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TECHNOLOGICAL DEVELOPMENTS IN INDIAN BANKING SECTOR**N. SURESH BABU****RESEARCH SCHOLAR****DEPARTMENT OF COMMERCE & BUSINESS ADMINISTRATION****ACHARYA NAGARJUNA UNIVERSITY****NAGARJUNA NAGAR****DR. G.V.CHALAM****PROFESSOR****DEPARTMENT OF COMMERCE & BUSINESS ADMINISTRATION****ACHARYA NAGARJUNA UNIVERSITY****NAGARJUNA NAGAR****ABSTRACT**

This paper studies about the technological developments (innovations) in Indian Banking Sector. It also highlights the benefits and challenges of innovative banking trends. The purpose of the study is to analyze the effects of technological developments in banking growth and development in India. The use of technology in expanding banking operations is one of the focus areas of Indian banking sector. The banks in India are using information technology not only to improve their own internal processes but also to improve facilities and services to the banking community at large. The efficient use of technology has provided accurate and timely management of the increased volume of transactions achieved larger customer base. By designing the safe and secured technology, banks will reach the door-steps of customers.

KEYWORDS

Technology, ATM, ECS, NEFT, RTGS.

INTRODUCTION

Banking sector plays a significant role in development of any Economy. In recent years, the technological development of the Indian banking sector has become a novel topic for discussion. Internet usage in India continues to grow over the period of time. Now, India has achieved the third largest internet population country in the world after China (at 575 m) and the US (at 275m). At 150 million total internet users, the internet penetration in India remains at 12% vs. 43% in China and 80% in the US. However, the low penetration of internet usage in India presents unmatched growth opportunity for the internet sector in coming years. 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 2012

Sl. No	Country	Internet users	Penetration (% of population)	% of world users	Population
1	China	538,000,000	40.1	22.4	1,343,239,923
2	United States	245,203,319	78.1	10.2	313,847,465
3	India	137,000,000	11.4	5.7	1,205,073,612
4	Japan	101,228,736	79.5	4.2	127,368,088
5	Brazil	88,494,756	45.6	3.7	193,946,886
6	Total world	2,405,518,376	34.3	100	7,017,846,922

Source : World Internet User Statistics, June 30, 2012

NEED FOR PROMOTING INTERNET BANKING IN INDIA

Over the last decade, most of the banks completed the transformation to technology-driven signalizations. Moving from a manual scale- constrained environment to a global presence with automated systems and processes, it is difficult to envisage the adverse scenario, and the sector was in the era before the reforms, when a simple deposit of withdrawal of Cash would require a day. ATMs mobile banking and online bill payments, like mobile phone bills, telephone bills, electricity bills, water bills, credit card bills, rail reservations, movie tickets booking, insurance premiums and also online trading , shop payments, deposit renewal requests for cheque book, demand drafts, etc., of all these services will be provided to the customers.

With the emergence of Universal Banking, banks aim at to provide all banking product and service offering under one roof and their end over is to be customer relationship and move towards "Relationship Banking", customers are increasingly moving away from the confines of traditional branch banking and seeking the convenience of remote electronic banking. Information technology and the communications networking systems have revolutionized the working of banks and financial entities all over the world.

TABLE -2: SELECT INDICATORS OF FINANCIAL INCLUSION IN DIFFERENT NATIONS AS ON 31.03.2013

Country	No. of branches (per 0.1million adults)	No. of ATMs (per 0.1 million adults)	Bank loan as % of GDP	Bank deposits as % GDP
India	10.64	8.90	51.75	68.43
Australia	29.61	166.92	128.75	107.10
Brazil	46.15	119.63	40.28	53.26
France	41.58	109.80	42.85	34.77
United States	35.43	-	46.83	57.78
Korea	18.80	-	90.65	80.82

Source: - Report on Trend and Progress of Banking in India, RBI (2011-12).

