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An Impact of IT on Branch Productivity of Indian Banking in the Era of Transformation

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Abstract

Banking all over the world witnessed changes during last decade, which perhaps it did not see during its entire history. The changes are not only confined to developed countries, banking in developing countries like ours has also witnessed drastic changes. It is due to liberalization of economies and related policies, globalization of world markets especially because of increasing interdependence of different developed and developing countries. In this context of changing environment, the new financial services have been provided with the support of Information Technology such as transfer of funds across and beyond the national boundaries. Financial institutions, including banks, all over the world are, therefore, crucially dependent on information technology and consequently, it has become imperative to evaluate the performance of banking industry. The present paper analyzes the impact of IT on branch productivity and concludes that IT along with other factors, improving the productivity at an excellent rate and fully IT-oriented banks are the most beneficiaries whereas partially IT-oriented banks though proved increase in productivity in the post-ebanking period but still not harmonized with fully IT-oriented banks. The paper also suggests some measures to improve the branch performance along with better utilization of IT.

Keywords: **Parameters of Productivity and IT, Suggestions**

INTRODUCTION

Since inception, banking has always been a commercial venture, the prime motive of which banks being to enlarge profits, by adopting the current change in the economic environment like liberalization, privatization and globalization. Due to this, Indian banking has undergone a sweeping change where deregulation, technological innovations and globalization are significantly affecting the banking services. New technology has revolutionized the banking business led paradigm shift in business environment. New technological changes like ATMs, credit cards, internet-banking, EFTs etc. along with other aspects of transformation, are replacing traditional products and services and creating new scale in banking environment as *Singh, Chhatwal, Yahyabhoy and Yeo (2002)* recognize that being in a fiercely competitive industry, the ability of banks to differentiate themselves on the price is limited but ebanking serves the purpose of differentiation strategy to meet the competition.

All the banks have to be well-versed in IT, its usage and application to meet emerging international competition. Private and foreign banks have been the early adopters of technological innovations and gaining the fruits in terms of improved efficiency and customer satisfaction while public sector banks are beginning to hold on to the competition. *Garg M. (1994)* also analyzes that foreign banks earn as much profits as of 20 nationalized banks earn. *Swamy (2001)* also have similar view point and concludes that new private sector banks are much better in efficiency than public sector banks. It is whole because of better technology Utilization. ICICI and SBI Banks have taken a lead in introduction of ebanking in India. ICICI Bank is the first one to introduce internet-banking for limited number of services. The new private sector banks and foreign banks gain lead by merely invested in best of breed ebanking solutions from the start.

Consequently, in sight of growing technology usage in banking system, it has become imperative to evaluate the performance of the banking industry. In the present paper an attempt has been made to analyze the branch productivity in terms of various factors and further the impact of IT on productivity is examined to know whether IT is positively contributing towards productivity or negatively and to what extent?

The analysis is made on the basis of available information and the paper divided into four parts, After brief introduction of the theme the second part reviews the literature and concludes with research gap. This part also describes the objective, hypothesis and research methodology. The third part analyzes the results and last part concludes the paper with some suggestions, limitations and future areas of research.

LITERATURE REVIEW

Rao N. and Tiwari S. (2009) studies that all employee efficiency factors have insignificant influence on deposits, assets and advances, from branch efficiency, only operating profits per branch and from operating efficiency, cost of deposits have significant and positive impact. Liquidity influencing factors and ultimate profit factors do not influence deposits, assets and advances significantly although all profit factors have negative effect.

Seelanatha S. l. (2007) observes negative trend in efficiency during the first half of study period and a slight positive trend during the end of the second half and concludes that deregulation may have failed to improve efficiency. Technical efficiency in intermediation

has positive relationships with profitability, operational risk, liquidity etc. and negative with product quality and line of business.

