IOSR Journal of Economics and Finance (IOSR-JEF)
e-ISSN: 2321-5933, p-ISSN: 2321-5925
PP 22-29
www.iosrjournals.org

Wings of Changed Technological Payment Systems in Indian Banking –An Empirical Study

***Dr.Deepak Tandon, Dr. Neelam Tandon, ***Ms. Nishi Kumari, ****Ms. Reema Ranjan**

[*]Professor, International Management Institute (IMI), Qutab Institutional Area, New Delhi, India Email deepaktandon@imi.edu, 9811688833
**Associate professor, JIMS Kalkaji New Delhi
[***]PGDM (Finance) Final Year student, IMI ,New Delhi [****]PGDM (Finance) Final Year student, IMI, New Delhi

ABSTRACT: Information Technological changes have brought in a vertical and not so subtle products in Banking. There has been a radical shift from mass Banking to Class banking thereby bringing a total change in the face of Banking . .According to RBI, the major driving force behind the technological up gradation & transformations in the Indian banking sector has been the financial sector reforms of the nineties, opening up of the economy and globalization. Moreover, arrival of foreign and private banks with their superior state-of-the-art technology has led to growing competition in the sector. This has brought in a win – win catch situation between Bankers and Customers . The computerization and use of technology in banks has helped in a number of ways. Minimized costs of operation, Minimized transaction costs for customers, improved customer services, overall efficiency, and improved front end are examples of such outcomes. This has brought in widening the gap between marginal benefits and costs in the technological enabled Indian Banking set up. The authors have attempted to expound the scope of innovation and the paradigm shifts taking place in RTGS, M- banking, NEFT, EFT, ECS have made significant move in payment systems through electronic mode. The authors have studied Volume of RTGS & Mobile transactions for the years 2011 to 2013 for 14 chosen banks - seven each in private and public banks by applying Shapiro-Wilk Test of normality and NEFT/ RTGS, paired T tests and have concluded that by increasing cost of building brick-and-mortar branches, decreasing cost of computers, high delivery costs and slow revenue growth force a relook at the conventional delivery systems in the Indian Banking system. The new strategy changes the focus of the branch from being a high cost transaction centre to a provider of a wide range of services like tele-banking, customer service kiosks, ATMs, and remote electronic banking.

Key Words:
(i) PLC – Product life cycle
(ii) NEFT – National Electronic Fund Transfer
(iii) RTGS – Real Time Gross Settlement
(iv) **ECS** – Electronic clearing system

JEL Classification - G20, G21, L10, L11, O30

1. Introduction

During the period March 2000 and March 2010, total assets with the banks have increased more than five times, from $250 billion to more than $1.3 trillion, registering a CAGR of 18% compared to average GDP growth of 7.2% during the same period. In the last decade more than 14000 branches and 41000 ATMs have been added by the banks to their network, besides broadening the scope of delivery channels to internet banking, mobile banking, phone banking and call centers. The industry has become more efficient and productive over the years. The computerization and use of technology in banks has helped in a number of ways. The most important of these are:

1) Minimized costs of operations
2) Minimized transaction costs for customers
3) Improving customer services
4) Increased overall efficiency
5) Enhancement of competitive efficiency of the banking sector
6) Strengthening of back-end administrative processes

7) Improvement of front-end operations
8) Furthering of financial inclusion by making small ticket retail transactions cheaper, easier and faster for the banking sector as well as for the small customers

1.1 Beginning of IT in Indian Banking Sector

In the mid eighties RBI started promoting computerization and Management Information System (MIS) in banking to improve customer services, book keeping and to enhance productivity. Since then banks, along with the guidance of RBI, achieved various objectives, such as the introduction of MICR based cheque processing, implementation of the electronic payment system such as RTGS (Real Time Gross Settlement), Electronic Clearing Service (ECS), Electronic Funds Transfer (NEFT), Cheque Truncation System (CTS), Mobile Banking System etc.

