INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT & MANAGEMENT

IJRCM

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

Indexed & Listed at:

Ulrich's Periodicals Directory ©, ProQuest, U.S.A., EBSCO Publishing, U.S.A., Cabell's Directories of Publishing Opportunities, U.S.A.

as well as in Open J-Gage, India [link of the same is duly available at Inflibnet of University Grants Commission (U.G.C.)]

Registered & Listed at: Index Copernicus Publishers Panel, Poland & number of libraries all around the world.

Circulated all over the world & Google has verified that scholars of more than 1667 Cities in 145 countries/territories are visiting our journal on regular basis.

Ground Floor, Building No. 1041-C-1, Devi Bhawan Bazar, JAGADHRI – 135 003, Yamunanagar, Haryana, INDIA

www.ijrcm.org.in

CONTENTS

CALL FOR MANUSCRIPTS

We invite unpublished novel, original, empirical and high quality research work pertaining to recent developments & practices in the area of Computer, Business, Finance, Marketing, Human Resource Management, General Management, Banking, Insurance, Corporate Governance and emerging paradigms in allied subjects like Accounting Education; Accounting Information Systems; Accounting Theory & Practice; Auditing; Behavioral Accounting; Behavioral Economics; Corporate Finance; Cost Accounting; Econometrics; Economic Development; Economic History; Financial Institutions & Markets; Financial Services; Fiscal Policy; Government & Non Profit Accounting; Industrial Organization; International Economics & Trade; International Finance; Macro Economics; Micro Economics; Monetary Policy; Portfolio & Security Analysis; Public Policy Economics; Real Estate; Regional Economics; Tax Accounting; Advertising & Promotion Management; Business Education; Management Information Systems (MIS); Business Law, Public Responsibility & Ethics; Communication; Direct Marketing; E-Commerce; Global Business; Health Care Administration; Labor Relations & Human Resource Management; Marketing Research; Marketing Theory & Applications; Non-Profit Organizations; Office Administration/Management; Operations Research/Statistics; Organizational Behavior & Theory; Organizational Development; Production/Operations; Public Administration; Purchasing/Materials Management; Retailing; Sales/Selling; Services; Small Business Entrepreneurship; Strategic Management Policy; Technology/Innovation; Tourism, Hospitality & Leisure; Transportation/Physical Distribution; Algorithms; Artificial Intelligence; Compilers & Translation; Computer Aided Design (CAD); Computer Aided Manufacturing; Computer Graphics; Computer Organization & Architecture; Database Structures & Systems; Digital Logic; Discrete Structures; Internet; Management Information Systems; Modeling & Simulation; Multimedia; Neural Systems/Neural Networks; Numerical Analysis/Scientific Computing; Object Oriented Programming; Operating Systems; Programming Languages; Robotics; Symbolic & Formal Logic and Web Design. The above mentioned tracks are only indicative, and not exhaustive.

Anybody can submit the soft copy of his/her manuscript **anytime** in M.S. Word format after preparing the same as per our submission guidelines duly available on our website under the heading guidelines for submission, at the email address: **infoijrcm@gmail.com**.

GUIDELINES FOR SUBMISSION OF MANUSCRIPT

1. **COVERING LETTER FOR SUBMISSION:**

DATED: _____

THE EDITOR
IJRCM

Subject: **SUBMISSION OF MANUSCRIPT IN THE AREA OF _____.**

(e.g. Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/Engineering/Mathematics/other, please specify)

DEAR SIR/MADAM

Please find my submission of manuscript entitled '_____' for possible publication in your journals.

I hereby affirm that the contents of this manuscript are original. Furthermore, it has neither been published elsewhere in any language fully or partly, nor is it under review for publication elsewhere.

I affirm that all the author (s) have seen and agreed to the submitted version of the manuscript and their inclusion of name (s) as co-author (s).

Also, if my/our manuscript is accepted, I/We agree to comply with the formalities as given on the website of the journal & you are free to publish our contribution in any of your journals.

NAME OF CORRESPONDING AUTHOR:
Designation:
Affiliation with full address, contact numbers & Pin Code:
Residential address with Pin Code:
Mobile Number (s):
Landline Number (s):
E-mail Address:
Alternate E-mail Address:

NOTES:
a) The whole manuscript is required to be in ***ONE MS WORD FILE*** only (pdf. version is liable to be rejected without any consideration), which will start from the covering letter, inside the manuscript.
b) The sender is required to mention the following in the **SUBJECT COLUMN** of the mail:
New Manuscript for Review in the area of (Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/ Engineering/Mathematics/other, please specify)
c) There is no need to give any text in the body of mail, except the cases where the author wishes to give any specific message w.r.t. to the manuscript.
d) The total size of the file containing the manuscript is required to be below **500 KB**.
e) Abstract alone will not be considered for review, and the author is required to submit the complete manuscript in the first instance.
f) The journal gives acknowledgement w.r.t. the receipt of every email and in case of non-receipt of acknowledgment from the journal, w.r.t. the submission of manuscript, within two days of submission, the corresponding author is required to demand for the same by sending separate mail to the journal.