Uppal R.K. and Kaur R. (2007) analyzes that the efficiency of all the bank groups has increased in the second post banking sector reforms period but these banking sector reforms are more beneficial for new private sector banks and foreign banks. Sakar B. (2006) studies the performance of 11 Turkish commercial banks and concludes strong correlation between input variables but it is weak between input and output variables. The banks with less than 200 branches and 5000 employees have the best DEA variables returns to scale (VRS) scores and banks having less than 3 pc market share have higher scores. Arora and Verma (2005) concludes that the performance of Corporation Bank in case of financial and operational parameters is higher as compared to other PSBs under study but Indian Bank recorded low as scored poor in some parameters of operational performance. On the other side Vijaya Bank scored well in profitability parameters but UCO Bank scored negative growth in case of all parameters of profitability except operating profits and in case of productivity. Prasuna G.D. (2004) analyzes that overall performance is better in 2003-04 as compared to 2002-03 the total income of nationalized banks increased by 7.7 pc, private sector banks recorded 9.81 pc growth whereas foreign banks have grown by 9.41 pc. Similarly, the banks have improved their capital adequacy and sound asset quality with reduced NPAs. Liquidity position is observed as better in all the banks. Mishra B.S. (2003) examines that allocative efficiency of Indian banking system has improved after the introduction of financial sector reforms in the early 1990s. Among 23 states of India, overall allocative efficiency of majority states is showing improvement in the post reforms period which is more marked for the service sector than for industry across the states as agriculture and industry sector witness a decline in allocative efficiency. T. Padamasai (2000) evaluates that productivity and profitability of five big banks has increased throughout the post-reforms period in terms of selected ratios of each parameter, but on account of efficiency, the performance of the top five banks is very dismissal as inefficiency has increased during the study period. It suggests that if the government sells its share in the profit making banks, it will be able to bail out the weak banks.

RESEARCH GAP

There are number of studies on productivity evaluation but scholarly research on analysis of technology's impact on banks' productivity is still not conducted in India despite few articles. Hence the present paper will surely be an addition to the current literature where an attempt is made to evaluate the impact of IT on productivity of Indian banking industry.

OBJECTIVE

The major objective of the paper is to evaluate the impact of IT on branch productivity of partially and fully IT-oriented banks.

HYPOTHESIS

The branch productivity of all bank groups and industry has no significant impact of technology.

RESEARCH METHODOLOGY

To evaluate the impact of IT on productivity, Indian banking industry is taken as universe

of the study which is further classified into 2 categories:

(A) Partially IT-Oriented Banks
- G-I- Public Sector Banks (PSBs – SBI, its associates and NBs)
- G-II- Old Private Sector Banks (OPSBs)

(B) Fully IT-Oriented Banks
- G-III- New Private Sector Banks (NPSBs)
- G-IV-Foreign Banks (FBs)

The analysis is made at bank group and industry. From the branch productivity, only single factor i.e. Business per Branch has been selected to evaluate the impact of IT which comprises following variables:

- X_1 Computerized Branches as percentage of Total Branches
- X_2 ATMs per Branch
- X_3 Credit Cards per Branch
- X_4 Internet-banking as percentage of Total Branches
- X_5 Mobile-banking as percentage of Total Branches
- X_6 Tele-banking as percentage of Total Branches

For this study, we have deliberately divided the time period into two parts because in the first period, IT was not mature but after 2001, IT is becoming mature in the banking sector.

(A) Pre-ebanking period (from 1996-97 to 2000-01)
(B) Post-ebanking period (from 2001-02 to 2006-07)

Secondly data is taken from Performance Highlights of IBA from 1996-97 to 2006-07 and Report on Trend and Progress of Indian Banking (2000-07). While data regarding IT in terms of Computerized branches, ATMs, Credit Cards, Internet-banking, Mobile-banking and Tele-banking has been collected thorough IBA. Data is analyzed by way of correlation coefficient and R-square which depicts the extent of variations in productivity due to any change in IT usage. The correlation is calculated from the mentioned ratios of selected factors drawn from IBA and RBI reports' data. Calculations are made through SPSS 16.00.

ANALYSIS & DISCUSSION

Correlation matrix in table 1 demonstrates that all variables are positively and significantly correlated with business per branch in pre-ebanking period and X_5 (mobile-banking) is highly correlated affecting business per branch by 99.40 pc with 1 pc more use of mobile-banking services. Post-ebanking period confirms lesser correlation although positive and significant where also X_5 (mobile-banking) is the most important variable explaining 99.60 pc variations. Positive and significant correlation is observed between independent variables also. Post-ebanking period, although have a good amount of correlation, proves lesser effect of e-channels on per branch business except mobile-banking reporting larger effect. Therefore, all bank groups should avail all ebanking techniques to cope up with fully IT-oriented banks.