With the support of RBI, the Institute for Development and Research in Banking Technology (IDRBT) was set up in Hyderabad as a research and technology centre for the banking sector for excellence and advancement in technology. This also resulted:

- Commissioning of the Indian Financial Network (INFINET), a Closed User Group based network for the exclusive use of the Banking Sector with state-of-the-art safety and security
- Commissioning of Certification Authority (CA) functions for ensuring that electronic banking transactions get the requisite legal protection under the Information Technology Act, 2000
- Implementation of the National Financial Switch (NFS) to ensure inter-connectivity of shared ATMs and to provide for fund settlement across various banks (now managed by NPCI).

IDRBT also provides a platform for transmission of electronic messages across banks using common standards, for facilitating 'Straight Through Processing ' (STP) in the form of Structured Financial Messaging System (SFMS), which is similar to the Society for Worldwide Interbank Financial Telecommunication (S.W.I.F.T) messaging pattern.

Recognizing the need for upgrading the country's financial infrastructure in respect of Clearing and Settlement of debt instruments and forex transactions, The Reserve Bank of India initiated the move to set up the Clearing Corporation of India Ltd. (CCIL). The country's largest bank, State Bank of India, took the lead in setting up of the CCIL. The other core promoters of CCIL are LIC, IDBI, ICICI Bank, HDFC Bank, and Bank of Baroda. CCIL is the country's first clearing house for Government Securities, Repos, forex and other related market segments.

1.2 Innovations in technology at Indian Banking Sector

Technology has led banks to grow and expand its reach to the underserved areas as well. It is now the spearhead for Banking, making it more convenient for the common man. Indian banks are putting in place a robust infrastructure to leverage the benefits of IT. Also, it helps them function in an organized and secure way. Accounts at any of the Clearing Banks with access to the EFT clearing system can be credited or debited.

Currently, banks have focused on a number of IT products especially EFT (Electronic Fund Transfer) which is comprehensive, flexible and cost effective alternative to cash and paper payments. The large value electronic payment systems, viz., Real Time Gross Settlement System (RTGS) and the Retail Electronic Payment Systems, viz., National Electronic Clearing Services (NECS and ECS), National Electronic Fund Transfer (NEFT) and Card Payment Systems are the electronic payment systems available in India.

Technological innovations give customers following advantages:-

- **Comfort** – Access to the bank 24 hours a days, 7 days a week, without depending on the bank's schedule
- **Low costs** – In order to reduce the number of clients who go to the bank desks, there are fee reductions (10-50% of the ordinary fees) for the electronic payments
- **Time saving and reduced expenses** - No more transportation to and from the bank building
- **Safety** – Transactions take place in the best security conditions as customers use a username, a password, and an encrypted channel
- **Accessibility** – Online connection with the bank fro any Internet connected computer
- **Simple and ergonomic menu -** leading the client directly to the operation he/she wants to perform

2. Objectives of the paper

1. To study the technological shift in private and public banks from the year 2011 to 2013
2. To compare volume of e-transactions done in private and public banks using NEFT and mobile.
3. To study the performance of banks due to the implementation of e-banking products.

3. Review of Literature

1. Kumar (2006) another path-breaking innovation in the banking sector in recent times isthe emergence of internet banking customer can access his account anywhere even from the comfort of his computer in the house with the added benefit of funds transfer facility. Internet banking is estimated to be even more cost effective for banks as compares to ATMs. Internet banking also provides the customers with value added services like payment of insurance premiums, payment of utility bills, booking of railway tickets etc.
2. RBI (2001) with the popularity of PC's, easy access to internet & World Wide Web banks increasingly use internet as a channel for receiving instructions and delivering their products and services to their customers. This form of banking generally referred to as internet banking, although the range of products and services offered by banks vary widely both in their content and sophistication.
3. Radakrishna et.al. (2007) BNM defines 'internet banking' as '*banking products & services offered by banking institutions on the Internet through access devices, including personal computers & other intelligent devices*'
4. Avasthi & Sharma (2000-01) have analyzed in their study that advances in technology are set to change the face of banking business. Technology has transformed the delivery channels by banks in retail banking. It has also impacted the markets of banks. The study also explored the challenges that banking industry and its regulator face.
5. B. Janki (2002) analyzed that how technology is affecting the employees' productivity. There is no doubt in India; particularly public sector banks will need to use technology to improve operating efficiency and customer services. The focus on technology will increase like never before to add value to customer services, develop new products, strengthen risk management.

