Influence of E-delivery Channels on Productivity of Commercial Banks in India

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ABSTRACT

Technological progress in the banking industry is important because of the key roles of banks in providing financing, deposits and payment services to other sectors of the economy. So, This paper brings out the impact of use of e-delivery channels on the employee productivity and branch productivity of commercial banks in India. The commercial banks are divided into five broad groups- Foreign banks, Nationalized banks, New Private banks, Old Private banks, SBI and its Associates. For the purpose of this study six productivity ratios have been taken for a five year duration ranging from 2007-08 to 2011-12. Regression analysis has been made to bring out the impact of e-delivery channels on productivity performance. SPSS (version 19) is applied for statistical data analysis. The findings indicated that the productivity has positive relationship with the use of ATMs and Credit cards.

Key Terms: *E-Delivery Channels, Branch Productivity, Employee productivity, Debit Cards, and Credit Cards*

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INTRODUCTION

Indian banking industry has now entered to the technology based customer-centric and competitive banking from the earlier social banking era. The use of technologies such as automated teller machines, phones, the internet, credit cards, and electronic cash have transformed the way banks deliver their services. Jalan, B. (2003), expressed that perhaps no other sector has been affected by advances in technology as much as banking and finance. Shetty, V.P. (2000) states that technology is dramatically altering the ways in which financial services are delivered to consumers. In line with global trends, electronic banking in India has been undergoing many changes. Banks in India have used IT not only to improve their own internal processes but also to increase facilities and services to the customer. Apart from reducing transactions costs, the use of technology has also provided new avenues to banks to expand their outreach, especially in the remote and rural areas. The development of E-Banking has an enormous effect on development of more flexible payment methods and more user friendly banking services. In recent years, the use of electronic payments has witnessed manifold increase, partly reflecting increased adoption of technology. The ultimate aim of using e-delivery channels include ensuring increase in productivity and efficiency of banks through customer satisfaction, improvement in internal operations and employee empowerment. The majority of the banks in India have started using e-delivery channels since the beginning of twenty first century. Hence, it is high time to investigate the influence of IT on productivity of Indian's banking sector.

One of the most frequently used tools for performance analysis is productivity ratios. Productivity helps firms, industries and nations to achieve sustainable competitive advantage. Every firm is concerned with its productivity and there are various factors which affect the productivity of various players in the banking field. So, in order to have a reliable idea of productivity, it is necessary to study the relationship of those factors with bank productivity.

The profitability and employee productivity are two categories of performance indicators of a bank. The financial performance is measured by profitability indicators and the employee productivity measures non financial performance. Employee productivity refers to per employee deposits, credits and business etc. Every employee and every branch of a bank contributes to its total productivity. Branch productivity means proportionate production of the banks per branch in terms of deposits, credits, business, total income etc. Hence, the management and evaluation of the branch productivity and employee productivity is an imperative for taking policy decisions in banks.

EVIEW OF LITERATURE

Recently several researchers, bankers, and policy makers have either conducted studies or written conceptual articles on the topic 'impact of computerization and IT' on the efficiency, productivity, customer satisfaction etc. in Indian banking industry. In this part of the paper some of the more frequently quoted studies have been reviewed.

Kamesam (2001)studied the changes that took place in the Indian banking industry which emphasized on technological advancements and profitability in banks. This study highlights that emergence of services such as electronic data interchange (EDI), usage of smart cards, RTGS, e-commerce etc. have resulted in increasing the level of profitability and productivity of banks. The author concluded that in order to reduce crimes, security audit should be done which will be helpful in improving customer service, increase systematic efficiency and thus increased productivity and profitability. DD Krishnamoorthy, Deputy General Manager, information technology, Bank of India (2002) says that the primary reason preventing PSU banks from introducing online banking services, has been the absence of a legal framework to back up, and regulate Internet banking operations in the country. Though the Information Technology Act, 2000 attempted to address a number of e-commerce regulatory issues, he feels that there are still grey areas which have neither been spelt out properly nor have the courts suggested workable modes of implementation. Janki, B. (2002) analyzed the effect of technology on the productivity of employees. The author found that there is utmost need in public sector banks to use technology to improve operating efficiency and customer services.

Mittal and Dhingra (2007) used Data Envelopment Analysis (DEA) to study the impact of computerization on profitability and productivity of banks in India. The study found that IT investment is one of the factors which lead to improved performance of banks. Shabbar Jaffry, et al. (2007) study is aimed to measure changes in productivity and technical efficiency levels within banking sectors of the Indian sub-continent: specifically India, Pakistan and Bangladesh, over the period 1993–2001. It was found that India and Bangladesh experienced immediate and sustained growth in technical efficiency, whereas Pakistan endured a reduction in efficiency during the middle years of the study, before rebounding to levels comparable to the rest of the sub-continent in the latter years of the study. Uppal, R.K. and Kaur, R. (2007), studied the status of IT in Indian banking sector. The authors mentioned that IT revolution has changed the way banking business is done in India. Hugar S.S. and Vaz N.H. (2008) evaluated the customer orientation in 5 public sector, 3 new private sector and 3 foreign banks. The study concludes that new private sector banks have more ATMs, at the end of March 2006, followed by SBI group. Business per employee and profits per employee are higher in foreign banks than SBI.

Pooja Malhotra and Balwinder Singh (2009) present the current state of internet banking in India. The results show that nearly 57 percent of the banks provide internet banking services. The multiple regression results reveal that the profitability and offering of Internet banking do not have any significant association. Paper of Uppal (2011) exhibits the growth of information technology in various bank groups. The maximum technology is taking place in new generation private sector banks as well as foreign banks. Public sector banks have more on site ATMs where as new private sector banks and foreign banks have more off site ATMs. The paper also suggested some strategies to enhance e delivery channels in banks particularly in public sector banks. The main objective of Paul and Trehan (2011) study was to analyze the impact of technology on bank customers using e-delivery

channels. This paper takes into account all the technological initiatives by banks as part of their channel diversification strategy. The results show that public sector banks have the least average increase of customers as compared to other bank groups. The employee, branch and total productivity index has shown an increase in all bank groups.