Table 1
Correlation Co-efficient Matrix for Business per Branch and Each e-channel (G - I)

Period	Variables	Y_0	X_1	X_2	X_3	X_4	X_5	X_6	R^2
Pre – ebanking	Y_0	1.00							1.0000
	X_1	0.949*	1.00						0.9006
	X_2	0.971**	0.989**	1.00					0.9428
	X_3	0.908*	0.969**	0.972**	1.00				0.8245

	X_4	0.992**	0.912*	0.946*	0.886*	1.00			0.9841
	X_5	0.997**	0.923*	0.949*	0.872	0.994**	1.00		0.9940
	X_6	0.994**	0.914*	0.952*	0.877	0.995**	0.996**	1.00	0.9880
Post – ebanking	Y_0	1.00							1.0000
	X_1	0.946**	1.00						0.8949
	X_2	0.950**	0.830*	1.00					0.9025
	X_3	0.884*	0.672	0.959**	1.00				0.7815
	X_4	0.978**	0.926**	0.969**	0.893*	1.00			0.9565
	X_5	0.988**	0.892*	0.984**	0.916*	0.982**	1.00		0.9960
	X_6	0.943**	0.831*	0.996**	0.968**	0.974**	0.980**	1.00	0.8892

Source: Data Calculated from various selected factors drawn from IBA Performance Highlights and Report on Trend and Progress of Banking (1996-2007)

Note: ** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

G-II, through table 2 proves positive and significant correlation between e-channels except X_2 & X_3 and business per branch and X_1 records the highest correlation and hence causing 97.61 pc variations during pre-ebanking period. Comparatively post-ebanking period envisages much higher correlation with utmost effect of X_4 explaining 98.80 pc variations. Correlation between independent variables is also significant where X_2 proves the highest correlation with other variables particularly X_3 & X_6 respectively in pre and post-ebanking period. Overall, post-ebanking period confirms positive and greater impact of all e-channels on business per branch with utmost effect of internet-banking.

Table 2

Correlation Co-efficient Matrix for Business per Branch and Each e-channel (G - II)

Period	Variables	Y_0	X_1	X_2	X_3	X_4	X_5	X_6	R^2
Pre – ebanking	Y_0	1.00							1.0000
	X_1	0.988**	1.00						0.9761
	X_2	0.817	0.777	1.00					0.6675
	X_3	0.868	0.839	0.994**	1.00				0.7534
	X_4	0.934*	0.915*	0.858	0.886*	1.00			0.8724
	X_5	0.905*	0.873	0.968**	0.978**	0.959**	1.00		0.8190
	X_6	0.930*	0.905*	0.918*	0.938*	0.991**	0.988**	1.00	0.8649
Post – ebanking	Y_0	1.00							1.0000
	X_1	0.963**	1.00						0.9274
	X_2	0.928**	0.821*	1.00					0.8612
	X_3	0.991**	0.960**	0.903*	1.00				0.9821
	X_4	0.994**	0.975**	0.885*	0.987**	1.00			0.9880
	X_5	0.982**	0.900*	0.946**	0.975**	0.968**	1.00		0.9643
	X_6	0.968**	0.895*	0.989**	0.949**	0.937**	0.967**	1.00	0.9370

Note: ** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

From table 3 negative though insignificant correlation of all e-channels except X_5 & X_6 with business per branch is observed in pre-ebanking period. Correspondingly in post-ebanking period, only X_2 (ATMs) proves significant and positive correlation and explains 74.48 pc variations in business per branch means one percent increase in ATMs' use

lead 74 pc growth of business per branch. G-III represents diverse image where only ATMs has improved business per branch highly but internet-banking too proves improvement of per branch business from decrease in pre-ebanking period to increase in post-ebanking.

Table 3
Correlation Co-efficient Matrix for Business per Branch and Each e-channel (G - III)

Period	Variables	Y_0	X_1	X_2	X_3	X_4	X_5	X_6	R^2
Pre – ebanking	Y_0	1.00							1.0000
	X_1	a	1.00						a
	X_2	-0.037	a	1.00					0.0014
	X_3	-0.271	a	0.850	1.00				0.0734
	X_4	-0.055	a	0.438	-0.024	1.00			0.0030
	X_5	0.044	a	0.419	-0.052	0.990**	1.00		0.0019
	X_6	0.178	a	0.481	0.069	0.884*	0.935*	1.00	0.0317
Post – ebanking	Y_0	1.00							1.0000
	X_1	a	1.00						A
	X_2	0.863*	a	1.00					0.7448
	X_3	-0.121	a	-0.035	1.00				0.0146
	X_4	0.211	a	0.162	0.754	1.00			0.0445
	X_5	0.439	a	0.531	0.532	0.880*	1.00		0.1927
	X_6	-0.358	a	-0.336	0.889*	0.443	0.097	1.00	0.1282

Note: ** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)
a Cannot be computed because at least one of the variables is constant

Independent variables also witness insignificant correlation with each other apart from one or two. Consequently, post-ebanking period witness slight change since this group has started its business with full computerization and favoring ebanking system totally and contributing to enhanced performance from the last decades and secondly banks have excessive credits though in progress to control and essentially these are still in establishment stage.

