

Looking Inside the Association Between Information Technology And Banking Performance

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Abstract

Technology, undoubtedly, is the key strategic issue in modern banking. Over the past few decades the use of technology for commercial purposes in developed countries has become widespread. Although the use of Information System for commercial purposes or electronic commerce is still in growing stage, the growth of the Information Technology is changing the way of consumer banking. It has been predicted that the majority of the bank customers will soon prefer to manage their banking transactions through technology. This paper will try to establish a relationship between IS and the financial performance indicators of commercial banks in Bangladesh by representing the correlation between IS with profit, assets and equity of these commercial banks using statistical tools. Thus the paper will look into the values of information systems in commercial banking services in Bangladesh.

KEYWORDS: It, Profit, Bank, Technology.

1. Introduction

The prospective of banking is changing gradually with the passage of time to meet the demands of customers. Introduction of information technology is a revolutionary step in contemporary banking. The common idea about productivity of banks greatly depends on effective utilization of IT. No industry spends more on information technology (IT) than financial services. “Banks are essentially technology firms,” says Hugo Banziger, former chief risk officer at Deutsche Bank.

The impact of IT on bank productivity has been examined by a number of studies on commercial banks, which gives contradictory results in all cases. For example there was a rise in output per employee hour to the advance in computer technology and its rapid diffusion is attributed by Brand and Duke (1982). But in contrast Franke (1987) reports an increase in IT capital intensity without a corresponding increase in labor and output productivity. A study by Crowston and Treacy (1986), on ‘impact of IT on enterprise level performance’, concluded that attempts to measure the impact of IT were surprisingly unsuccessful and attributed this to the lack of defined variables, which in turn stems from inadequate reference disciplines and methodologies. IT was only partially responsible for the increased growth of Israeli banks as determined by Kim and Weiss (1989). In Canadian banks, Parsons et al. (1990) have got and evidence of growth in productivity from IT. The productivity growth in the 1990s in the Austrian banking with increasing use of ATMs, credit cards, EFTPOS, debit cards etc. has also been reported by Oster and Antioch (1995). Radigan (1996) and Morisi (1996) both consider that (with the same or fewer employees) technology increases performance and provide more services. Feldner-Bustin and Associates (2002) projected that productivity ratios for well-utilized Internet bank should be 15-20%. But it was actually found that the staff payroll ratio to revenue increased while the non-interests costs ratio to revenue did not reduce (Stassmann, 2001) in U.S. commercial banks with major investments in computer equipment. This finding indicates that productivity does not increase as a result of IT. 20% of the 461 banks that use IT intensively had more than 10% improvement in the staff payroll to revenue ratio, indicating an increase in productivity, which was also found in the study. In the late 1990s in retail banking in France, Germany and the U.S. (Kriesel et al. 2003), IT related innovations had made an important and significant role in the productivity growth of robust labor. On the contrary in the late 1990s, a reduction in productivity growth rate for U.S. retail banking in spite of having major IT investment was reported by Olazabal (2002). In the developing countries, Frischtak (1992) reported that in commercial banks in Brazil IT reinforced productivity while McKendrick (1992) found that in commercial banks in Indonesia impact of IT was not so important and can be neglected easily. No agreement can be found about the impact of IT on bank productivity from those studies review.

2. Literature Review

Studies about impact of IT on banking received massive attention in Europe but was with mix results in Americas and Asia. Developing countries tends to be parsimonious in comparison with the theoretical and empirical evidences from the developed economies. The effectiveness about the productivity of IT is still on

doubt. The traditional analysis tends to be more technical but conclusive. Different alternative methods have been suggested to complement evaluation of IT investment.