Paper by Dhiraj Sharma (2012), attempts to study financial performance of banks by classifying them on the basis of usage of Technology. The study brought out that the performance of most of the banks has improved significantly since the adoption of technology. Kaur (2012) paper analyzes the impact of IT on branch productivity of partially and fully IT-oriented banks. The correlation was calculated from the mentioned ratios of selected factors drawn from IBA and RBI reports' data. It concludes that IT along with other factors, have improved the productivity at an excellent rate and fully IT-oriented banks are the most beneficiaries. Natarajan and. Duraisamy (2012)hashighlighted the level of awareness of the customers regarding the various e-banking products and services. The study found that the profitability performance of banks is determined by non- interest income positively whereas NPA's have negative effect on it.

The review of literature indicates that the issue of impact of IT on performance of banking have attracted the attention of numerous scholars and bankers since the beginning of 21st century. However, there are some gaps in the existing studies. For instance, there is a negligible research work which focuses on the relationship between usage of e-delivery channels (such as numbers of debit cards and credit card). Also majority of the previous studies are either conceptual or opinionistic survey about the use of technology in banking operations. In view of the above, there was an urgent need of a study which could bring out the influence of the usage of e- delivery channels on the efficiency and performance of the varied groups of commercial banks in India. The present study which aims to bring out the influence of e- delivery channels on the productivity of commercial banks in India is a well thought and timely initiative in this direction.

ESEARCH OBJECTIVE AND HYPOTHESIS

The objective of the present research paper is to analyze the impact of e-delivery channels on productivity of various banks in India. The Study has also brought out the present e-banking scenario of ATMs, Internet banking, Mobile banking and Credit cards in India. To achieve the objectives of the study, the following hypothesis is formulated

H_0: There is no significant relationship between the magnitude of E-delivery channels and the level of productivity of various bank groups' i.e. foreign banks, nationalized banks, new private sector banks, old private sector banks and SBI and its associates.

ESEARCH METHODOLOGY

The present study is descriptive in nature. The reference period of the study is 5 years from 2007-08 to 2011-12. It compares the productivity performance of the various bank sector banks. Thus, it reveals the bank group-wise productivity in place of bank wise. The secondary data is taken as input to achieve the objectives of the study, For this study secondary data has been procured from:(i) Performance highlights, various issues, IBA (Mumbai), (ii) IBA Bulletin (Special Issues), 2007-08 to 2011-12; (iii) Report on Trend and Progress of Banking in India, 2007 to 2013; (iv) Statistical Tables Relating to Banks in India (RBI).

The data have been analyzed through descriptive and inferential statistical techniques such as mean, R, adjusted R2, F-test and multiple regressions. The problem of multi-co linearity is examined by Durbin Watson test. Excel spreadsheet and spss software (version 19) are used for statistical analysis. To remove the multicollinearity problem, if any, in the data the step wise method of regression has been used. The analysis is in conformity with the objective of study and the hypothesis formulated. The following productivity indicators are used to measure labor/employee productivity and branch productivity:

Deposit per employee	(D/E)	Deposit per branch	(D/BR)
Credit per employee	(CR/E)	Credit per branch	(CR/BR)
Profit per employee	(TP/E)	Profit per branch	(TP/BR)

The following multiple regression equation has been used to examine the impact of e-delivery channels on the productivity of Indian banks.

$$Y_c = a + b1*X1 + b2*X2 + b3*X3 + b4*X4 + e$$

Where Y_c = Estimated value of dependent variable, bi's are regression coefficients for various independent variables. X1 to X4 are the observed values of the independent variables. In the above mentioned model different regression equations were fit by taking various measures of productivity as the dependent variable. The independent variables under study include: percent of ATMs to branches, per cent of off-site ATMs to total ATMs, number of outstanding credit cards and debit cards issued by a particular bank group during 2007-08 to 2011-12. The error term(e) in model is assumed as zero.

Status of E-delivery Channels in Indian Banking Industry

The process of computerisation, which was the starting point of all technological initiatives, is reaching near completion for most of the banks. Public sector banks continue to spend large amounts on computerisation and development of communication networks. Table 1 indicates that the proportion of public sector bank branches which achieved full computerization increased from 71 per cent as at end-March 2005 to 97.8 per cent as at end-March 2010 and the process of computerization is almost on the completion stage as more number of banks have moved into the 'more than 90 per cent but less than 100 per cent' category.

Table 1: Computerization in Public Sector Banks (percentage to total branches)

Category	2005	2006	2007	2008	2009	2010
Partially Computerized Branches	**21.8**	**18.2**	**13.4**	**6.3**	**5**	**2.2**
Fully Computerized (i+ii) Branches	**71**	**77.5**	**85.6**	**93.7**	**95**	**97.8**
(i) Branches Under Core Banking Solution	11	28.9	44.4	67	79	90
(ii) Branches already Fully Computerized	60	48.5	41.2	26.6	15.6	7.8

Source:Reporton TrendandProgress ofBankinginIndia2010-11RBI,Mumbai

Table 2: Bank group wise no. of Branches and ATMs of Scheduled Commercial Banks in India