4. Methodology

The present paper is concerned with the technological advancement and its role in performance in the Indian Banking Industry. Secondary Data of RTGS and mobile in terms of number of transactions in millions for the annual years 2011 to 2013 has been collected from Reserve Bank of India, New Delhi. Paired sample T- Test and Shapiro Wilk Test are used as statistical tools to analyze the significant product contribution in terms of technological advancements for two succeeding years.

5. Data Analysis

Volume of RTGS & Mobile transaction for the years 2011 to 2013 was consolidated for 7 private and public banks and is shown below:-

BANK NAME	RTGS	MOBILE
AXIS BANK LTD	17626897	6915493
BANK OF INDIA	9531949	2382585
CANARA BANK	6248993	108707
CORPORATION BANK	4982605	78942
DEVELOPMENT CREDIT BANK	820930	9603
DHANALAKSHMI BANK LTD.	909340	3906
HDFC BANK LTD.	42643228	1599504
ICICI BANK LTD	15757169	11924857

ING VYSYA BANK LTD.	4146197	519
KOTAK MAHINDRA BANK LTD.	5132520	57139
ORIENTAL BANK OF COMMERCE	6591020	36398
PUNJAB NATIONAL BANK	13939276	25919
STATE BANK OF INDIA	45813809	69452606
UNION BANK OF INDIA	9989207	885653

5.1. Descriptive Statistics Analysis

Sample size: 14 (Private and public banks)

- Mean statistics for RTGS 2011-13 is 13152367.14 and that of Mobile 2011-13 is 6677273.64.
- We can clearly see that the volume of transaction for RTGS for the given sample is way too high when compared to volume of transaction in mobile.

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
RTGS 2011-13	14	820930	45813809	184133140	13152367.14	14119972.96	1.994E+14	1.734	.597	2.193	1.154
Mobile2011-13	14	519	69452606	93481831	6677273.64	18394250.56	3.383E+14	3.530	.597	12.780	1.154
Valid N (listwise)	14										

5.2. T-Test Analysis

a) Hypothesis

H0: There is no significant difference between the means of the two variables namely RTGS and Mobile
H1: There is a significant difference between the means of the two variables namely RTGS and Mobile

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	RTGS 2011-13 - Mobile2011-13	6475093.500	13192454.11	3525831.669	-1142002.725	14092189.72	1.836	13	.089

- P-value for the pair RTGS and Mobile is 0.089 which is greater than 0.05, required level of confidence. Hence, we accept the null hypothesis. Hence, there is no significant difference between the means of the two variables namely RTGS and Mobile.

5.3. Shapiro-Wilk Test

b) Hypothesis :

H0: The sample data is normally distributed for both RTGS and Mobile.
H1: The sample data is not normally distributed for both RTGS and Mobile.