Many experts of early studies examined the correlation between IT spending ratios and various performance measurements, such as profits or stock returns (Dos Santos, Peffers and Mauer, 1993). Since the correlation was either zero or very low, some concluded that computer investments have been unproductive. However, spending more on computers should generate higher profitability or stock market returns (Lim, Richardson and Robert, 2004). Studies about the impact of IT investments on the U.S. economy at the national stage are really disappointing (Schrage, 1997). On the other hand a report by Dewan and Kraemer (1998) has found that developed countries (e.g., Germany) have good returns on IT related investments. In the U.S. Dos Santos (1993) and Weill (1992) found a mixed results on IT investment. They found that there was no impact of IT on the excess of return, but later their study found that if IT investment is related to innovation in a firm then it increases the value of the firm. In 1992 Weill found that an investment can produce significant productivity gains if the investment decision is transaction processing systems directed

Some researchers were more optimistic about the impact of IT (Hitt and Brynjolfsson, 1995, 1996; Brynjolfsson and Hitt, 1996; Brynjolfsson, Hitt and Yang, 2000; Brynjolfsson and Hitt, 2001). The 1996 researches, involving Hitt and Brynjolfsson, admitted that investment in IT were associated with an increase in productivity of workers who work with information and, additionally, they claim that investments in computing generates greater levels of productivity than any other type of investments, despite the short life-span of this type of tool (Brynjolfsson and Hitt, 1996, p.49-50). However, the researchers maintain that the results obtained did not imply that investing in IT guarantees net productivity gains, but that other factors may influence the relation (Bruque et al, 2002). An expectation about IT use was that it might increase productivity but in the “Productivity Paradox” or the “IT Paradox” (Brynjolfsson, 1993; Olazabal, 2002) productivity statistics showed the opposite.

In banking and financial sector few other studied are done to represent the relationship of the industry (Davis, 1993; Strassman, 1997a, 1997b; Alpar and kim, 1990; Turner, 1985; Harris and Katz, 1991).In 1999 Davis used the statistical data to show the relationship between productivity and several industry sector including us banking industry. The annual productivity gains were 2.48% for U.S. commercial banks (Davis, 1993), compared to 0.93% for U.S. national productivity (U.S. Bureau of Labor Statistics, 1997). A sample of the 16 large U.S. banks with over $5 billion revenues was utilized by Stresemann (1997b) to assess the relationship between IT and productivity that was measured by staff expense ratio and non-interest expense ratio, and profit as measured by ROE. They invested on their IT sector more rapidly than any other component of the bank, where ROE were relatively low. It shows contribution towards productivity or ROE. Alpar and Kim (1990) reassured the findings on their ratio studies based on multi-input performance ratio of the selected U.S. firms of the banking industry. The ratios were not satisfactory from any positive conclusion about IT expenditure. At the same time, production functions found a significant IT cost reduction. The relationship between IT expenses or IT use and banks with performance of 58 mutual savings banks in the U.S. was assessed by Turner (1985) which was also inconclusive. Harris and Katz (1991) examined the same relationship for selected U.S. life insurance companies and concluded with no possible answer. But using Data from 1983 to 1986, Harris and Katz were able to find a weak relationship with the level of information technology investment and performance. There are other studies about non-financial sectors including Loveman, 1988; Barua et al., 1995. It capital investment contribution to output is near to nothing for the U.S. manufacturing sector, concluded by Loveman (1988). To test the IT effect on two non-financial industrial sectors a two-stage model was used in studies of Barua et al., (1995). Some other studies focuses on the smaller banks (Turner, 1985; Banker and Kauffman, 1988; Haynes, 1990; Brady and Targett, 1995) went with the same inconclusive conclusion.

3. Methodology

Previous researchers on the topic heavily depend on theoretical study with survey, interview and archival methods. The questionnaires were developed to extensively examine the relationship of productivity and IT expenditure. From the previous studies it was already established that the impact of information technology into the financial performance of bank can go on both ways. Thus we modified the question of the research from the other side. Rather than finding the impact of information technology on bank, we targeted the financial indicators of a bank to interpret and establish the computerization rate of a bank, which is an indicator of IT success. In this paper, we have established our goal to statistically test the same objective but staying inside of the context of Bangladesh.