The coverage of banking and the number of ATMs in different countries are shown in Table -2. It can be seen from the data in table -2 that India is a highly under banked country among various nations in the globe and also show that the number of ATMs also very meager which shows that there is a poor financial inclusion in India.

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, 2011-17 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).

COMPUTERIZATION IN BANKS

The peace and quality of banking was changed by technological advancement through computerization as well as the adoption of core banking solutions was one of the major steps in improving the efficiency of banking services, while new private sector banks and foreign banks started their operations in the mid-nineties followed by liberalization, were front runners in adopting technology. Among the total number of public sector bank branches, 98% are fully computerized and within which almost 90% of the branches are on core banking platform at the end of March 2011, whereas all branches of SBI are fully computerized.

TABLE-3: COMPUTERIZATION OF PUBLIC SECTOR BANKS AS ON MARCH 31, 2011 (% of Bank branches)

Category	2010	2011
I. Fully computerized branches (a+bs)	95.0	97.8
(a). Branches under core banking solutions	79.4	90.0
(b). Branches already computerized.	15.6	7.8
II. Partially computerized branches	5.0	2.2

Source: Report on Trends and Progress of Banking in India, RBI (2010-11)

CHANGING TREND OF THE PAYMENT SYSTEMS FROM CASH TO CASHLESS

In India, cash continues to be the pre-dominant mode of payment. The policy initiatives and the regulatory stance of the Reserve Bank has continued to focus on increasing the acceptance and penetration of safe, secure and efficient non-cash payment modes comprising cheques, credit/debit cards and transactions through ECS/NEFT/RTGS over the years. Due to these measures, the average ratio of non-cash retail payment to GDP continues to hover around 6% over the last three years.

IMPORTANT EVENTS IN INDIA

- Arrival of card based payments-debit and credit cards late 1980s and 1990s.
- Introduction of Electronic Clearing Services (ECS) in late 1990s.
- Introduction of Electronic Fund Transfer (EFT) in early 2000s.
- Introduction of Real Time Gross Settlement (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 - 4: TRENDS IN PAYMENTS SYSTEM IN INDIAN BANKS

Year	Non-cash Retail Payments*	Non-cash Retail payments to GDP Ratio	Currency circulation as % of GDP
2006-07	1,94,459	4.53	11.77
2007-08	3,05,382	6.12	11.85
2008-09	3,29,736	5.91	12.38
2009-10	1,06,116	6.29	12.38
2010-11	4,76,291	6.21	12.36
2011-12	5,16,332	5.83	12.04

* indicate cheques, ECS, NEFT, cards, RTGS customer transactions

Source:- Report on Trend and Progress of Banking in India, RBI (2011-12)

The bank-led model for mobile banking has also started gaining popularity in the recent months. At the end of June 2012, 69 banks were granted approval to provide mobile banking facility, of which 49 have started operations. During November 2010, National Payment Corporation of India (NPCI) was given approval to launch Interbank mobile payment service (IMPS), which is a unique 24x7 Inter-bank electronic funds transfer system providing instantaneous credit to the beneficiaries with this channel having now stabilized and gaining further customer acceptance, the earlier transaction limit for mobile banking has been removed by the RBI. The banks are now free to fix their own per transaction limit based on their own risk perception with the approval of their respective boards.

NATIONAL ELECTRONIC FUND TRANSFER (NEFT)

NEFT is an online system of transferring funds of Indian financial institutions, especially loans. This facility is used mainly to transfer funds less than Rs 2,00,000. The NEFT system in India commenced from 21st November, 2005. The NEFT was sent to over all banks which were participating in the special Electronic Funds Transfer (NEFT) clearing. It was made on the Structured Financial Messaging Solutions (SFMS) platform. Public Key Infrastructure (PKI) technique used in the NEFT to maintain security. Apart from this, the volume and value of transactions through the two major electronic payment systems of the country, i.e., RTGS and NEFT has increased rapidly over the period.