2. **MANUSCRIPT TITLE:** The title of the paper should be in a 12 point Calibri Font. It should be bold typed, centered and fully capitalised.

3. **AUTHOR NAME (S) & AFFILIATIONS:** The author (s) **full name**, **designation**, **affiliation** (s), **address**, **mobile/landline numbers**, and **email/alternate email address** should be in italic & 11-point Calibri Font. It must be centered underneath the title.

4. **ABSTRACT:** Abstract should be in fully italicized text, not exceeding 250 words. The abstract must be informative and explain the background, aims, methods, results & conclusion in a single para. Abbreviations must be mentioned in full.

5. **KEYWORDS:** Abstract must be followed by a list of keywords, subject to the maximum of five. These should be arranged in alphabetic order separated by commas and full stops at the end.

6. **MANUSCRIPT:** Manuscript must be in ***BRITISH ENGLISH*** prepared on a standard A4 size ***PORTRAIT SETTING PAPER***. It must be prepared on a single space and single column with 1" margin set for top, bottom, left and right. It should be typed in 8 point Calibri Font with page numbers at the bottom and centre of every page. It should be free from grammatical, spelling and punctuation errors and must be thoroughly edited.

7. **HEADINGS:** All the headings should be in a 10 point Calibri Font. These must be bold-faced, aligned left and fully capitalised. Leave a blank line before each heading.

8. **SUB-HEADINGS:** All the sub-headings should be in a 8 point Calibri Font. These must be bold-faced, aligned left and fully capitalised.

9. **MAIN TEXT:** The main text should follow the following sequence:

   INTRODUCTION

   REVIEW OF LITERATURE

   NEED/IMPORTANCE OF THE STUDY

   STATEMENT OF THE PROBLEM

   OBJECTIVES

   HYPOTHESES

   RESEARCH METHODOLOGY

   RESULTS & DISCUSSION

   FINDINGS

   RECOMMENDATIONS/SUGGESTIONS

   CONCLUSIONS

   SCOPE FOR FURTHER RESEARCH

   ACKNOWLEDGMENTS

   REFERENCES

   APPENDIX/ANNEXURE

   It should be in a 8 point Calibri Font, single spaced and justified. The manuscript should preferably not exceed ***5000 WORDS***.

10. **FIGURES & TABLES:** These should be simple, crystal clear, centered, separately numbered & self explained, and **titles must be above the table/figure**. **Sources of data should be mentioned below the table/figure**. It should be ensured that the tables/figures are referred to from the main text.

11. **EQUATIONS:** These should be consecutively numbered in parentheses, horizontally centered with equation number placed at the right.

12. **REFERENCES:** The list of all references should be alphabetically arranged. The author (s) should mention only the actually utilised references in the preparation of manuscript and they are supposed to follow **Harvard Style of Referencing**. The author (s) are supposed to follow the references as per the following:

- All works cited in the text (including sources for tables and figures) should be listed alphabetically.
- Use (**ed.**) for one editor, and (**ed.s)** for multiple editors.
- When listing two or more works by one author, use --- (20xx), such as after Kohl (1997), use --- (2001), etc, in chronologically ascending order.
- Indicate (opening and closing) page numbers for articles in journals and for chapters in books.
- The title of books and journals should be in italics. Double quotation marks are used for titles of journal articles, book chapters, dissertations, reports, working papers, unpublished material, etc.
- For titles in a language other than English, provide an English translation in parentheses.
- The location of endnotes within the text should be indicated by superscript numbers.

PLEASE USE THE FOLLOWING FOR STYLE AND PUNCTUATION IN REFERENCES:

BOOKS

- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio" Ohio State University, Nigeria.

CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

UNPUBLISHED DISSERTATIONS AND THESES

- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University, Kurukshetra.

ONLINE RESOURCES

- Always indicate the date that the source was accessed, as online resources are frequently updated or removed.