Research Question: Can the financial indicators of a bank also indicate information technological advancement of the entity?

The data used in the paper are collected from secondary sources. The primary financial data are collected from the annual reports (2001-2010) of the sample 10 banks in three categories. Namely:

NAME OF THE BANK		
1	BASIC BANK	Specialized Bank
2	AB BANK	Private Bank
3	ISLAMI BANK	Private Bank
4	UTTARA BANK	Private Bank
5	SOUTHEAST BANK	Private Bank
6	EASTERN BANK	Private Bank
7	SONALI BANK	Government Bank
8	AGANI BANK	Government Bank
9	JANATA BANK	Government Bank
10	GRAMEEN BANK	Specialized Bank

We used the review paper on ‘‘IT Operations of Bank-2012” by Bangladesh Institute of Bank Management to secure our data on it operations of Bangladesh sourced as computerization of bank branches of Bangladesh. Presented below as percent (%).

	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
Government Bank	40.15	23.59	21.7	19.4	16.38	16.12	14.43	11.89	10.09	8.35
Private Bank	99.11	99.01	99	98.97	98.92	98.9	98.45	97.76	95.67	85.86
Specialized bank	16.23	15.93	15.22	12.57	8.51	4.35	4.39	4.2	4.2	2.06

Our sample banks only consist of government, private and specialized bank but no foreign bank. The reason because they don’t provide there information’s publicly. Out of the last 10 years financial data, the study only consider asset, equity and profit after tax as a valued financial performance indicator.

The core research is done using regression analysis models over the stated variables which also includes ANOVA. Computerization of banks were choose as dependent variable Y and the other three financial aspects namely asset equity and profit after tax were given independent X variable status.

Computerization(Y) = Intercept + Coefficient1 (asset) +Coefficiant2 (equity) +Coefficient3 (profit after tax)

In the next step, the results are going to be interpreted to find the value behavior. Adjusted goodness of fit will be used to find out the efficiency of the regression as a linier model. Adjusted goodness of fit will be used on the notion of there are multiple x variables in the regression analysis. Analysis of variance will also be used to interpret the X variables ability to deduct computerization or Y using F statistic. Once the adjusted goodness of fit and Anova results are incorporated, p values of the relating x variables will be used to determine the probability of coefficients of variables could be 0.For the last two states the hypothesis will be:

H1 (Null Hypothesis): Coefficients Will Be 0
H2 (Alternate Hypothesis): At least one or more Coefficients Will Not Be 0

4. Empirical Findings

4.1. Goodness of fit

The adjusted R square show what proportion of variance of dependent variable can be explained through independent variables. Using a 50% cut off point, only 5 of the models actually passed through the adjusted goodness of fit statistic. Rests were unable to show the variation in the regression model.

	NAME OF THE BANK	ADJUSTED R SQUARE	VERDICT BASED ON ADJ R SQUARE
1	BASIC BANK	0.90195874	X Variables Does Explain
2	AB BANK	0.060125311	X Variables Failed To Explain
3	ISLAMI BANK	0.062040147	X Variables Failed To Explain
4	UTTARA BANK	-0.33136	X Variables Failed To Explain
5	SOUTHEAST BANK	0.14704476	X Variables Failed To Explain
6	EASTERN BANK	-0.140692111	X Variables Failed To Explain
7	SONALI BANK	0.834611255	X Variables Does Explain
8	AGANI BANK	0.960775706	X Variables Does Explain
9	JANATA BANK	0.879907655	X Variables Does Explain
10	GRAMEEN BANK	0.864560289	X Variables Does Explain

4.2. Analysis of Variance

The analysis of variance tests the null hypothesis which states all of the coefficients are 0.Rejecting the null verifies the alternative and as a whole states there is some explanatory power of x variables to interpret the dependent variable.

