pay:** Pay a VISA Credit card bill issued by any bank in India using HDFC Bank's VISA Card Pay. No branch queues, no waiting, no issuing cheques. Just fast, safe payments, when and where you need them.
- **IMPS:** IMPS (Immediate Payment Service) from HDFC Bank is an instant real time inter-bank electronic fund transfer service. Using this service, you will now be able to receive or send money even on Sundays and Bank Holidays or late at night.
- **Unified Payment Interface (UPI):** Now funds transfer has become faster, safer, and hassle free. No need to share your personal details like account number, IFSC Code or mobile number. You can send and receive money using only your Virtual Payment Address(VPA).

Table 5: RTGS Details for HDFC Bank

Year	Inward		Outward	
	Volume	Value (in Rupees Billions)	Volume	Value (in Rupees Billions)
March,2015	1456929	15541.04	1295276	16044.09

March,2016	1512276	18673.51	1356497	19241.52
March,2017	1908726	26869.05	1766680	27613.62

Source:RBI

Table 6: Year wise details of National Electronic Fund Transfer (NEFT) for the month of March

Year	Total outward debits		Received Inward Credits	
	No. transactions	Of Amount ₹. Million)	No. transactions	Of Amount (₹. Million)
March,2015	11290337	901238.23	7834788	947448.82
March,2016	16738783	1401829.96	10033325	1280914.22
March,2017	25272277	2425620.00	13585652	2398490.00

Source:RBI

- HDFC Bank has had a number of customer electronic transactions in RTGS continuously for the FY 2015, 2016 &2017 as well as the highest total value of such transactions, among all the banks in India.
- In March,2015, through NEFT ,a total of **19.13 lakh** transactions were made electronically via HDFC amounting to a total of ₹ **1848686 million**. However this increased to 38.85 lakh transactions amounting to ₹4824110 million. This is a sum of both inward as well as outward transactions.

B (iii) Banking with Watch(www.hdfc.com):

For the first time in India, Watch Banking is now available exclusively for HDFC Bank customers through an Apple Watch. You can now do your favourite transactions like View Information of all your accounts, Recharge your Mobile & DTH Connection, Request A/c Statement & Cheque book ,Locate HDFC Bank ATM & Branch, Hotlist your Debit Card, View

Notifications sent by HDFC bank, Call us using Apple Watch right from your Apple Watch without even taking out your phone.

B (iv) Services on Social Media

HDFC Bank On Chat

Discover the easiest way to bank with HDFC Bank On Chat. All you need to do is open up your Facebook Messenger, find 'HDFC Bank OnChat', and just say 'Hi'. Start chatting to Recharge your mobile phone, Pay your utility bills like postpaid mobile, electricity, DTH, data card, Book a cab from OLA or Uber, Booking of Buses etc. This service is available 24/7. This service can be used by anyone whether he is an HDFC bank customer or not.

B(V) Details of E- Payment with HDFC Bank

- **Pay Zapp:** With PayZapp, you can shop on your mobile at partner apps, buy movie tickets, music and groceries, compare and book flight tickets and hotels, shop online and get great discounts at SmartBuy, send money to anyone in your contact list, pay bills and recharge your mobile, DTH and data card.
- **Pay Via Smart Hub:** Now enjoy the hassle-free process of paying all your taxes, utility bills, credit card bills or even making donations with great ease. Just pick the payment option you wish to make, select the state, city and type of payment from the dropdown menu to view if the the payment can be made online and the list of branches the payment can be made.
- **Pay Via Samsung Pay:** Introducing Samsung Pay - The simple and secure way to pay. It works almost everywhere you can swipe or tap your HDFC Bank Debit / Credit Card. So, you enjoy all the convenience you need, on your Samsung Galaxy device. Samsung Pay uses near-field communication (NFC) technology to process payments at Contactless/NFC terminals. Samsung Pay also work with almost all magnetic strip terminals as it uses magnetic secure transmission (MST), when the phone is held against the terminal. The phone emits a magnetic signal that emulates the magnetic strip found on the back of a credit or debit card.

B(VI) Bank in Person(www.hdfc.com):

- **HDFC Bank ATMs:** With a wide spread network of 12,260 ATMs across India as in March, 2017, enjoy the following benefits at your convenience: 24 hour access to cash,

Personalised cash withdrawals, View account statements and mini-statements, Make HDFC Bank Credit Card payments etc.

➤ **Cash@Stop:** You can now use your Debit Card to withdraw cash at select merchant outlets when you shop.

Table 7: Yearwise details of Number of ATMs,POS,Debit Cards,Credit Cards in HDFC Bank

Year	No. Of ATMs	POS	Debit Cards(No. in Lacs)	Credit Cards(No. in Lacs)
March,2015	11766	244991	216.3	59.7
March,2016	12000	283274	230.3	72.8
March,2017	12260	429749	235.6	85.4

Source: Annual reports of HDFC Bank

Bank has significant presence in the ‘merchant acquiring’ business, with the total number of point-of-sale (POS) terminals installed crossing 2.8 lakh.in 2016 and reaching 4.30 lakh in 2017.

B(VII) Internet Banking

➤ HDFC Bank offers 200+ transactions through its NetBanking channel. HDFC Bank has implemented an extra security solution for its customers - Secure Access.

➤ **Credit Card Net Banking:** Access your HDFC Bank Credit Card account online using NetBanking and view all your account information quickly and easily. Manage your Credit Card transactions, pay your Credit Card bills and track your reward points, which you can redeem for some great offers.

➤ **Loans Account online:** view your loan details just by logging into NetBanking.

Customers can obtain car loans in less than three minutes from the convenience of their homes. ATms and branches offer instant loans to select customers. ZipRide and Zipdrive are two services that offer instant and preapproved loans

Conclusion:

Technology adoption has changed the overall working of banking system in India. Banks are providing sophisticated services to their customers through product and process innovations.

Data coverage in this study confirms that customers are rapidly adopting technology in their lives. Customers at HDFC bank are able to access services from home, at office or on the go through Mobile Banking, ATM Banking and Net Banking. In transaction processing for e.g. in electronic payment processing through its innovative systems like RTGS, NEFT etc it has made large presence. We can conclude that HDFC bank is offering a wide range of banking and payment services through its digital platforms.

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