Year	Bank Group	Total Branches	ATMs		Total ATMs	Percent of Onsite ATMs to Total ATMs	Percent of Offsite ATMs to Total ATMs	Percent of ATMs to Total Branches
			Onsite	Offsite				
(March end 2012)	All Scheduled Commercial Banks	81,24	47,545	48,141	95,686	49.7	50.3	117.8
	Nationalized Banks	48,636	18,277	12,773	31,050	58.9	41.1	63.8
	State Bank Group	18,830	15,735	11,408	27,143	58.0	42	144.1
	Old Private Sector Banks	5386	3342	2429	5771	57.9	42.1	107.1
	New Private Sector Banks	8,066	9,907	20,401	30,308	32.7	67.3	375.8
	Foreign banks	322	284	1130	1414	20.1	79.9	439.1
(March end 2011)	All Scheduled Commercial Banks	74,130	40,729	33,776	74,505	54.7	45.3	100.5
	Nationalized Banks	44,298	15,691	9,145	24,836	63.2	36.8	56.1
	State Bank Group	17,913	14,104	10,547	24,651	57.2	42.8	137.6
	Old Private Sector Banks	4,817	2641	1,485	4,126	64.0	36	85.7
	New Private Sector Banks	6,785	8007	11518	19525	41.0	59	287.8
	Foreign banks	317	286	1021	1367	20.9	79.1	431.2
(March end 2010)	All Scheduled Commercial Banks	69,160	32,679	27,474	60,153	54.3	45.7	87
	Nationalized Banks	41,596	12,655	7,047	19,702	64.2	35.8	47.4
	State Bank Group	17,229	11,142	9,836	20,978	53.1	46.9	121.8
	Old Private Sector Banks	4,952	2,266	1,124	3,390	66.8	33.2	68.5
	New Private Sector Banks	5,075	6,337	8,720	15,057	42.1	57.9	296.7
	Foreign banks	308	279	747	1026	27.2	72.8	333.1
(March end 2009)	All Scheduled Commercial Banks	64,608	24,645	19,006	43,651	56.5	43.5	67.6
	Nationalized Banks	39,376	9,861	5,177	15,038	65.6	34.4	38.2
	State Bank Group	16,062	7,146	4,193	11,339	63.0	37	70.6
	Old Private Sector Banks	4,673	1,830	844	2,674	68.4	31.6	57.2
	New Private Sector Banks	4,204	5,166	7,480	12,646	40.9	59.1	300.8
	Foreign banks	293	270	784	1054	25.6	74.4	359.7
(March end 2008)	All Scheduled Commercial Banks	61,132	18,486	16,303	34,789	53.1	46.9	56.9
	Nationalized Banks	37,775	8,320	5,035	13,355	62.3	37.7	35.4
	State Bank Group	15,105	4,582	3,851	8,433	54.3	45.7	55.8
	Old Private Sector Banks	4,450	1,436	664	2,100	68.4	31.6	47.2
	New Private Sector Banks	3,525	3,879	5,988	9,867	39.3	60.7	279.9
	Foreign banks	277	269	765	1034	26.0	74	373.2
(March end 2007)	All Scheduled Commercial Banks	57,042	14,796	12,292	27,088	54.6	45.4	47.5
	Nationalized Banks	35,636	6,634	3,254	9,888	67.1	32.9	27.7
	State Bank Group	14,030	3,655	2,786	6,441	56.7	43.3	45.9
	Old Private Sector Banks	4,606	1,104	503	1,607	68.7	31.3	34.9
	New Private Sector Banks	2,497	3,154	5,038	8,192	38.5	61.5	328.1
	Foreign banks	273	249	711	960	25.9	74.1	351.6

ATMs are becoming more popular in this world of technology among all the bank groups. It is a tremendous achievement of all bank groups that number of ATMs has increased in all bank groups during e-banking period. Table 2 indicates the total number of ATMs and percentage of ATMs to total branches. The total numbers of ATMs installed by the scheduled commercial banks rose to 95,686 at end-March 2012 from 27,088 at end-March 2007.

The ATMs installed by new private sector banks and foreign banks were more than 3 times of their respective branches during 2008-09. The total numbers of ATMs installed by them were 9,152 and 10,901 in the year 2007 and 2008 respectively where as old private sector banks had 1607 and 2100 ATMs in the corresponding duration. The number of ATMs of public sector banks at the end of March 2007 and 2008 was 16,329 and 21,788 respectively. The private sector banks have 36,079 ATMs as on 31st march 2012 which is more than four times to that of 2007. Similarly the numbers of ATMs of public sector banks rise to 58,193 on 31st march 2012 from 16,329 in 2007.

The new private sector banks have the largest share in off-site ATMs, while nationalised banks have the largest share in on-site ATMs. During 2008-09, the maximum average of ATMs as a percentage of total branches has been observed in foreign bank groups, i.e. 357.3 percent, as compared to other bank groups. The percentage of off-site ATMs to total ATMs witnessed a marginal decline to 45.3 percent in 2009-10.Over the years the percentage of off-site ATMs to total ATMs has come very closure to that of on-site ATMs. While, the ATMs

installed by new private sector banks and foreign banks were more than 3 times of their respective branches, the ATM to branch ratio was relatively lower for other bank groups. More than 65 per cent of the total ATMs belonged to the public sector banks as at ends March 2011.During 2011-12, an additional 21,000 ATMs were deployed by the banks. Public sector banks accounted for more than 60 per cent of the total number of ATMs as at end-March 2012, while close to one - third of the total ATMs were attributable to new private sector banks. The percentage of ATMs to total number of branches of scheduled commercial banks has risen to 117.8 percent in 2012 from 100.5 percent in 2011 and 47.5 percent in 2007. The foreign banks have an edge over domestic private sector as well as public sector banks in terms of the ratio of their ATMs to their branches. During 2012, this ratio stood at 439.1 percent in foreign banks, 375.8 percent in new private banks and 86.3 percent in public sector banks. Nationalized banks have the lowest percentage of ATMs to branches (i.e. 63.8%) followed in, upside, by old private sector banks (i.e. 107.1%) and by State Bank of India group (i.e. 144.1%), in 2012. Overall the growth in ATMs has been excellent in recent years.

In India, the use of electronic payments has witnessed manifold increase, partly reflecting increased adoption of technology. Table 3 discerns that transactions such as Electronic Clearing Service (ECS) credit and debit, National Electronic Fund Transfer (NEFT) (both retail and card-based) increased by 41 per cent during 2007-08 as compared to 32.9 per cent in the previous year. It was mainly due to the refund of the oversubscription amount of IPOs floated by companies using electronic mode as mandated by the stock exchange.