WEBSITES

- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

THE IMPACT OF E-BANKING ON PERFORMANCE – A STUDY OF INDIAN NATIONALISED BANKS

MOHD. SALEEM
ASSOCIATE PROFESSOR
DEPARTMENT OF ECONOMICS
KAMLA LOTIA S.D. COLLEGE
LUDHIANA

MINAKSHI GARG
ASST. PROFESSOR
DEPARTMENT OF ECONOMICS
KAMLA LOTIA S.D. COLLEGE
LUDHIANA

ABSTRACT

Banks all over the world make significant investments in information and communication technologies (ICT) aiming to increase their efficiency. It is of critical importance to investigate the impact of these investments on banks performance. The role of information and communication technology and its effect on the productivity both at micro and the macro level has been a subject of recent debate in economics. World over the contribution of information technology to the efficiency of a system, especially in the service sector, is being questioned. Still this relation is an unresolved paradox. This paper presents the results of an empirical investigation of the effect of ICT investments on performance of banks measured through comprehensive index of performance. The study is based on a research dataset of eleven nationalised banks which has been collected from head offices and websites of banks. . Using the time series database of Reserve Bank of India, covering the period 1998 to 2010, an information technology index and a performance index is derived. Empirical prognostication of the relation has been done using the correlation, regression and other techniques. Study confirms that contribution of technology to bank's performance has a differential behaviour. It contributes positively only to those banks where some preconditions conducive to performance are existing, e.g., trained manpower, size and scale of business. It shows that bank's performance is related not just to its technological stance but to other areas of competencies.

KEYWORDS

Information Technology, Performance, Productivity, Profitability.

INTRODUCTION

The two most powerful forces affecting each sector of the economy today are the increasing rate of globalisation and advances in information and communication technologies. It causes companies to use their input resources as much as possible in an effective way. Information technology is a powerful force and perhaps the single massive drive, impacting global society during past decade. Under the saga of information technology, world economy has witnessed a massive technological change in the recent past. Technological change brings about an increase in per capita income, either by reducing the amount of inputs per unit of output or by yielding more output for a given amount of input. In the last decade, almost all the sectors have gone in for a massive investment in information technology. One of the major areas of economy that has received renewed focus in recent times has been the financial sector and within the broad ambit of the financial sector, it is the banking sector that has been the cynosure of academia and policy makers alike. The role of information technology in performance of an organization is still a paradox. As technology is not a panacea, it is a tool for efficiency, to make it work it requires planning, organizational capabilities, managerial skills, and entrepreneurship. In the age of competition, the contribution of information technology to the performance of an organization is being questioned. In this context, the study is an attempt to analyse the effect of information technology on performance of Indian banking industry. Hence the study deals with the research question how information technology is going to have its impact on performance of Indian banking industry.

MAIN OBJECTIVES

In the present study it is broadly hypothesized that the increasing use of information technology has improved the intellectual capital and has made the banks to be more efficient. The main objective of the study is to: (a) review the theory and empirics on the relation of technology and performance with special reference to service sector; and (b) analyse the relation of information technology and performance in nationalised banks

DATA

The data comes from the publicly available data source on bank's financial statements and income expenses reports sent to banking associations. The secondary data and information have been collected from the publications of the Reserve Bank of India, Annual Reports of Respective banks and other valuable publications of banks in India. Various websites have also been used for the collection of data and information.

SIGNIFICANCE OF THE STUDY

The studies that examined the association between information technology spending and performance in developed countries and many developing countries may not apply directly to Indian banking industry. The current research study fills the gap in existing information about the relationship between information technology and performance. The study adds to the existing pool of knowledge on technology-productivity paradox. It also has a social significance. Over budgeting for information technology spending would leave fewer resources for other activities with transparent financial profitability. Further since information technology managers and senior executives of organization often face pressure to justify rising information technology expenditure to shareholders; the current study provides new knowledge and perspectives on how information technology investment affects performance.

REVIEW OF LITERATURE

The enduring magnitudes of investment in information technology have drawn attention of many researches and policy makers to the impact of IT on growth and productivity. The expectation was that increased investment in IT would naturally lead to increase in performance of organization but despite massive investment in IT, its impact on performance continued to be questioned (Willock et. al 1998). Despite hundreds of studies carried out, opinion of the experts is solidly divided on the IT-productivity debate. The debate is divided into two groups: (a) productivity Paradox, i.e., the IT has no impacts on productivity; and (b) productivity pays off, i.e., IT does improve the productivity. Some literature defence the idea of Solow paradox in concluding that information technology may affect negatively on bank's efficiency and may reduce productivity. Similar conclusions of productivity paradox have been reached by many studies (Loveman,

1994); Roach, 1998; Dasgupta, 1999; Barua et al., 1995; Onliner and Sichel, 1994; Egland et al., 1998; Diwert and Fox, 1999; and Beccalli, 2003). Some of the studies have drawn on statistical correlation between IT spending and performance measures (Das Santos et al., 1996; Prattipati, 1997; and Strassman, 1995). They have found an insignificant correlation, implying thereby that IT spending is unproductive.