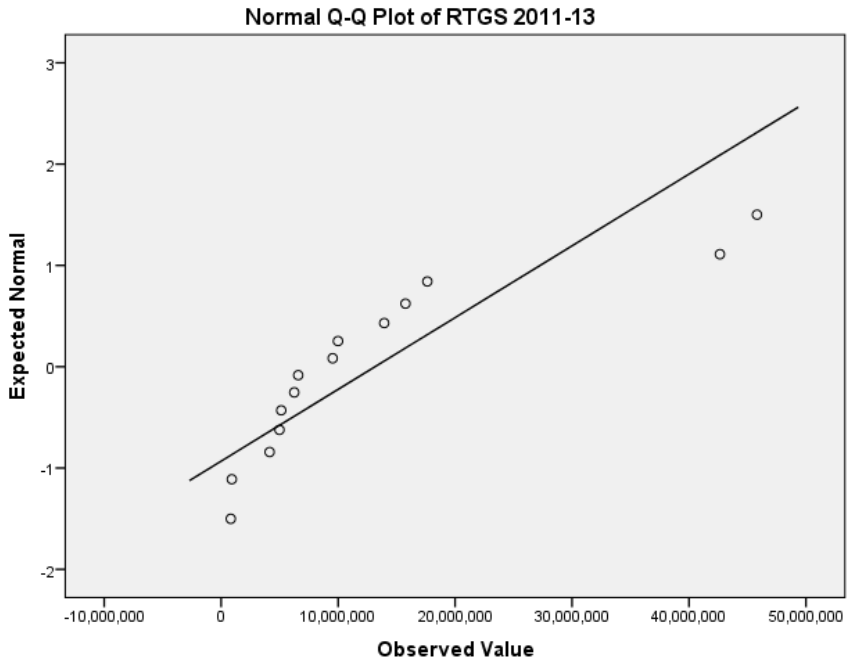
To test the normality of the sample data, Shapiro-Wilk test was performed as the sample size was just 14. In order to perform Kolmogorov-Smirnov test, sample size must be greater than 2000. We see that the p–values for RTGS 2011-13 and Mobile 2011-13 are 0.001 and 0.000 respectively which are less than 0.05, required level of confidence. Hence, we reject the null hypothesis of sample being normal for both RTGS 2011-13 and Mobile 2011-13.

Tests of Normality

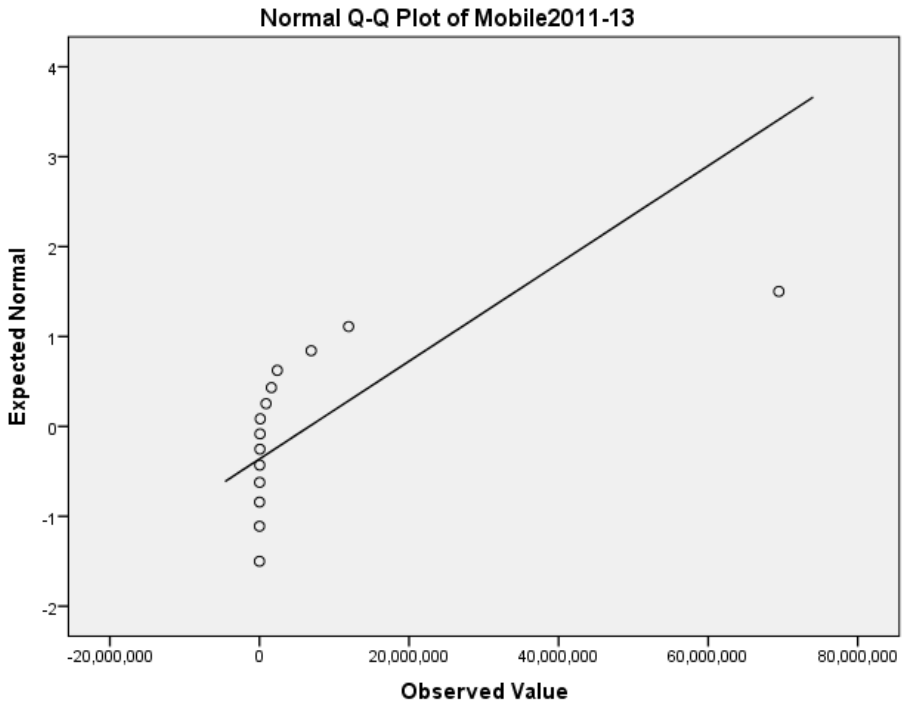
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
RTGS 2011-13	.233	14	.038	.753	14	.001
Mobile2011-13	.378	14	.000	.416	14	.000

a. Lilliefors Significance Correction

RTGS 2011-13



Mobile 2011-13



6. Conclusion

With the growth and development of IT and technology in all sectors of the economy, it becomes highly important for the banking sector to keep pace with the changing times. In order to be more updated with the changes happening across the banking sector, all kind of banks have to make use of Information Technology to make their work efficient. Also customers are required to change and adapt as per the need of the time. However, with more involvement of Information technology, there are high level of security issues which should be handled critically in order to safeguard customers and banks information.