TABLE -5: PROGRESS OF NATIONAL ELECTRONIC FUND TRANSFER IN INDIA

Year	Volume(in million)	Value (in billion)
2009-10	66.3	4095
2010-11	132.3	9321
2011-12	226	17,903

Source: Report on Trend and Progress of Banking in India, RBI (2011-12)

Table-5 shows the data on the progress of NEFT in size and value of the business during the period 2009-12. It can be observed from the data in table-5 that the size and value of the NEFT operations during the last three years are increasing cent per cent every year. It can be said from this analysis that there is a tremendous progress in India in making use of the banking technology.

REAL TIME GROSS SETTLEMENT (RTGS)

The Real Time Gross Settlement System was introduced in India since March 2004, and it is a interlink research analysis system through which electronics instructions can be given by banks to transfer funds from their account to the account of another bank. The RTGS system is maintained and operated by the RBI and provides a means of efficient and faster funds transfer among banks and thus facilitating their financial operations.

TABLE-6: PROGRESS OF REAL TIME GROSS SETTLEMENT SYSTEM IN INDIA

Year	Volume (in millions)	Value (in billion)
2007-08	58.4	2,77,183
2008-09	133.6	3,22,799
2009-10	33.2	3,94,533
2010-11	49.2	4,84,872
2011-12	55.0	5,39,307

Source:- Report on Trend and progress of Banking in India , RBI (2011-12)

Pre-payment Instruments (PPT) have emerged as a convenient replacement/substitution for cash transaction, besides providing a proper audit trail. The PPIs are payment instruments which facilitate purchase of goods and services against the value stored on such instruments. At end of June 2012, 40 banks (including the Department of Posts, Government of India) and 21 non-bank entities were granted approval/authorization under the Payment and Settlement System (PSS), Act 2007 to issue PPIs in India. Three types of PPIs are popularly issued, viz., paper voucher, cards and m-wallets. Amongst these, the paper vouchers are the most popular in terms of number and value. These were mainly issued by non-banks. However, efforts are underway to migrate these paper based PPIs to electronic modes.

TABLE-7:- % OF PRE-PAYMENT INSTRUMENTS DURING 2011-12 (Volume in million, value in billion)

Instrument type	No. of PPIs issued	% to total PPIs issued	Value of PPIs issued	% to total PPIs issued
Paper voucher	42.00	97.0	1.76	60.8
Card based	0.57	1.3	1.04	35.8
Mobile account/ballet	0.55	1.3	0.1	3.5
total	43.00	100.00	2.9	100.00

Source: Report on trend and progress of Banking in India, RBI (2011-12)

Table-7 presents the data on percentage of pre-payment instruments during 2011-12. It can be seen from the data in table-7 that the paper voucher instrument is playing a dominant role among the different categories of the PPIs during the period of study. Going forward, the relaxation in the demotic money transfer guidelines introduced in October 2011 are expected to provide further impetus towards financial inclusion through electronic PPIs, including the use of m-wallets by enabling all authorized entities, both banks as well as non-banks to increase domestic remittances through formal payment channels.

ELECTRONIC CLEARING SERVICE (ECS)

The ECS is a mode of electronic funds transfer from one bank account to another bank account by using the services of a clearing house. This is used for bulk transfers from one account to many accounts and vice-versa. There are two types of ECS, viz., ECS (credit) and ECS (debit). The ECS (Credit) is used for affording credit to a large number of beneficiaries by raising a single debit to an account such as dividend, payments of salary, interest, pension, etc. Whereas, the ECS (Debit) is used for raising debits to a number of accounts holders for crediting a particular institution, e.g., payment to utility companies, like telephone, electricity or charges such as house tax, water tax, etc.