Table 3: Volume and Growth in Transactions through Retail Electronic Payment Methods

Type	Growth in volume (%)						Growth in value					
	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2006-07	2007-08	2008-2009	2009-10	2010-11	2011-12
ECS-Credit	56.1	13.5	12.8	11.0	19.5	3.6	157.6	839.3	–87.5	20.6	54.5	1.2
ECS-Debit	109.1	69	25.9	–6.7	5.0	5.1	95.9	92.3	36.9	3.8	5.9	13.3
EFT-NEFT	55.7	178.8	141.5	106.3	99.5	70.9	26.4	81.2	79.6	62.5	127.6	92.1
Credit Cards	8.6	34.6	13.7	–	13.2	20.7	22.1	40.2	12.7	–	22.2	27.9
Debit Cards	31.7	46.7	44.6	–	39.3	38.2	38.6	53.2	48.1	–	46.6	38.0

However, the growth in volume of transaction through electronic method declined to 24.8 percent in 2008-09.The decline in value of ECS credit transactions during 2008-09 may be interpreted more as returning to normal trend rather than a matter of concern. In 2010-11, the electronic payment systems for retail transactions registered a steep growth over the previous year but in 2011-12 it showed down trend in value of transactions through electronic payment method. The growth remained impressive during 2010-11 (127.6%) and 2011-12 (92.1%).

It is evident from the table 4 that outstanding number of debit cards of scheduled commercial banks has risen to 227.84 million in 2012 from 102.44 million in 2007. During 2007-08, SBI and its associates have the highest (36.04 millions) and foreign banks have the lowest (4.02 millions) number of debit cards. The outstanding number of debit cards issued by public sector bank was91.7 million and 129 in the year 2008 and 2009 respectively where as other banks had 45.73 million and 52.23 million outstanding debit cards in the corresponding duration. The share of public sector banks and private sector banks in outstanding debit cards witnessed an increase during the year 2010-11, while that of foreign banks witnessed a decline in the same year. At the end of March 2012,more than three-fourth of the outstanding numbers of debit cards were issued by public sector banks. It is noteworthy that the outstanding number of credit cards for all scheduled commercial banks has decreased from 27.55 million in 2007 to 17.65 million during 2012. New private sector banks have issued the highest (13.25 millions) number of outstanding credit cards followed by foreign banks (10.33 million) during 2007-08.

Table 4: Bank Group-wise Outstanding Number of Debit Card and Credit Card Issued by Scheduled Commercial Banks (in millions)

Bank group	Outstanding no. of debit cards					Outstanding no. of credit cards				
	2007-08	2008-09	2009-10	2010-11	2011-12	2007-08	2008-2009	2009-10	2010-11	2011-12
Public sector banks (i)	**64.33**	**91.7**	**129.69**	**170.34**	**215**	**3.93**	**3.44**	**3.26**	**3.08**	**3.06**
Nationalized banks	28.29	40.71	58.82	80.27	103	0.72	0.72	0.73	0.78	0.84
SBI group	36.04	50.99	70.87	90.07	112	3.21	2.72	2.53	2.3	2.22
Private sector banks (ii)	**34.1**	**41.34**	**47.85**	**53.58**	**60**	**13.29**	**12.18**	**9.5**	**9.32**	**9.67**
Old private sector banks	5.34	7.09	9.81	12.44	14	0.04	0.06	0.06	0.04	0.04
New private sector banks	28.76	34.25	38.04	41.14	46	13.25	12.12	9.44	9.28	9.63
Foreign Banks	4.02	4.39	4.43	3.92	3.8	10.33	9.08	5.57	5.64	4.92
All scheduled commercial banks (i+ii)	**102.44**	**137.43**	**181.97**	**227.84**	**278**	**27.55**	**24.7**	**18.33**	**18.04**	**17.65**

It is observed that the number of outstanding credit cards in case of public sector banks and private sector banks decreased during the 2010-11, while that of foreign banks witnessed an increase in the same year. At the end of March 2012,more than half of the total outstanding credit cards in India belong to new private sector banks.

ESULTS ABOUT PRODUCTIVITY OF BANKS

As stated earlier the objective of this paper is to analyze the influence of e- delivery channels on productivity performance of selected scheduled commercial banks. Accordingly, the data has been processed with the help of spss and the results of the analysis are given in tables 5 to 8.

Table 5 presents various productivity ratios during 2007 to 2012 for various banks under this study. Deposit per employee which represents the potency of the banks in liquidity support is showing an upward trend. During 2007-08, per employee deposit ratio was the highest in the case of foreign banks (Rs. 61.07 million) and the lowest in case of SBI and its Associates with (Rs. 31.08 million). In 2011-12, foreign banks (with Rs.100.03 million) were on the top followed by nationalized banks (with Rs. 73.24 million) in so far as the deposits per employee are concerned. It is obvious from the table that on an average of the last five years, the amount of deposit per employee is the highest (Rs. 80.43 million) in case of foreign banks followed, with wide difference by nationalized banks (Rs. 55.13 million), new private banks (Rs. 49.01 million), old private banks (Rs. 42.49 million) and SBI and its associates, where the productivity is seen the lowest (Rs. 40.85 million).This ratio is showing a remarkable positive change during 2007 to 2012.The same phenomenon is observed about Credit per employee.

Table 5: Averages of Productivity ratios of banks for the periods 2007-2008 to 2011-2012(Rs. Million)