7. Recommendation

- Continuous up gradation in technology at Banks is recommended to so as to survive successfully in the growing competitive environment.
- Due to the omnipresent threat of cyber crime, data errors, data inconsistency, etc. and the increasing volume of transactions through IT enabled payment systems in banks, the prevailing system needs to be more robust and highly secured
- Training the customers to use the online banking services would increase their convenience and thereafter decrease the burden on the bank for small transactions.
- A mix of technologies, better processes of credit and risk appraisal, treasury management, product diversification, internal control and external regulations and not the least, human resources is the need of the hour to make a transformed Indian Banking -IT vision 2025.

REFERENCES

[1] Andrade, C: "*Banking products and services*" in **Indian institute of Banking and Finance Mumbai**.
[2] Avasthi G P M (2000 - 01), "Information Technology in Banking: Challenges for Regulators**",** Prajnan, Vol. XXIX, No. 4, pp. 3 – 17
[3] B. Janki (2002): "*Unleashing Employee Productivity: Need for a Paradigm Shift*"; Indian Banking Association Bulletin XXIV (3); March 7 - 9.
[4] Gupta V: "*Risks of E-banking in India*" in E-Banking, the ICFAI University Press, 2004.
[5] Mittal, R.K. & Sanjay (2007): "*Technology in Banking Sector: Issues and Challenges*"; Vinimaya, Vol. XXVII, No. 4, (Jan – March); pp. 14 – 22.
[6] Padhy, K.C. (2007): "*Banking Future"*; (ed. book) Dominant Publishers and Distributor, New Delhi.
[7] Reddy, Y. V. 2005. "Banking Sector Reforms in India: An Overview." RBI Bulletin. June 2006. "Reforming India's Financial Sector. Changing Dimensions and Emerging Issues. RBI Bulletin.
Shastri, R.V. (2003): "*Recent Trends in Banking Industry: IT Emergence*"; Analyst (March); pp. 45-46.
[8] Santhanakrishnan, M.S and Chetan, D: "*Information systems for banks*" in Indian Institute of Bankers Mumbai
[9] Uppal R.K., "Customer Perception of E – Banking Services of Indian Banks: Some Survey Evidence", The ICFAI Journal of Bank Management, Vol. VII No.10