TABLE -7: VOLUME AND VALUE OF ELECTRONIC CLEARING SERVICES BY SCBS. (Volume in Million, Value in Billion)

Items	Volume		% of change		Value		% of change	
	2010-11	2011-12	2010-11	2011-12	2010-11	2011-12	2010-11	2011-12
ECS Credit	117	122	19.5	4.3	1817	1838	54.5	1.2
ECS Debit	157	165	5.0	5.1	736	834	5.9	13.3

Source:- Report on Trend and Progress of Banking in India, RBI(2011-12)

Table-7 presents the data on change of electronic credit and debit transactions through the electronic clearing services during 2010-12. It can be seen from the data in table-7 that the ECS debit transactions both in size and value are more when compared to the credit transactions during the period of study.

AUTOMATIC TELLER MACHINES (ATMs)

ATM is the most popular device in India, which enables the customers to withdraw their money 24 hours a day 7 days a week. It includes many other bank related transactions, such as cash withdrawal, paying bills, fees and taxes, printing bank statements, funds transfer, purchasing online products, train ticket reservations, purchases from shopping malls, donating to charities, cheques processing module, adding pre-paid cell phone/mobile phone credit, advertising channels for own or third party products and services. Thus, the ATM card performs the routine banking transactions without interacting with a human teller.

TABLE- 8: BRANCHES AND ATMS OF SCHEDULED COMMERCIAL BANKS (As on March -31, 2012)

Bank Groups	Number of Branches					Number of ATMs		
	Rural	Semi urban	Urban	Metro- Politian	Total	On-site	Off-site	Total
Nationalized Bank	15,606	12,154	10,744	10,132	48,636	18,277	12,773	31,050
State Bank Group	56,582	5,619	3,504	3,125	18,830	15,735	11,408	27,143
Old Private sector banks (OPSBs)	3,342	2,025	1,395	1,085	5,386	3,342	2,429	5,771
New Private Sector Banks (NPSBs)	700	2,662	2,174	2,530	8,066	9,907	20,401	30,308
Foreign Banks (FBs)	7	8	61	246	322	284	1130	1414
Total	23,776	22,468	17,878	17,118	81,240	47,545	48,141	95,686

Source:-Report on Trend and Progress of Banking in India, RBI (2011-12)

Table-8 shows the data on the bank coverage and ATM facility of different types of banks in various regions at the end of 31st March 2012. It can be seen from the data in table-8 that 29.26% of the bank branches are located in rural areas and 27.65% of the branches are located in semi-urban areas. Further, it is also observed that 60% of the nationalized bank branches are located in rural and semi urban areas. The ATMs installed in the country at the end March 2012, new private sector banks had the largest share in offsite ATMs, while nationalized banks have the largest share in onsite ATMs. During the year 2011-12, an additional 21,000 ATMs were deployed by these banks. The public sector banks accounted for more than 60% of the ATMs at the same time, while close to one third of the total ATMs were attributed to new private sector banks. This trend indicates that it is a move towards door-step banking.