Banks	Year	Deposit per	Credit per		Profit per	Deposit per	Credit
per Profit per							
Foreign Banks	2007-08	61.07	51.48	2.11	6901.12	5817.07	238.71
	2008-09	72.37	55.91	2.54	7256.83	5606.26	254.56
	2009-10	82.86	58.28	1.69	7535.7	5300.66	153.93
	2010-11	85.83	69.72	2.75	7592.01	6167.53	243.5
	2011-12	100.03	82.98	3.4	8577.81	7116.05	291.83
	Grand Average	**80.43**	**63.67**	**2.5**	**7572.69**	**6001.51**	**236.51**
Nationalized Banks (Includes IDBI Bank Ltd.)	2007-08	36.02	25.81	0.38	427.97	306.63	4.48
	2008-09	45.49	32.83	0.49	514.14	371.07	5.49
	2009-10	54.62	38.96	0.57	594.66	424.17	6.17
	2010-11	66.28	48.97	0.7	675.46	499.11	7.14
	2011-12	73.24	55.51	0.7	719.21	545.12	6.83
	Grand Average	**55.13**	**40.42**	**0.57**	**586.29**	**429.22**	**6.02**
New Private Sector Banks	2007-08	43.08	34.39	0.64	1401.5	1118.93	20.75
	2008-09	42.97	35.75	0.68	1239.57	1031.21	19.52
	2009-10	46.51	37.53	0.85	1133.23	914.29	20.64
	2010-11	55.73	46.24	1.1	1058.17	878.08	20.93
	2011-12	56.74	48.65	1.24	1093.46	937.63	23.93
	Grand Average	**49.01**	**40.51**	**0.9**	**1185.18**	**976.03**	**21.16**
Old Private Sector Banks	2007-08	34	22.93	0.41	353.07	238.1	4.22
	2008-09	38.81	25.03	0.47	406.02	261.83	4.91
	2009-10	41.76	27.99	0.42	440.42	295.18	4.43
	2010-11	47.7	33.34	0.56	522.98	365.57	6.14
	2011-12	50.17	36.54	0.62	568.66	414.21	7.06
	Grand Average	**42.49**	**29.17**	**0.5**	**458.23**	**314.98**	**5.35**
SBI and its Associates	2007-08	31.08	23.84	0.36	488.31	374.64	5.68
	2008-09	37.49	27.53	0.44	596.09	437.7	7.04
	2009-10	41.56	32.18	0.47	609.58	471.96	6.84
	2010-11	43.97	35.08	0.42	658.18	525.2	6.27
	2011-12	50.13	41.1	0.55	721.08	591.22	7.87
	Grand Average	**40.85**	**31.95**	**0.45**	**614.65**	**480.14**	**6.74**

The amount of profit per employee was also seen the highest in case of foreign banks (Rs. 2.5 million) followed, in down side with significant gap, by new private banks (Rs. 0.9 million) and nationalized banks (Rs. 0.57 million), SBI and its associate indicates the poorest (Rs. 0.45 million) profitability per employee during 2008-2012 as compared to other bank groups. Domestic banks have no match with the foreign banks in so far as deposits, credits and profit per branch are concerned. Amongst domestic banks, new

private sector banks have the highest credit per branch and profit per branch. Public sector banks are lagging in term of branch productivity as compared to other bank groups except old private banks. The table further shows that both the employee productivity as well as branch productivity have shown a remarkable growth during study period.

To assess the impact of various e-delivery channels on the productivity of banks in India regression analysis is made. For the regression analysis, the productivity per employee and productivity per branch are taken as dependent variables and e-delivery channels like Per cent of ATMs to Branches, Per cent of Off-site ATMs to total ATMs, Outstanding Number of Debit Card and Outstanding Number of Credit Card are independent variables. The model summary indicating R, R2, adjusted R2, F-value and the regression coefficients are shown in Table 6. In order to examine the problem of multi-co linearity in the data Durbin Watson statistics has been applied. Table 6 indicates that value of Durbin Watson test for all the bank groups is more than 2 which shows no auto correlation in the sample. Hence our data on various variables do not have the problem of multi-colinearity. F-test has been applied to examine variation, whether the variation in productivity i.e. deposits, credits and profits (dependent variable) with the changes in the e-delivery channels (independent variable) is significant. When F value is found significant, we can proceed further for regression analysis.

Table 6 indicates that F-value and the corresponding p value of all the bank groups are significant at 5 percent level for 'deposits per employee' as dependent variable and e-delivery channels as independent variable. It implies that deposit per employee varies significantly with the change in e- delivery channels and it is true across the selected banks. This is further confirmed by noting the high degree of coefficient of determination (R2) in case of all bank groups. The p value given in table 7 indicates that 'outstanding number of credit card' is an important variable influencing deposit per employee in case of foreign bank group. However the outstanding no. debit cards is an important variable that influence deposit per employee positively and significantly in case of the remaining four groups of banks namely nationalized banks, new private banks, old private banks and SBI and its associates.

Table 6: Model Summary for the relationship between productivity of banks and e-delivery channels

Dependent Variable	Banks	Mean	Std. Deviation	R	R^2	Durbin-Watson	F	P Value
Deposit per Employee	FOREIGN BANKS(G1)	80.43	14.65	.933[a]	0.871	1.973	20.26	.020[b]
	NATIONALIZED BANKS(G2)	55.13	15.09	.991[a]	0.981	1.812	158.206	.001[b]
	NEW PRIVATE SECTOR BANKS(G3)	49.01	6.76	.902[a]	0.814	2.34	13.123	.036[b]
	OLD PRIVATE SECTOR BANKS(G4)	42.49	6.56	.993[a]	0.986	3.432	215.7910	.001
	SBI AND ITS ASSOCIATES(G5)	40.85	7.13	0.984	0.968	2.223	1.835	0.002
Credit per Employee	FOREIGN BANKS(G1)	63.67	12.72	0.902	0.814	2.522	13.157	0.036
	NATIONALIZED BANKS(G2)	40.42	11.98	0.995	0.991	2.6	319.63	0
	NEW PRIVATE SECTOR BANKS(G3)	40.51	6.48	0.924	0.854	2.228	17.504	0.025
	OLD PRIVATE SECTOR BANKS(G4)	29.17	5.68	0.992	0.984	2.603	187.873	0.001
	SBI AND ITS ASSOCIATES(G5)	31.95	6.69	0.997	0.994	2.977	465.148	0
Profit per Employee	FOREIGN BANKS(G1)	2.5	0.65	0.908	0.824	2.363	14.014	0.033
	NATIONALIZED BANKS(G2)	0.57	0.14	0.952	0.907	2.021	29.343	0.012
	NEW PRIVATE SECTOR BANKS(G3)	0.9	0.26	0.956	0.914	2.073	1.95	0.011
	OLD PRIVATE SECTOR BANKS(G4)	0.5	0.09	0.923	0.853	3.101	17.38	0.025
	SBI AND ITS ASSOCIATES`(G5)	0.45	0.07	0.835	0.698	2.737	2.306	0.302
Deposit per Branch	FOREIGN BANKS(G1)	7572.69	625.06	0.67	0.448	2.503	0.813	0.552
	NATIONALIZED BANKS(G2)	586.29	118.28	0.999	0.997	2.794	375.309	0.003
	NEW PRIVATE SECTOR BANKS(G3)	1185.19	138.74	0.963	0.927	3.293	38.12	0.009
	OLD PRIVATE SECTOR BANKS(G4)	458.23	87.31	0.99	0.981	2.634	155.58	0.001
	SBI AND ITS ASSOCIATES(G5)	614.65	85.96	0.974	0.949	1.87	55.292	0.005
Credit per Branch	FOREIGN BANKS(G1)	6001.51	698.43	0.904	0.818	2.636	13.46	0.035
	NATIONALIZED BANKS(G2)	429.22	95.85	0.99	0.981	1.96	154.87	0.001
	NEW PRIVATE SECTOR BANKS(G3)	976.03	97.91	0.983	0.966	2.937	84.732	0.003
	OLD PRIVATE SECTOR BANKS(G4)	314.98	73.37	0.995	0.989	2.877	282.557	0
	SBI AND ITS ASSOCIATES(G5)	480.14	82.72	0.994	0.988	2.895	250.874	0.001
Profit per Branch	FOREIGN BANKS(G1)	236.51	50.64	0.762	0.581	1.98	1.385	0.419
	NATIONALIZED BANKS(G2)	6.02	1.07	0.907	0.823	1.919	13.902	0.034
	NEW PRIVATE SECTOR BANKS(G3)	21.15	1.65	0.916	0.84	1.749	15.747	0.029
	OLD PRIVATE SECTOR BANKS(G4)	5.35	1.21	0.943	0.89	2.912	24.215	0.016
	SBI AND ITS ASSOCIATES(G5)	6.74	0.82	0.765	0.585	2.426	1.407	0.415