Conversely there are many works, approving the positive impact of information technology to business value. Such studies have used firm level evidence and have concluded that productivity paradox has disappeared (Bender, 1986; Brynjolfsson and Hitt, 1995 & 1996; Lichtenberg, 1999; Mody and Dahlman, 1992; Karemer et al., 1994; Dewan Karemer, 1998; Weill, 1992; and Holden Ken, 1999). Work by Jorgenson and Stiroh (1995) reported the productivity paradox but however in their recent works in the year 2004, they concluded that the impact of IT on aggregate economic performance has increased overtime. Some of the recent studies have shown a strong empirical evidence in support of the benefit of further investment in IT (Battery, 2003; Vincent, 2005; Hernando and Nieto, 2006; Agboola, 2007; Mashhour, 2008; and Parsad, 2008). These findings raise several questions about mismeasurement of output by not accounting for improved variety and quality. However, some studies could not show a clear cut pay off of information technology (Gera, 2004); Shu and Westley, 2005; Albert, 2005, Altinkemer, 2005; Howells; 2005; and Shobhani, 2008). The difficulty in measuring and evaluating the benefits of information technology has generated an extensive literature both quantitative and qualitative. There are very few studies to appropriately index both the information technology and the performance of a service organization. This work is step ahead to fill this gap.

METHODOLOGY

As already mentioned, the main objective of the study is to analyse the effect of information technology on performance of nationalized banks. Study draws its database from RBI and IBA publications and databases. To make the work manageable and effective, it is confined to 11 nationalised banks only. They are Canara Bank, Bank of Baroda, Bank of India, Punjab National Bank, Dena Bank, Punjab and Sind Bank, Union Bank of India, Allahabad Bank, Indian Overseas Bank, Oriental Bank of Commerce and Central Bank of India. It covers the period from the year 1998 to 2010. To derive the overall technology parameter, a ***technology index*** has been derived using the discrete technology parameters. They are: (a) number of ATM per one lakh customers (b) number of credit card per one lakh customers; (c) number of computerized branches as percentage to total branches; (d) number of internet banking branches as percentage to total branches; (e) number of mobile banking branches as percentage to total branches; and (f) number of tele-banking branches as percentage to total branches**.** Performance analysis has been done by computing a ***performance index*** which takes into consideration different variables like profitability, efficiency and productivity. Six performance indicators have been taken to generate the performance index. The selected indicators are credit-deposit ratio, business per branch, profit per branch, profit per employee, spread per branch and spread per employee. The relation of technology index and performance index has been analysed by using correlation and regression on time series and panel data. Wherever needed, appropriate price adjustments have been made.

ANALYSIS

Using the methodology outlined above, technology and performance indices have been computed for 11 sampled banks of India. The straight forward way to analyze the relation is by using simple Karl Pearson's correlation coefficient. Correlation between technology and performance has been analyzed using the cross-section data and time series data, first separately then by pooling the two and forming a panel data. Karl Pearson's correlation coefficient between the technology index and performance index, for cross section data, for different years is shown in table no: 1 The statistical significance of correlation has been tested at 5 percent and 1 percent level of significance using t-test. It reveals that during the entire period under consideration, there has been a positive correlation between technology and performance. It is further learnt that for the initial years, from 1998-99 to 2008-09, correlation is consistently positive and is statistically significant at 1 percent level of significance. In the recent years, i.e., 2009 onwards, the value of coefficient is positive but is statistically insignificant. A clear conclusion that emerges from this analysis is that performance is a positive function of information technology in the Indian banking. That is to say, information technology is a driving force behind efficiency and performance in the Indian banking.

TABLE- 1: CORRELATION BETWEEN TECHNOLOGY INDEX AND PERFORMANCE INDEX AMONG NATIONALISED BANKS

Years	Karl Pearson's Correlation Coefficient	t-statistics
1998-99	0.716**	5.529
1999-00	0.831**	8.053
2000-01	0.818**	7.649
2001-02	0.819**	7.696
2002-03	0.839**	8.308
2003-04	0.798**	7.131
2004-05	0.762**	6.341
2005-06	0.676**	4.822
2006-07	0.623**	4.287
2007-08	0.490**	3.028
2008-09	0.539**	3.447
2009-10	0.374^{NS}	2.172
2010-11	0.179^{NS}	0.979

****** Correlation is significant at the 0.01 level; NS means, not significant

Using the temporal data, table 2 shows the correlation between technology index and performance index of all the 11 nationalized banks, It is learnt from the table that there is a close relationship of technology index and performance index for Canara Bank, Bank of Baroda, Bank of India, Punjab National Bank, Dena Bank, Union Bank of India, Allahabad Bank, Indian Overseas Bank.The relation is significant at 1 percent level of significance. A close look at the table also leads us to conclude that for Central Bank of India, , correlation is significant at 5 percent level of significance. It is further observed from table that for Punjab and Sind Bank, Oriental bank of commerce, Correlation is positive but not statistically significant.