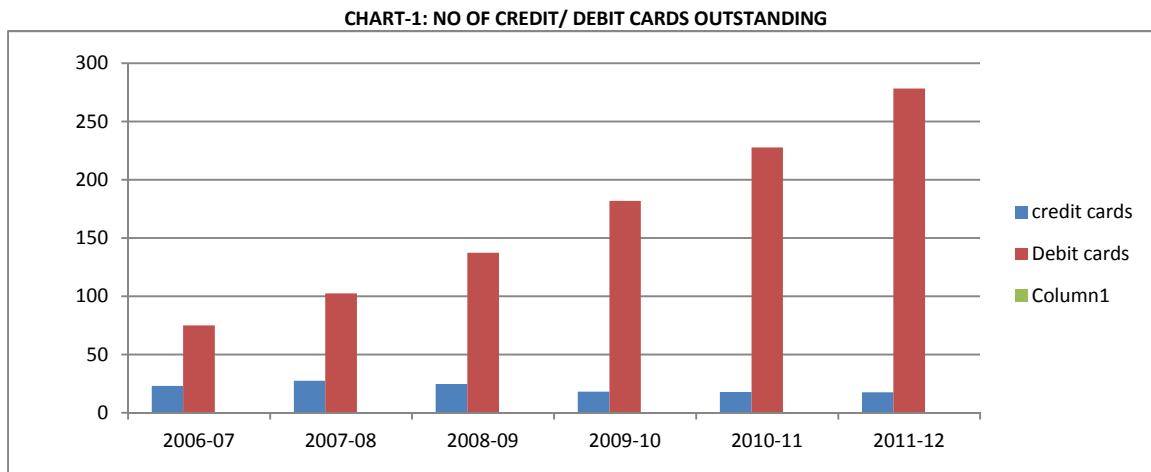
CARDS TRANSACTION

Debit card is a plastic card which provides alternative payment method for cash when making transaction. By using debit card, the cardholder can see the balance available in his account. Debit card is mainly used for cash withdraw from ATM, at point of time also on the internet for online purchase, funds transfer, paying bills, accessing detail account information, changing PIN, etc.. The bank provides the debit card free of cost at the time of opening account. From 1st January 2011, the RBI declared that for every transaction with debit card on ATM has to enter password for every transaction. This is done for security purpose.

DEBIT AND CREDIT CARDS

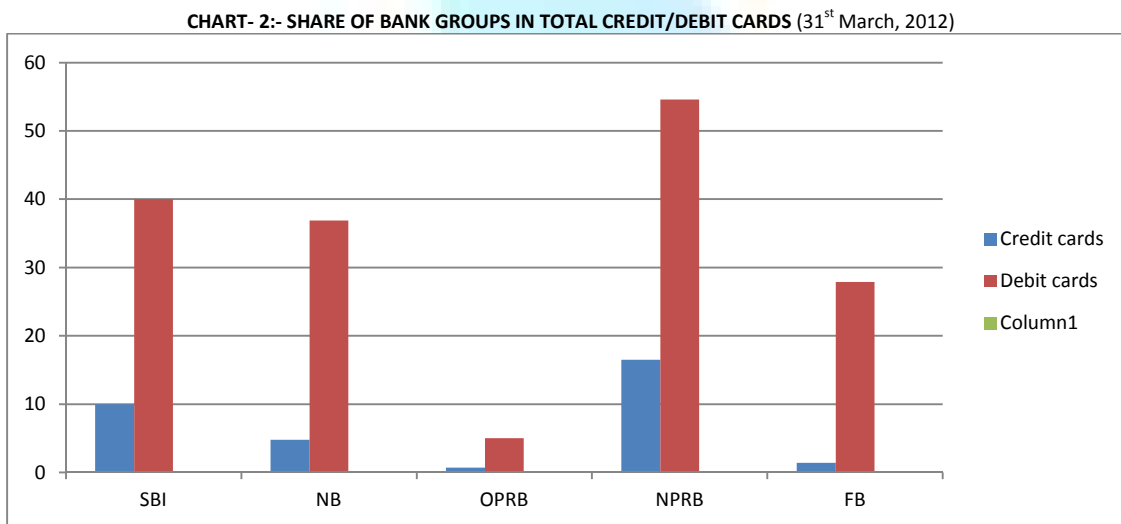
Issuance of credit cards declined, while debit cards showed a high growth trend. Foreign banks showed a small decline in the issuance of debit cards. More than three-fourths of the total debit cards outstanding at the end of March 2012 were issued by public sector banks. In contrast, more than half of the outstanding

credit cards at the same time were issued by new private sector banks. The trends in issuance of debit and credit cards by the public sector banks in India during the period 2006-07 to 2011-12 were shown in chart-1. It can be seen from the chart-1 that the debit cards issue is dominating the issue of credit cards by the banks in India. It shows that the banks are following a positive policy in taking the public in its fold as an inclusive model. It can be concluded from the foregoing analysis that the circulation of hard currency is being reduced and the plastic money can be increased which is a welcome trend in banking activities.



Source: Report on Trend and Progress of Banking in India, RBI(2011-2012).