Regarding the linear relationship between credit per employee and various e- delivery channels it can be noted from the table 6 that F value is significant irrespective of the bank group. The relationship between the variables under reference is also confirmed by the values of coefficient of determination, which are above 0.814 in case of various bank groups. Hence, more

Table 7: Regression Coefficients for the relationship between Employee Productivity of banks and e - delivery channels

Dependent Variable	Bank Group		Model	Unstandardized Coefficients		Standardized Coefficients	t	P Value
				B	Std. Error	Beta		
Deposit per Employee	FOREIGN BANKS (G1)	1	(Constant)	120.47	9.3		12.95	0
			Outstanding Number of Credit Card	–5.63	1.25	–0.93	–4.5	0.02
	NATIONALIZED BANKS (G2)	1	(Constant)	24.19	2.68		9.03	0
			Outstanding Number of Debit Card	0.5	0.04	0.99	12.58	0
	NEW PRIVATE SECTOR BANKS (G3)	1	(Constant)	14.06.	9.76		1.44	0.25
			Outstanding Number of Debit Card	0.93	0.26	0.9	3.62	0.04
	OLD PRIVATE SECTOR BANKS (G4)	1	(Constant)	24.859	1.264		19.667	0
			Outstanding Number of Debit Card	1.811	0.123	0.993	14.69	0.001
	SBI AND ITS ASSOCIATES	1	(Constant)	24.162	1.86		12.991	0.001
			Outstanding Number of Debit Card	0.232	0.024	0.984	9.583	0.002
Credit per Employee	FOREIGN BANKS (G1)	1	(Constant)	–	74.66		–	0.069
			Percent of Offsite ATMs to total ATMs	3.559	0.981	0.902	3.627	0.036
	NATIONALIZED BANKS (G2)	1	(Constant)	15.737	1.504		10.465	0.002
			Outstanding Number of Debit Card	0.397	0.022	0.995	17.878	0
	NEW PRIVATE SECTOR BANKS (G3)	1	(Constant)	6.199.	8.301		0.747	0.509
			Outstanding Number of Debit Card	0.912	0.218	0.924	4.184	0.025
	OLD PRIVATE SECTOR BANKS (G4)	1	(Constant)	24.859	1.264		19.667	0
			Outstanding Number of Debit Card	1.811	0.123	0.993	14.69	0.001
	SBI AND ITS ASSOCIATES	1	(Constant)	16.086	0.786		20.476	0
			Outstanding Number of Debit Card	0.22	0.01	0.997	21.567	0
Profit per Employee	FOREIGN BANKS (G1)	1	(Constant)	–11.378	3.709		–	0.055
			Percent of Offsite ATMs to total ATMs	0.182	0.049	0.908	3.744	0.033
	NATIONALIZED BANKS (G2)	1	(Constant)	0.296	0.055		5.402	0.012
			Outstanding Number of Debit Card	0.004	0.001	0.952	5.417	0.012
	NEW PRIVATE SECTOR BANKS (G3)	1	(Constant)	–5.132	0.257		–2.072	0.13
			Outstanding Number of Debit Card	0.038	0.007	0.956	5.652	0.011
	OLD PRIVATE SECTOR BANKS (G4)	1	(Constant)	0.237	0.065		3.652	0.035
			Outstanding Number of Debit Card	0.004	0.001	0.923	4.169	0.025
	SBI AND ITS ASSOCIATES	1	(Constant)	0.328	0.076		4.301	0.05
			Outstanding Number of Debit Card	0.003	0.003	1.374	1.102	0.385
			Percent of ATMs to Branches	–0.001	0.002	–0.589	–0.472	0.683

than 81 percent of the variation in credit per employee is caused by e-delivery channels. Regarding the importance of various factors affecting credit per employee table 7 indicates that 'percent of off-site ATMs to total ATMs' is a significant variable in case of foreign banks. The outstanding number of debit cards is found having the t- values significant at 5 percent level in case of the remaining bank groups. It implies that credit per employee increases with the increase in number of

Table 8: Regression Coefficients for the relationship between Branch Productivity of banks and e - delivery channels