TABLE 2: BANK-WISE CORRELATION BETWEEN TECHNOLOGY AND PERFORMANCE INDEX

Code	Name of the bank	Correlation	t -statistics	Significance
1.	Canara Bank	0.777	4.10	**
2.	Bank of Baroda	0.925	8.09	**
3.	Bank of India	0.907	7.13	**
4.	Panjab National Bank	0.883	6.23	**
5.	Dena Bank	0.676	3.05	**
6.	Punjab & Sind Bank	0.343	1.21	NS
7.	Union bank of India	0.760	3.87	**
8.	Allahabad Bank	0.834	5.02	**
9.	Indian Overseas Bank	0.898	6.76	**
10.	Oriental Bank of Commerce	0.516	2.00	NS
11.	Central Bank of India	0.607	2.53	*

**Significant at 0.01 level; * Significant at 0.05 level; NS Not significant

On the whole, the table shows that value of correlation coefficient is positive for all the banks, this correlation is much stronger and significant for some nationalized banks .The logic is that public sector banks have a scale and size advantage. They stand at advantage so far as market share, size of bank and experience of the bank is concerned. Their market share in the total business is large. Their branch network and customer base is large. These public sector banks are maintaining their performance (with exception of few banks) and information technology has undoubtedly contributed to large banks having greater flexibility to adapt to changes,

To better investigate the above preliminary evidences and to gain a deeper insight into the relationship between technology index and performance index, a set of regressions has been analyzed. Technology index has been treated as independent (exogenous) variable and performance index has been treated as dependent (endogenous) variable. The mathematical representation of regression equation is written as follows:

$Y = a + bX$

Where Y is the performance Index; 'a' is the intercept; 'b' is the regression coefficient and X is the technology index. Regression coefficient represents the estimated change in the value of dependent variable, for each unit change in independent variable values. Following analysis deals with regression analysis at banking group and individual banks' level.

NATIONALISED BANKS

At the bank level, the regression results as shown in table no.3 indicate that performance index is a positive function of technology index as all the nationalized banks under study have positive regression coefficients indicating the contribution of technology towards performance but for Dena Bank, Oriental Bank of Commerce and Central Bank of India, R^2 turns out to be very poor, indicating weak explanatory power (45 percent, 26 percent and 36 percent respectively). For Punjab and Sind Bank, regression results are what may be called damped, as the regression coefficient are statistically insignificant. Moreover low explanatory power of R^2 (12 percent) indicates that IT investment explains a relatively low portion of performance measure. Overall the results indicate that technology has improved the performance of nationalized banks but some nationalized banks like Dena Bank, Punjab and Sind Bank and Oriental Bank of Commerce have not been successful in leveraging their technologies to raise their performance.

POOLED DATA REGRESSION RESULTS

Pooled data regression analysis has been done for 11 Indian nationalised banks, for all the years under study (1998-99 to 2010-11). The regression model is as follows:

Performance Index = f(Technology Index)

Regression results are indicative of the fact that regression coefficient of performance as a function of technology is positive. At the nationalized bank group level, the regression results show that performance index is a positive function of technology index and the regression results are statistically significant (p=0.01 level). Further the coefficient of determination comes out to be 0.43 percent. It shows that although this new technology regime is shaping the performance of the nationalized banks, yet the coefficient of determination shows that technology is a poor determinant in case of nationalized banks. Study confirms that contribution of technology to bank's performance has a differential behaviour. It varies with size, scale, ownership and phase of technology adoption.

TABLE 3: REGRESSION RESULTS FOR PERFORMANCE AND INFORMATION TECHNOLOGY RELATIONSHIP IN NATIONALIZED BANKS AND BANK GROUP IN INDIA

Bank/ Group	Constant (a)	Coefficient (b)	Standard Error	t for coefficient	R^2	F for Regression
Canara Bank	0.047	0.402**	0.098	4.097	0.604	16.787**
Bank of Baroda	0.028	0.225**	0.028	8.092	0.856	65.488**
Bank of India	0.096	0.216**	0.030	7.126	0.822	50.780**
Panjab National Bank	0.073	0.227**	0.036	6.227	0.779	38.776**
Dena Bank	0.079	0.193**	0.063	3.046	0.458	9.281**
Punjab & Sind Bank	0.078	0.110^{NS}	0.091	1.209	0.117	1.462^{NS}
Union Bank of India	0.074	0.260**	0.067	3.873	0.577	14.996**
Allahabad Bank	0.099	0.107**	0.021	5.016	0.696	25.160**
Indian Overseas Bank	0.085	0.200**	0.030	6.757	0.806	45.651**
OBC	0.135	0.066^{NS}	0.033	1.996	0.266	3.982^{NS}
Central Bank of India	0.092	0.087*	0.034	2.534	0.369	6.421*
Nationalized Banks Group	**0.089**	**0.151****	**0.014**	**10.463**	**0.437**	**109.472****

Note: Marking * indicates significant at 5% and ** indicates significant at 1%

Source: Calculated

MULTIVARIATE REGRESSION RESULTS

So far, the performance has been taken as a sole function of technology and assuming the effect of other inputs to be constant. This is an unrealistic assumption and hence the inferences are indicative of the broad relation. To refine the technology and performance relationship, technology is taken in conjunction with other inputs: capital and labour. Now the modified performance function appears as follows:

Performance = f (Capital, Labour, Technology)

For arriving at the coefficients, multiple regression model has been fitted to the panel data. The analysis has been carried at the banking group level only. Following is explicit form of regression model fitted.