Correlation matrix in table 4 shows that all the variables have positive and significant correlation with business per branch in pre-ebanking period where X_5 (mobile-banking) proves the most effective one causing 97.42 pc growth of business per branch with the one percent more use of mobile-banking services. Comparatively, in post-ebanking period, all the variables witness positive correlation but only few variables have significant and X_6 (tele-banking) proves the highest correlation so is important to enhance business per branch by 92.35 pc with more use of tele-banking services. It is essential to note that all variables have smaller correlation with business per branch in post-ebanking period with utmost effect of tele-banking.

Table 4
Correlation Co-efficient Matrix for Business per Branch and Each e-channel (G - IV)

Period	Variables	Y_0	X_1	X_2	X_3	X_4	X_5	X_6	R^2
Pre – ebanking	Y_0	1.00							1.0000
	X_1	a	1.00						A

	X_2	0.981**	A	1.00					0.9624
	X_3	0.935*	A	0.892*	1.00				0.8742
	X_4	0.909*	A	0.851	0.995**	1.00			0.8263
	X_5	0.987**	A	0.942*	0.970**	0.958*	1.00		0.9742
	X_6	0.933*	A	0.863	0.981**	0.988**	0.977**	1.00	0.8705
Post – ebanking	**Y_0**	1.00							1.0000
	X_1	a	1.00						A
	X_2	0.697	A	1.00					0.4858
	X_3	0.790	A	0.839*	1.00				0.6241
	X_4	0.898*	A	0.852*	0.969**	1.00			0.8064
	X_5	0.898*	A	0.907*	0.947**	0.979**	1.00		0.8064
	X_6	0.961**	A	0.784	0.814*	0.932**	0.919**	1.00	0.9235

Note: ** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)
a Cannot be computed because at least one of the variables is constant

Correlation between independent variables is also positive and significant but lowers where X_4 is highly affecting the other variables more particularly X_3 & X_5. This bank group has also all its branches computerized moreover ventured into ebanking system and take a lead during pre-ebanking period so record a minor change. All e-channels have caused lesser variations in business per branch in post-ebanking period whereas one and the only channel; tele-banking proves higher variations i.e. 92.35 pc.

It is evidence from table 5 that industry shows positive and significant correlation between business per branch and e-channels except ATMs in pre-ebanking period where, X_4 (internet-banking) proves the highest correlation and causing 95.65 pc variations in business per branch. Post-ebanking period embodies little bit different trace where only three variables X_2, X_5 & X_6 have greater correlation in this period in comparison of first period and X_6 is highly affecting (87.80 pc) the business per branch. It is worth mentioning that computerized branches, affecting business per branch significantly in pre-ebanking period, trim down its impact in post-ebanking period however computerized branches are rising at an escalating trend. Independent variables also explain assorted outcome as if some variables have greater correlation in pre-ebanking period then others have in post-ebanking period. Tele-banking has greater correlation with other variables and also with business per branch of the industry although ATMs and mobile-banking explain greater variations in the second period.

Table 5
Correlation Co-efficient Matrix for Business per Branch and Each e-channel (Industry)

Period	Variables	Y_0	X_1	X_2	X_3	X_4	X_5	X_6	R^2
Pre – ebanking	**Y_0**	1.00							1.0000
	X_1	0.920*	1.00						0.8464
	X_2	0.770	0.606	1.00					0.5929
	X_3	0.923*	0.774	0.952*	1.00				0.8519
	X_4	0.978**	0.866	0.885*	0.982**	1.00			0.9565
	X_5	0.921*	0.946*	0.781	0.890*	0.923*	1.00		0.8482
	X_6	0.889*	0.729	0.975**	0.996**	0.964**	0.859	1.00	0.7903
Post –	**Y_0**	1.00							1.0000

ebanking	X_1	0.763	1.00						0.5822
	X_2	0.936**	0.905*	1.00					0.8761
	X_3	0.881*	0.939**	0.932**	1.00				0.7762
	X_4	0.894*	0.938**	0.974**	0.920**	1.00			0.7992
	X_5	0.924**	0.932**	0.977**	0.941**	0.996**	1.00		0.8538
	X_6	0.937**	0.905*	0.979**	0.922**	0.993**	0.997**	1.00	0.8780

Note: ** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

Overall, correlation is smaller in post-ebanking period in all bank groups and industry where only a small number of e-channels like ATMs, mobile-banking and tele-banking has larger correlation in G-III and industry but G-II is the only group having greater correlation during post-ebanking period. Amongst all the e-channles, mobile-banking has affected the business per branch at the most in pre-ebanking period, whereas in post-ebanking period, tele-banking has greater impact on business per branch as mobile, internet-banking and ATMs are in succession. It is worth mentioning that e-channels don't have straight impact on branch business but in combination of other factors of transformation, IT can greatly improve the branch productivity as tele-banking has established. G-III & IV reports much lesser impact of e-channels on their business per branch primarily because of their previously higher performance from last decade and secondly over credits in contrast of lesser branches along with establishing new branches.