Dependent Variable	Bank Group		Model	Unstandardized Coefficients		Standardized Coefficients	T	P Value
				B	Std. Error	Beta		
Deposit per Branch	FOREIGN BANKS (G1)	1	(Constant)	–3508.832	19095.112		–0.184	0.871
			Outstanding Number of Debit Card	1229.694	2996.092	0.557	0.41	0.721
			Per centof ATMs to Branches	15.558	18.405	1.148	0.845	0.487
	NATIONALIZED BANKS (G2)	2	(Constant)	760.043	77.337		9.828	0.01
			Outstanding Number of Debit Card	4.531	0.191	1.151	23.748	0.002
			Per centof ATMs to Branches	–12.262	2.275	–0.261	–5.389	0.033
	NEW PRIVATE SECTOR BANKS (G3)	1	(Constant)	396.857	129.141		3.073	0.054
			Outstanding Number of Credit Card	73.374	11.884	0.963	6.174	0.009
	OLD PRIVATE SECTOR BANKS (G4)	1	(Constant)	224.327	19.751		11.358	0.001
			Outstanding Number of Debit Card	24.025	1.926	0.99	12.473	0.001
	SBI AND ITS ASSOCIATES (G5)	1	(Constant)	1164.127	74.579		15.609	0.001
			Outstanding Number of Credit Card	–211.664	28.465	–0.974	–7.436	0.005
Credit per Branch	FOREIGN BANKS (G1)	1	(Constant)	698.396	1453.624		0.48	0.664
			Per centof ATMs to Branches	13.694	3.732	0.904	3.669	0.035
	NATIONALIZED BANKS (G2)	1	(Constant)	232.711	17.202		13.528	0.001
			Outstanding Number of Debit Card	3.158	0.254	0.99	12.445	0.001
	NEW PRIVATE SECTOR BANKS (G3)	1	(Constant)	408.184	62.393		6.542	0.007
			Outstanding Number of Credit Card	52.852	5.742	0.983	9.205	0.003
	OLD PRIVATE SECTOR BANKS (G4)	1	(Constant)	90.378	13.914		6.495	0.007
			Per cent of ATMs to Branches	3.071	0.183	0.995	16.809	0
	SBI AND ITS ASSOCIATES (G5)	1	(Constant)	284.506	13.196		21.561	0
			Outstanding Number of Debit Card	2.717	0.172	0.994	15.839	0.001
Profit per Branch	FOREIGN BANKS (G1)	1	(Constant)	–124.642	1348.794		–0.092	0.935
			Outstanding Number of Debit Card	5.889	211.631	0.033	0.028	0.098
			Per centof ATMs to Branches	0.87	1.3	0.792	0.669	0.572
	NATIONALIZED BANKS (G2)	1	(Constant)	2.104	1.076		1.954	0.146
			Per centof ATMs to Branches	0.081	0.022	0.907	3.729	0.034
	NEW PRIVATE SECTOR BANKS (G3)	1	(Constant)	–3.205	6.148		–0.521	0.638
			Per cent of Off-site ATMs to total ATMs	0.401	0.101	0.916	3.968	0.029
	OLD PRIVATE SECTOR BANKS (G4)	1	(Constant)	1.837	0.744		2.47	0.09
			Per cent of ATMs to Branches	0.048	0.01	0.943	4.921	0.016
	SBI AND ITS ASSOCIATES (G5)	1	(Constant)	5.731	1.057		5.424	0.032
			Outstanding Number of Debit Card	0.047	0.04	1.719	1.176	0.361
			Per cent of ATMs to Branches	–0.022	0.03	–1.088	–0.744	0.534

debit cards.

It is obvious from table 6 that F value is significant in case of all bank groups except State Bank of India group because p value is less than .05 in these cases when 'profit per employee' is taken as dependent variable. The above results are also supported by coefficient of determination which is above 0.82 in various bank groups except State Bank of India and its associates. The results of step wise method of multiple regression when profit per employee is taken as dependent variable and e- delivery channels as independent variable reveals that regression coefficients of the variable 'percent of off-site ATMs to total ATMs' is significant at 5 percent level in case of foreign banks. 'Percent of ATMs to total branches' is found an important determinant of profit per employee in case of old private sector banks where t = 4.169 and p is less than 0.05. In case of nationalized banks and new private banks the regression coefficient for profit per employee are found positive and significant (Table 7).

Table 6 shows further that p value of F-test when 'deposit per branch' is considered as dependent variable significant at 5 percent level for all bank groups except foreign banks. So, it is concluded that there is a significant relationship between e-delivery channels and deposit per branch of various bank groups. Hence, deposit per branch rise with the rise in e-channels. The above results are also supported by coefficient of determination which is above 0.92 in various bank groups except foreign banks.

The regression results about 'deposit per branch' as presented in Table 8 shows that p value of predictor in case of SBI and its associates is not significant at 5 percent level which means branch productivity of this bank group is not significantly related with the 'outstanding number of debit card' and 'percent of ATMs to branches'. However, the outstanding number of debit cards and outstanding numbers of credit cards are found having the t- values significant at 5 percent level in case of the remaining bank groups meaning thereby the e- channels exert significant influence on branch productivity.

For 'credit per branch', F- value and the corresponding p value of all the bank groups are significant at 5 percent level (Table 6). So we reject the null hypothesis regarding this ratio. The relationship between the variables under reference is also confirmed by the value of coefficient of determination, which is above 0.82 in case of various bank groups. Hence, more than 82 percent of the variation in 'credit per branch' is caused by e-delivery channels. Table 8 indicates that the standardized beta is positive and approaching to 1 in case of all bank groups. It also reveals that 'percent of ATMs to total branches' is a significant variable affecting credit per branch in case of foreign banks and old private sector banks but for the other bank group 'outstanding number of debit cards' has turned as an important variable. Both of these variables are found having the t- value significant at 5 percent level in case of all the bank groups. It implies that 'credit per branch' increases with the increase in percent of ATMs to total branches and number of debit cards.

Table 6 further shows that F value in case of 'profit per branch' as dependent factor and e- delivery channels as independent is not significant at 5 percent level for the foreign banks and SBI and its associates. It is also confirmed by the moderate degree coefficient of determination (R2) in case of these bank groups. The p value for regression coefficients of branch productivity as given in table 8 indicates that 'percent of ATM to branches' is an important variable influencing profit per branch in case of nationalized banks and new private banks. It further shows that p-value corresponding to regression coefficients of profit per branch is not significant in case of foreign banks and SBI and its associates so we accept the null hypothesis and conclude that no relationship exists among various e-delivery channels and profit per branch performance of these bank groups.