$Yi = a + b_1x_1 + b_2x_2 + b_3x_3$

Where Yi is the performance of Bank Group i; a is the constant intercept; X_1 is capital; X_2 is labour; X_3 is technology; and b_1, b_2 and b_3 are regression coefficients of capital, labour and technology respectively.

The regression results are presented in table 4. Regression results are indicative of the fact that in case of nationalized banks group, performance is positively determined by labour and technology and negatively by the capital. But the regression coefficient for labour is significant at 1 percent level of significance and for other two variables, it is statistically insignificant. Coefficient of determination is 0.952 which show that model is statistically a sound model. Hence in case of nationalized banks labour out-performs the capital and technology.

TABLE 4: REGRESSION RESULTS FOR DIFFERENT BANKING GROUPS IN INDIA

Bank Group	a	B1 (S.E) (t-value)	B2 (S.E) (t-value)	B3 (S.E.) (t-value)	R2	F	N
Nationalized Banks	-0.0019	-0.0015 (0.044) (0.033)	0.744** (0.048) (15.634)	0.236 (0.048) (4.966)	0.952 (0.746)	140.213** (3, 139)	142

Note: Marking ** Indicates significant at 1 percent level of significance and NS, not significant

Overall, multivariate regression explains that out of three variables namely capital, labour and technology, capital impact is negative in case of nationalized banks. It indicates that these banks have gone for a highly capital intensive mode of production. However the performance has not grown to that extent at which the capital has accelerated. Labour is contributing significantly for all the banks. It is because of better human resource management practices in all banks which include performance based pay, flexible job design, improving employee's skill and institutional structure affecting the labour management relations. So far as technology is concerned, it is contributing positively to public sector banks. Overall it implies that every investment decision relating to technology must be evaluated in the light of its interaction with other inputs and its contribution to performance.

CONCLUSION AND POLICY IMPLICATION

The complex nature of this relationship has been stylized and modelled empirically. In general, this study does not show a clear link between IT investment and performance. Study confirms that contribution of technology to bank's performance has a differential behaviour. It contributes positively only to those banks where some preconditions conducive to performance are existing, e.g., trained manpower, size and scale of business. It shows that bank's performance is related not just to its technological stance but to other areas of competencies. Banks those give greater stress both to use of advance IT and human resource strategies, experience superior performance gains; whereas, in some other banks, higher IT investments are not associated with higher performance. The technology is a poor determinant in case of nationalized banks. This implies that every investment decision relating to technology must be evaluated in the light of its interaction with other inputs and its contribution to performance. Still, this relation is a sort of paradox which needs to be analyzed with larger data base. Above results are what may be called preliminary in nature for policy and planning issues, an exercise, fortified with a bigger data base is called for.

LIMITATIONS

1. Since financial performance data analysed is obtained from bank's annual reports published on the websites of commerce banks and central bank of India (RBI). In some cases, the two sources contained discrepancies.
2. There was non availability of some requisite data. Although plethora of information and data are available with the bank, most of the bankers even today are very conservative and are reluctant to part with the information treating it as confidential. This non response further narrowed the coverage of the study.
3. In addition to the parameters studied some other parameters may exist which may not have been included in the study.