NAME OF THE BANK		ANOVA P VALUE	VERDICT BASED ON P VALUE
1	BASIC BANK	0.00059563	Reject the Null Hypothesis
2	AB BANK	0.389368901	Accept the Null Hypothesis
3	ISLAMI BANK	0.38736143	Accept the Null Hypothesis
4	UTTARA BANK	0.856433471	Accept the Null Hypothesis
5	SOUTHEAST BANK	0.303270535	Accept the Null Hypothesis
6	EASTERN BANK	0.621911062	Accept the Null Hypothesis
7	SONALI BANK	0.002808148	Reject the Null Hypothesis
8	AGANI BANK	3.87291E-05	Reject the Null Hypothesis
9	JANATA BANK	0.001088326	Reject the Null Hypothesis
10	GRAMEEN BANK	0.001554772	Reject the Null Hypothesis

Again in this result, the overall interpretation gives a 50-50 breakup. Half of the Anova models are qualified to predict the dependent variable and other half failed to predict.

4.3. Regression

In the last step, a regression model has been constructed by the five banks that previously passed the 50% goodness of fit test. Only one of the fifteen p value shows the accepted result to reject the null hypothesis. Thus the regression model shows close to no evidence that there is a underlying relationship between computerization or information technology infrastructure and profitability of bank.

	NAME OF BANK	X variable	P value	Verdict based on p value
1	BASIC BANK	Asset	0.153082153	Accept the Null Hypothesis
		Equity	0.145168811	Accept the Null Hypothesis
		Profit after tax	0.382957337	Accept the Null Hypothesis
2	SONALI BANK	Asset	0.343891478	Accept the Null Hypothesis
		Equity	0.725792048	Accept the Null Hypothesis
		Profit after tax	0.69609607	Accept the Null Hypothesis
3	AGANI BANK	Asset	2.39674E-05	Reject the Null Hypothesis
		Equity	0.091825894	Accept the Null Hypothesis
		Profit after tax	0.459796684	Accept the Null Hypothesis
4	JANATA BANK	Asset	0.233021465	Accept the Null Hypothesis
		Equity	0.206640581	Accept the Null Hypothesis
		Profit after tax	0.329088907	Accept the Null Hypothesis
5	GRAMEEN BANK	Asset	0.153082153	Accept the Null Hypothesis
		Equity	0.145168811	Accept the Null Hypothesis
		Profit after tax	0.382957337	Accept the Null Hypothesis

5. Results

The Goodness of fit, Anova and Regression showed abnormally mixed results with a contradictory view. But all the statistical models did show a negative view about the relationship of computerization and banks' financial performance indicators. The R square and Anova showed totally mirrored view. Both canceled out the others positive outcome. In the regression only 1 out of 15 X variables were able to interpret and relate to the computerization rate. So at the end, none of the statistical model can give satisfactory answer to correlate the information technology and financial performance indicators of Bangladeshi banks.

6. Conclusion

Introduction of newer technology gives tremendous boost to banking sector. It is a general acknowledgement that technology has a huge impact on the economic growth of a bank as other major inventions. The study accessed the parameters of bank performance and productivity in Bangladesh comparing with IT operations. Recently banks take a greater interest in building IT infrastructure and data management systems depending on the idea that these will boost the profit. Given the narrow scope of studies in the sector, the paper continues to try to contribute an answer to the core dilemma about the monetary benefits IT operations can bring. Even in current economic destabilizing condition, the Asia pacific basin experienced an upward growth in the IT investment of the banks and they subsequently improve their portfolios with better products with lower costs valued geographically.

Multiple regression data from 10 sample banks shows there are no correlation between the financial success and it operations of the Bangladeshi banks. The results are far different from the core ideas in the banking sector unlike the ideas in the more advanced countries, where financial success followed a more contributory pattern with the technological improvements. Our results open the door to further investigate the idea of banking and the relationship of reality in Bangladesh's financial sector.

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