ANNEXURE

PAYMENT SETTLEMENTS IN INDIAN BANKS

System	Volume (Million)				Value (` Billion)			
	2012-13	2013			2012-13	2013		
		Jul.	Aug.	Sep.		Jul.	Aug.	Sep.
	1	2	3	4	5	6	7	8
1 RTGS	68.52	6.58	6.21	6.26	1,026,350.05	80,774.86	67,557.35	77,271.32
1.1 Customer Transactions	63.99	6.15	5.81	5.86	512,997.84	48,216.21	42,652.24	49,130.14
1.2 Interbank Transactions	4.52	0.42	0.39	0.40	163,843.20	14,206.66	12,431.12	13,705.08
1.3 Interbank Clearing	0.009	0.001	0.001	0.001	349,509.02	18,352.00	12,473.99	14,436.09
2 CCIL Operated Systems	2.26	0.23	0.19	0.20	501,598.49	58,250.71	49,260.43	51,039.70
2.1 CBLO	0.16	0.02	0.02	0.02	120,480.39	19,764.77	17,340.95	16,683.33
2.2 Govt. Securities Clearing	0.70	0.07	0.04	0.06	119,947.98	13,885.62	9,896.36	11,963.83
2.2.1 Outright	0.66	0.07	0.04	0.06	65,920.33	7,182.59	4,247.80	5,792.58
2.2.2 Repo	0.041	0.004	0.004	0.004	54,027.65	6,703.03	5,648.56	6,171.25
2.3 Forex Clearing	1.40	0.14	0.13	0.13	261,170.12	24,600.32	22,023.12	22,392.54
3 Paper Clearing	1,313.48	110.61	107.22	98.08	99,982.25	7,946.28	7,754.26	7,276.11
3.1 Cheque Truncation System (CTS)	275.04	39.91	38.59	40.98	21,779.52	2,952.53	2,855.52	3,036.51
3.2 MICR Clearing	823.31	51.26	47.26	41.18	57,503.97	3,350.37	3,243.97	3,020.58
3.2.1 RBI Centres	496.81	29.07	25.77	22.45	36,045.97	1,908.31	1,636.27	1,484.37
3.2.2 Other Centres	326.50	22.19	21.49	18.73	21,458.00	1,442.06	1,607.69	1,536.21
3.3 Non-MICR Clearing	215.31	19.45	21.37	15.92	20,898.28	1,643.38	1,654.77	1,219.02
4 Retail Electronic Clearing	694.07	81.99	82.73	83.74	31,881.14	3,824.88	3,493.03	3,757.17
4.1 ECS DR	176.53	15.88	15.42	16.13	1,083.10	101.89	99.21	107.13
4.2 ECS CR (includes NECS)	122.18	15.05	18.91	15.35	1,771.28	274.80	238.78	210.16
4.3 EFT/NEFT	394.13	50.42	47.62	51.25	29,022.42	3,444.39	3,150.34	3,434.36
4.4 Immediate Payment Service (IMPS)	1.23	0.65	0.79	1.02	4.33	3.80	4.71	5.53
5 Cards	6,398.35	609.40	620.92	614.45	18,637.36	1,766.31	1,757.85	1,722.55
5.1 Credit Cards	399.13	42.59	41.65	40.26	1,243.93	111.75	108.88	105.50
5.1.1 Usage at ATMs	2.52	0.23	0.24	0.23	14.42	1.36	1.39	1.33
5.1.2 Usage at POS	396.61	42.36	41.41	40.04	1,229.51	110.39	107.48	104.17

5.2 Debit Cards	5,999.21	566.81	579.27	574.19	17,393.44	1,654.56	1,648.97	1,617.05
5.2.1 Usage at ATMs	5,530.16	514.36	523.78	520.70	16,650.08	1,577.34	1,568.79	1,543.18
5.2.2 Usage at POS	469.05	52.45	55.49	53.49	743.36	77.22	80.18	73.87
6 Prepaid Payment Instruments (PPIs)	66.94	12.40	14.12	13.59	79.22	6.18	6.01	6.08
6.1 m-Wallet	32.70	7.94	8.68	8.74	10.01	2.20	2.36	2.33
6.2 PPI Cards	33.76	4.41	5.41	4.81	49.62	1.96	2.02	1.91
6.3 Paper Vouchers	0.48	0.05	0.04	0.04	19.60	2.02	1.63	1.84
7 Mobile Banking	53.30	7.03	6.76	7.15	59.90	12.84	14.13	15.62
8 Cards Outstanding	350.75	374.22	380.80	386.39	-	-	-	-
8.1 Credit Card	19.55	18.80	18.46	18.60	-	-	-	-
8.2 Debit Card	331.20	355.42	362.34	367.79	-	-	-	-
9 Number of ATMs (in actuals)	114014	124072	1E+05	130290	-	-	-	-
10 Number of POS (in actuals)	854290	952634	1E+06	995941	-	-	-	-
11 Grand Total (1.1+1.2+2+3+4+5+6)	8,543.60	821.22	831.4	816.32	1,329,019.50	134,217.22	117,354.94	126,636.83