REFERENCES

1. Acharya, N.R. and Kagan, A. (2008), "Impact of Website Usability on Performance: A Heuristic Evaluation of Community Bank Homepage Implementation", *Journal of Business and Economic Research,* Vol.6, No.6, pp 139-145.
2. Achimugu, P. (2009), "Information System for Competitive Advantage", *MIS Quarterly,* Vol.6, No.4, pp 90-123.
3. Agarwal, B.P. (1981), *Commercial Banking in India,* Classical publishing Company, New Delhi.
4. Agboola, A. (2007), "Information and Communication Technology (ICT) in Banking Operations in Nigeria: An Evaluation of Recent Experiences", *Life Journal of Economics and Finance*, Vol.15, No.1, pp 1-21.
5. Amandeep. (1993), Profit *and Profitability in Commercial Banks,* Deep and Deep Publications, New Delhi.
6. Ammannaya, K.K. (1992), *Towards More Remunerative Development of Credit for Banking Profitability,* Macmillan India Limited, New Delhi.
7. Beccalli, E. (2003), "Information Technology and Economic Performance: Some Evidences from the EU Banking Industry", Working Paper, Accounting and Finance Department, London School of Economics.
8. Bhasker, P.V. (2004), "Customer Service in Banks", *IBA Bulletin*, Vol.36, No.8, pp 9-13.
9. Bhasker, P.V. (2005), "Trends towards Universal Banking with Strategic Alliance", *IBA Bulletin*, Vol.37, No.3, pp 8-13.
10. Bhatia, S. (2004), "Globalization and India: Trade in Services", *Chartered Secretary*, Vol.38, pp 54-55
11. Chakrabarthy, K.C. (1990), *Banking in 1990s,* Himalaya Publishing House, Bombay.
12. Chandrasekhar, M. and Sonar, R. (2008), "Impact of Information Technology on Efficiency and Total Factor Productivity of Indian Banks", *South Asian Journal of Management,* Vol. 15, No. 3, pp 74-91.
13. Chawla, A.C. (1998), *Indian Banking Towards 21st Century,* Deep and Deep Publications, New Delhi.
14. Daneshvar, P. Ramesh, H.N. (2012), "Determination of IT Strategies to Improve Banks Performance: Indian Public Banks Experience", *AJRBEM*, Vol.2, No.2, pp115-131.
15. Dauda, Y.A. and Akingbade, W.A. (2011), "Technological Innovation and Organizational Performance: Employee Relation Strategies", *Nigerian Journal of Industrial Relations*, Vol. 11. No. 3, pp 96-110.
16. Desai, V. (1980), *Indian Banking: Nature and Problems,* Himalaya Publication House, Bombay.
17. Devaraj S. Kohli, R. (2003), "Performance Impacts of Information Technology: Is Actual Usage the Missing Link", *Management Science*, Vol.49, No.3, pp 273-289.
18. Dewan, S. Min, C. (1997), "Substitution of Information Technology for Other Factors of Production: A Firm-level Analysis", *Management Science,* Vol.43, No.12, pp 1660-1675.
19. Hussain, F. (1998), *Computerization and Mechanization in Indian Banks,* Deep and Deep Publications, New Delhi.
20. Ibragimon, J. (2008), "Productivity Changes in Banking", *Journal of Banking and Finance,* Vol.26, pp 2221-40.
21. Inclaar, R. and Mcguckin, R.H. (2004), "ICT and Productivity in Europe and the United States: Where Do the Difference Come From?", *CESIFO Economic Studies,* Vol.49, No.3, pp 295-318.
22. Jalan, B. and Arora, A. (2003), "Profitability and Profit Planning in Banks", *The Journal of Indian Institutes of Bankers*, Vol.15, No.15. pp 13-16.
23. Janki, B. (2002), "Unleashing Employee Productivity-need for a Paradigm Shift", *Indian Banking Association Bulletin*, Vol. 24, No.3, pp 7-9.
24. Krueger, A. (1995), *Political Economy of Policy Reform in Developing Countries,* The MIT Press Cambridge.
25. Kumar, T.S.(2006),"Leveraging Technology for Foreign Banks Financial Inclusion", Banker's Conference Proceedings, (Nov.), pp 144-152.