But in case of other bank groups, p –value corresponding to profit per branch ratio is significant at 5 percent level. So, we reject the null hypothesis and conclude that percent of ATM to branches and percent of off-site ATM to total ATMs have influence on profit per branch of these bank groups.

ONCLUSION

The analysis has brought out that number of ATMs, use of Debit cards, Credit cards and extent of computerization have increased in all bank groups during 2007 to 2012. The new private sector banks have the largest share in off-site ATMs, while nationalised banks have the largest share in on-site ATMs. Over the years, the percentage of off-site ATMs to total ATMs has come very near to that of on-site ATMs. The foreign banks have an edge over domestic private sector as well as public sector banks in terms of the ratio of their ATMs to their branches.

The 'outstanding number of credit card' and 'percent of off-site ATMs to total ATMs' are found important variables influencing deposit per employee and credit per employee respectively in case of foreign banks. The deposit per employee and credit per employee have changed significantly with the rise in e- delivery channels. It is true across the selected banks. The ratio of 'percent of ATMs to total branches' is found as an important determinant of 'profit per employee'.

Domestic banks have no match with the foreign banks in so far as deposits, credits and profit per branch are concerned. Amongst domestic banks, new private sector banks have the highest credit per branch and profit per branch. Public sector banks are lagging in term of branch productivity as compared to other bank groups except old private banks. There is a significant relationship between e-delivery channels and deposit per branch of various bank groups except SBI group. Hence, deposit per branch rises with the rise in e- channels significantly. The ratio of 'credit per branch' increases with the increase in 'percent of ATM's to total branches' and 'number of debit cards'. Results also indicated that 'percent of ATMs to branches' is an important variable influencing profit per branch in case of nationalized banks and new private banks.

The results brought out by the study regarding the use of various e-delivery channels and its impact on productivity of banks will prove very useful for decision makers and policy makers in the banking industry. The study is an eye opener for those banks which have still not fully adopt edcore banking

solutions. All the banks should give more stress to modify their services, through e-deliverychannels. The adoption of e-delivery channels might help in improving the CRM in banks, which is essential for enhanced customer satisfaction. The study emphasizes that the banks should consider the expenditure on building the infrastructure of IT as an investment not expenses. In future only those banks would survive which are adopting the information technology fastly with the changing requirement of the customers. There are so many factors which influence productivity of employee. However, in the present study the influence of other factors has not been considered, which will remain the limitation of the study. It can be concluded that mere introduction of e-delivery channels alone will not be sufficient to bring necessary performance improvement and to get the competitive edge; intelligent people are required to use such intelligent tools. Thus, even though e-delivery channels have brought about higher productivity in banking sector, marketing is going to be the challenge. Other limitation of the present study is that the results are based only on secondary data. Hence, the future researchers may take into account this limitation by considering both primary as well as secondary data so as to make the study more useful. This study will be more useful for those banks, who are interested in investing heavily in e- delivery channels to increase their productivity.

REFERENCES

- *Hugar, S.S. and Vaz, N.H. (2008). "An Evaluation of Customer Orientation of Indian Public Sector Banks'. Indian Journal of Marketing", vol. 38, Issue 6, (June), pp.31-41.*
- *Jaffry, Shabbar & et al. (2007). "Regulatory Changes and Productivity of the Banking Sector in the Indian Sub-continent", The Pakistan Development Review, 44: 4 Part II, (Winter 2005) pp. 10.*
- *Jalan, B. (2003). "Strengthening Indian Banking and Finance: Progress and Prospects", IBA Bulletin, vol. XXV, No. 3 (March), pp. 5-14.*
- *Janki, B. (2002). "Unleashing employ productivity; A need for a paradigm shift", Indian Banking association bulletin, vol. XXIV, No.3 (March), pp. 7-9.*
- *Kamesam,V. (2001). "Information Technology Challenges to Banks," RBI Bulletin, vol.55, no. 11, (November), pp.1225-1228.*
- *Kaur, Rimpi (2012). "An Impact of IT on Branch Productivity of Indian Banking in the Era of Transformation", Journal of Internet Banking and Commerce, December 2012, vol. 17, no.3, pp. 1-10. (http://www.arraydev.com/commerce/jibc.*
- *Malhotra, Pooja and Singh, Balwinder (2010). "An analysis of Internet banking offerings and its determinants in India", Internet Research, vol. 20, Issue 1, pp. 87-106.*
- *Mittal, R.K. and Dhingra, Sanjay (2007). "Technology in Banking Sector: Issues and Challenges", Vinimaya, vol. XXVII, No. 4, (Jan – March), pp. 14 – 22*
- *Natarajan, K. and Duraisamy, K. (2012). "Profitability Performance of Commercial Banks in Electronic Era", Global Journal of Management and Research, Journal 4 October – December 2012, pp. 15.*
- *Paul, Justin and Trehan, Ruchi (2011). "Enhancing customer base and productivity through e-delivery channels – study of banks in India", Int. J. Electronic Marketing and Retailing (IJEMR), vol. 4, Nos. 2/3, pp.151-164.*
- *Sharma, Dhiraj (2012). "Does Technology Lead to Better Financial Performance? A Study of Indian Commercial Banks", Managing Global Transitions: International Research Journal; Spring2012, vol. 10, Issue 1(March), pp.3.*
- *Shastri, R.V. (2003). "Recent Trends in Banking Industry: IT Emergence", Analyst, (March), pp. 45-46.*
- *Shetty, V.P. (2000). "E-banking," IBA Bulletin, vol.XXI, no.3, (march special issue), pp.31-34.*
- *Uppal, R.K (2011). "E-DeliveryChannelsin Banks-AFreshOutlook" Journal of Arts Science & Commerce, vol. II, Issue-1, pp. 180-191.*
- *Uppal, R.K. and Kaur, R. (2007). "Indian Banking Moving Towards IT", Journal of Commerce and Trade, vol. 2, No. 1 (April), pp. 26-32*
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