Chart-2 shows the share of different bank groups in issuing of debit and credit cards during the period 2006-07 and 2011-12. It can be observed from the chart-2 that among the various banks the new private sector banks are issuing more debit cards than that of other groups of banks in India. It can be said that the newly entered private sector banks are more technological advanced ones in order to avail the technological developments in India.



Source: Report on Trend and Progress of Banking in India, RBI (2011-2012).

IMPLICATIONS

The banks were quickly responded to the changes in the industry; especially the new generation banks. The continuation of the trend has re-defined and re-engineered by the banking operations as a whole with more customization through leveraging technology. As technology makes banking convenient, customers can access banking services and do banking transactions any time and from anywhere. The importance of physical branches is going down. Thus, the changes have the following implication:

- ❖ Anywhere any time any place banking.
- ❖ Timeless and placeless banking.
- ❖ Banking at convenience.
- ❖ Dismantling of physical structure.
- ❖ Good bye to traditional instruments and innovation to new instruments.
- ❖ Leading to currency-less monetary system.
- ❖ Disappearance of conventional risk and arrival of new risks.

CHALLENGES IN IMPLEMENTATION

At present structure, banking in India is largely depended on technology. It is necessary that banks have appropriate and adequate arrangements for disaster recovery and business continuity to face any event of natural disaster or operational failures.

BUSINESS CONTINUITY MANAGEMENT (BCM)

In recent years, an integrated “Business Continuity Management”(BCM) arrangement encompassing continuity planning for all business functions including data centers has evolved, with support provided by the Reserve Bank of India. In addition to address the issues of disruption in business process arising from technology failure appropriate disaster recovery and business continuity arrangement have been implemented by the RBI data centers.

CORE BANKING SOLUTIONS

Considering the importance of accuracy and timelines regulatory reporting a project on automating data flow from the core banking solution (CBS) or other IT systems of commercial banks to the reserve bank was announced in the monetary policy statement of 2010-11. The approach paper released in November 2011, prepared by a core group with representation from banks, the reserve bank, IDRBT and the IBA envisions the implementation in two phases. In the first phase, banks were advised to ensure seamless flow of data from their transaction server to their management information system (MIS) Server while the second phase would involve the reserve bank to introduce system for generating all returns from banks’ MIS. Implementation of the first phase is in progress and is monitored

and reviewed at quarterly intervals. In the second phase, the RBI would introduce a system for the flow of data from the MIS server of banks in a straight through process.

TECHNICAL ADVISORY GROUP (TAG)

Considering the tremendous growth in volume of transactions through the RTGs system, a technical advisory group (TAG) with members from technology institutes, banks and reserve bank was constituted in order to review the RTGs system. The group recommended building up the new generation RTGs (NG-RTGS) system, which would encompass key features such as:

- ❖ Liquidity saving mechanism.
- ❖ Advanced queue management system.
- ❖ Various modes of access as per the size of the bank.
- ❖ Extensible mark- up language (XML) based messaging system.
- ❖ Real time information and transaction monitoring and control system having the dashboard facility.

FUTURE TRENDS

Energy management and move towards Green Technology: Most of the banks are conscious of the carbon foot print generated and are working towards energy management and use of Green Technology.

Some of the measures adopted are:

- Solar powered ATMs.
- Use of windmill energy.
- Adoption of server virtualization technologies to save on floor space, power and cooling components.
- Adoption of Blade server Technology to have higher computing power in small foot print.
- Up gradation of old power hungry servers, storage and networking equipment's
- Dynamic power capping of servers, desktops by employing newer power saving.
- Technologies like process stepping.

CONCLUSION

Use of technology in expanding banking is one of the focus areas of banks. The banks in India are using information technology not only to improve their own internal processes but also to increase facilities and services to the banking community at large. Efficient use of technology has facilitated accurate and timely management of the increased transaction volume of banks of that comes with larger customer base. By designing and use of simple safe and secure technology, banks reach at door-step of customer and further develop in the existing electronic payments.

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