26. Kwon, J. and Stoneman, P. (1995), "The Impact of Technology Adoption on Firm's Productivity", *Economics of Innovation and New Technology*, Vol. 3, pp 219-33.
27. Lal, R.C. (2007), "Banking Transformation through IT in India", *Journal of Commerce and Trade*, Vol.2, No.2, (Oct.), pp 46-48.
28. Leckson, T.Y. and Leckey, K.A. (2011), "Investment in IT and Bank's Business Performance in Ghana", *International Journal of Economics and Finance*, Vol.3, No.2, pp 133-142.
29. Lehr, W. and Lichtenberg, F.R. (1998), "Computer Use and Productivity Growth in Federal Government Agencies 1987-92", *Journal of Industrial Economics,* Vol. 46, No.2, pp 257-79.
30. Malhotra, P. and Singh, B. (2005), "New Revolution in Indian Banking Industry: Internet Banking", *Punjab Journal of Business Studies*.Vol.1, No.1, (April-Sept.), pp 75-86.
31. Malone T. and Rockart, J. (1991), "Computers, Networks and the Corporation", *Scientific American,* Vol.265, No 3, pp 128-136.
32. Mankidy, J. (2000), "Information Technology and HR issues: Experience of Banking Industry", *Management and Change*, Vol.4, No.2, (July-December), pp 309-320.
33. Martinez, J. and Kuri, T. (2007), "Innovation in Service", *Research Policy,* Vol.15, No.3, pp 516-26.
34. Mashhour, A. (2008), *"A* Framework for Evaluating the Effectiveness of Information System at Jordan Banks: An Empirical Study,*" Journal of Internet Banking and Commerce,* Vol.13, No1, pp 1-14.
35. Mathur, O.P. (1978), *Public sector Banks in India-A Case Study of State Bank,* Sterling Publishers private Ltd, New Delhi.
36. Mathur, P.N. (1963), "An Efficient Path of Technological Transformation of an Economy", in Barna, T. (ed.), *Structural Dependence and Economic Development,* Macmillan.
37. Mittal, R.K. Dhingra, S. (2007), *"*Assessing the Impact of Computerization on Productivity and Profitability of Indian Banks", *Delhi Business Review,* Vol.8, No1, pp 63-73.
38. Mody, A. and Dahlman, C. (1992), "Performance and Potential of Information Technology," An International Perspective", *World Development*, Vol.20, No.12, pp 1703 19.
39. Mohan, R. (2003), "Long Run Performance of Public and Private Banks", *EPW*, Vol. 37, No.8, pp 785-88.
40. Mohan, R. (2004), "Financial Sector Reforms in India: Policies and Performance Analysis," Lectures delivered at I.M.F, Washington, D.C.
41. Morrison, C.J. and Berndt, E.R. (1990), "Assessing the Productivity of Information Technology Equipment in the U.S. Manufacturing Industries", Working Paper 3582, National Bureau of Economic Research.
42. Motohashi, K. (2005), "Firm Level analysis of Information Network Use and Productivity in Japan", Discussion Papers Series 03-E-021, Institute of Innovation Research.
43. Mukhopadhyay, T. and Kalathur, S. (1995), "Business Value of Information Technology: A Study of Electronic Data Interchange", *MIS Quarterly.* Vol.19, No.2, pp 137-45.
44. Pandey, I.M. (1979), *Financial Management,* Vikas Publishing House, New Delhi.
45. Raj, K.N. (1974), *"Monetary Management and Nationalization of Banking in India,"* in: Ashok Mitra (ed,*), Economic Theory and Planning: Essay in Honour of A.K. Dasgupta*, Oxford University Press, New Delhi.
46. Rajagopalan, A.V. (1993), "Productivity in Banks: An Overview," in S.S. Hugar (ed), *Trends and Challenges to Indian Banking*, Deep and Deep Publication, New Delhi.
47. Sidikat, A. (2008), "Impact Assessment of BPR on Organizational Performance", *European Journal of Social sciences*, Vol.7, No.1, pp 115-126.
48. Singh, J. (1990), *Productivity in the Indian Banking Industry,* Deep and Deep Publications, New Delhi.
49. Singh, R. P. (1999), *Working of the Nationalized Banks,* Radha Publications,
50. Singla, H.K. (2008) "Financial Performance of Banks in India", *The ICFAI Journal of Bank Management*, Vol.7, No.1, (February), pp 41-49.
51. Sobhani, A. (2008), *"*Impact of Information Technology on Productivity*",* Master Thesis Continuation Course Marketing and E-commerce Lucea University of Technology Department of Business Administration and Social Science Division of Industrial Marketing and E-Commerce.
52. Solomon, J.F. and Donald, G. (1966), *Managerial Finance,* John Willey and Sons, New York.
53. Spithoven, A. H. (2003), "The Productivity Paradox and the Business Cycle", *International Journal of Social Economics*, Vol.30, No.6, pp 679-699.
54. Willcocks, L. and Lester, S. (1998), "*Beyond the IT Productivity Paradox,"* Wiley Publication.

REQUEST FOR FEEDBACK

Dear Readers

At the very outset, International Journal of Research in Commerce, IT and Management (IJRCM) acknowledges & appreciates your efforts in showing interest in our present issue under your kind perusal.

I would like to request you to supply your critical comments and suggestions about the material published in this issue as well as on the journal as a whole, on our E-mail i.e. **infoijrcm@gmail.com** for further improvements in the interest of research.

If you have any queries please feel free to contact us on our E-mail infoijrcm@gmail.com.

I am sure that your feedback and deliberations would make future issues better – a result of our joint effort.

Looking forward an appropriate consideration.

With sincere regards

Thanking you profoundly

Academically yours

Sd/-

Co-ordinator

ABOUT THE JOURNAL

In this age of Commerce, Economics, Computer, I.T. & Management and cut throat competition, a group of intellectuals felt the need to have some platform, where young and budding managers and academicians could express their views and discuss the problems among their peers. This journal was conceived with this noble intention in view. This journal has been introduced to give an opportunity for expressing refined and innovative ideas in this field. It is our humble endeavour to provide a springboard to the upcoming specialists and give a chance to know about the latest in the sphere of research and knowledge. We have taken a small step and we hope that with the active co-operation of like-minded scholars, we shall be able to serve the society with our humble efforts.

Our Other Journals