Co-efficient of Correlation between IT and Branch Productivity

Branch productivity, a combination of different factors (D/B, C/B, BUS/B, TE/B, TI/B, and ESTB/B & S/B) and IT are positively and significantly correlated in all bank groups and industry where G-II has the highest impact almost 100 pc in pre-ebanking period. Table 6 portrays a picture where, only G-I, IV and industry proves significant correlation in post-ebanking period, but it is weakening in case of other bank groups. G-I take an attention gaining the most by IT usage during the whole study period which shows 99 pc impact of IT on its branch productivity which proves that only 1 pc increase in IT usage leads 99 pc increase in branch productivity. G-II shows poor correlation mainly attributable to indecent management of IT. Overall, post-ebanking period confirms greater impact of IT in managing banking business of the industry with utmost effect on G-I. Hypothesis is rejected in case of G-I, IV and industry because IT is significantly affecting the branch productivity of these bank groups whereas not so in case of G-II & III, hence accepted the hypothesis. It is worth mentioning that IT on its own has more than 50 pc impact on improving the branch productivity and other factors play the role for remaining effect. IT along with other factors is an artifact of transformation that escorts the banks at the competitive rim and also enables these banks to compete robustly with the other players in national as well as international market.

Table 6
Co-efficient of Correlation between IT Index and Branch Productivity

Variables	G-I		G-II		G-III		G-IV		Industry	
	r	R^2	R	R^2	R	R^2	r	R^2	r	R^2
Pre-ebanking	0.988**	0.9761	0.999**	0.9980	0.899*	0.8082	0.997**	0.9940	0.960**	0.9216

Post-ebanking	0.995**	0.9900	0.762	0.5806	0.811	0.6577	0.822*	0.6757	0.976**	0.9526

Note: ** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

RECOMENDATIONS

On the basis of ongoing analysis, following recommendations are suggested for the improvement of performance of the banks:

1. The banks must improve the infrastructure of IT especially the old private sector banks.
2. All e-channels should be equally advertised to make the masses aware especially in local language and with demonstration in exhibitions.
3. Upgrade the existing training methods to update the skills of the bank staff especially for technology advancements or recruit technically skilled staff in poor performing branches.
4. Special seminars, exhibitions etc. should be arranged to aware the rural and semi-urban people about electronic banking system.
5. Provide customer friendly environment and employees too, to enhance the technical banking habits among the masses.
6. Mobile and internet banking has the highest impact on productivity even cost-effective so must be popularize among the masses with effective marketing policies.

CONCLUSION

Increasing competition has become a challenge for Indian banks but it also provides thoughtful opportunities to develop the banking business as per international standards. The technology holds the key to success of Indian banks as India could leap-frog into internet banking quicker than the United States provided Indian banks grab the opportunity. As it is concluded that post-ebanking period has excellently improved the productivity through the increasing use of IT, more particularly mobile-banking along with internet-banking and fully IT-oriented banks are the most beneficiaries of IT whereas partially IT-oriented banks though proved increase in productivity in the post-ebanking period but still not harmonized with fully IT-oriented banks. Therefore, technology based banking is need of the hour, which can't be lost sight of except at the cost of elimination from the competition.

LIMITATIONS OF THE STUDY

1. This study is based on secondary data, which was collected from banks annual reports and IBA's performance highlights. Hence, it may be subject to measurement and allocation errors which are common to traditional accounting reports.
2. For analyzing the impact of IT on productivity, data related to number of e-channels was collected directly from IT departments of concerned banks and through IBA, Mumbai which is subject to minimum disclosure.

FUTURE AREAS OF RESEARCH

1. Same methodology may be followed to study the IT impact on productivity of all banks at individual bank level.
2. Feasibility of transformation of banks through IT in the rural and semi-urban branches may be explored.

3. An in depth study is required to evaluate the impact of IT on each variable of productivity and profitability.

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