Journal of Information Engineering and Applications
ISSN 2224-5782 (print) ISSN 2225-0506 (online)
Vol.8, No.2, 2018

Impact of Information Technology (IT) Investment on Banks' Performance: A Study on Dhaka Stock Exchange (DSE) Listed Banks of Bangladesh

Syed Moinur Rashid
Faculty Member, Department of Management, Premier University, Chittagong, Bangladesh

Abstract
In Bangladesh, Information and communication technology (ICT) has become the impetus of current financial sector. Globalization, technological advancement and innovation, make it imperative for the banking industry in Bangladesh to invest more on ICT to stay ahead in the competition. This paper intends to explore the relationship between Information Technology (IT) investment and banks' performance. This study is conducted on Dhaka Stock Exchange (DSE) listed banks and especially five commercial banks are selected for this research. Based on secondary data, this research is quantitative and longitudinal in nature. The correlation and regression models have been used to measure the relationship between Information Technology (IT) investment and banks' performance. Bank's performance has been measured by Return on Investment (ROI), Net Profit Margin (NPM), Return on Equity (ROE) and Return on Asset (ROA). The findings of this study reveal that a positive relationship exists between IT Investment and banks performance. Hence, it is suggested that more thought has to be put towards the investment and use of Information and Communication Technology in banking sector.
Keywords: ICT, Information Technology, Investment, Bank, Evaluation, Bangladesh.

1. Introduction

Banking is considered as one of the most indispensable sectors in the financial industry. A major role has been played by ICT in providing customer services through online delivery channel. At recent time, it is become imperative for banking sector to evaluate the role of Information Technology (IT) on banks' performance (greater customer satisfaction, high market share etc.) for ensuring more effective and efficient use of IT in banking industry.

As a developing country with GDP above 7 over the last couple of years, the banking sector in Bangladesh is clearly recognizing the importance of information technology to their continued success (Huda, Momen, & Ahmed, 2004). As commented, banking industry in Bangladesh is mature to a great extent than earlier period (Shamsuddoha, 2008). It has developed a grand reflection in electronic banking. Modern banking services already have initiated by private commercials and multinationals banks. Now, Electronic banking is one of the most demanded and latest technologies in banking sector.

According to Rahman (2010), Bangladesh Bank has achieved a historic landmark in the trade and business arena which considered as a significant leap towards digital Bangladesh.

It was opined that Bangladeshi organizations have several problems to start full services of e-banking. These problems include limited resources, backwardness in technology, managerial inefficiency, socio-infrastructural problems such as corruption, default culture law, strike, blockade etc. (Ali, 2010).

2. Literature Review

Johnson (2005) defined Information Technology (IT) as the automation of processes, controls, and information production using computers, telecommunications, software and ancillary equipment. The use of ICT has revolutionized the banking service activities such as account opening, customer account maintenance, transaction processing and recording etc. (Irechukwu, 2000). The banking industry is using ICT products that include automated teller machine, smart cards, internet banking, electronic funds transfer, MICR, electronic data interchange (Akpan, 2008 and Johnson, 2005).

In recent years, the services of banking industry have been significantly reshaped by the utilization of information technology (Berger, 2003). Chandrasekhar and Sonar (2008) claimed that adequate attention to technological progress as well as efficiencies on the input and output sides will reap the benefit of Information Technology in the banking sector. It was stated that technological benefit can be accomplished in two ways; firstly, by reducing the cost of production of financial services and secondly, by reducing the cost of service delivery to the customers (Lynch, 1996). Technology provides a marginal cost by covering huge population of an area at a certain time which is almost impossible through manual branch banking (Huda, Chisty, & Rashid, 2007).

Some researchers found indecisive relationship between IT investments and the profitability of banks. Lin (2008) examined whether the firm Information technology (IT) capability can create value and competitive advantage. Baccelli (2006) investigated whether investment in Information Technology (IT) (hardware, software

and other IT services) influences the performance of banks and found little relationship between IT investment and improved bank profitability. The relationship between IT investments and the profitability of banks can be seen to be insignificant especially in the short run due to high costs of investments in ICT (Furst, Lang, & Nolle, 1998; Mashal, 2006; Siam, 2006).

However, there are many literatures showing the positive impacts of Information Technology investment to business value. Kozak (2005) conducted a research to find the influence of Information Technology on the profit and cost effectiveness of the banking zone during the period of 1992-2003. The study showed positive relationship between the executed Information Technology and productivity as well as cost savings. Brynjolfsson and hitt (2000) in their research suggested that IT lowers the operational costs of the banks in the long run.

According to Carlson et al (2000) and Furst et al (2002), who conducted an intensive research, there is a positive relationship that exists between offering electronic banking and bank's profitability. It was claimed that modernization of IT has provided the astonishing improvement in banking services throughout the world (Milne, 2006).

Moreover, Brynjolfsson and Hitt (2000) claimed that Information Technology has significant contribution to firm level output." Their research showed that Information Technology capital contributes an 81% marginal increase in output, whereas non Information Technology capital contributes 6%.

Mashal (2006) and Siam (2006) suggested that the relationship between IT investments and the performance of banks can be significant in the long run. According to Ugwuanyi & Ugwuanyi (2013), Even though IT investment has a negative relationship with banks profitability in the short run due to the IT products acquisition cost, in the long run it shows a positive relationship with performance of banks because it reduces operating cost significantly.

Acharya, et al., (2008) applied multiple regression models to show that banks with higher usability of ICT perform significantly better than those with low usability of ICT.

There are several methods available for evaluating ICT investments from simple to complex techniques that comprise both qualitative and quantitative attributes. Bank Performance – this variable has often been measured using return on investment (ROI), return on equity (ROE), return on assets (ROA) and net profit margin (NPM). Return on Investment (ROI) is one of the most popular performance measurement and evaluation techniques used in business analysis.

Return on investment (ROI), return on equity (ROE), return on assets (ROA) and net profit margin (NPM) are powerful tools for evaluating existing information systems and making informed decisions on software acquisitions and other projects (Botchkarev & Andru, 2011).

According to Sharma & Kumar (2012), performance indicators such as return on investment (ROI), net profit margin (NPM), return on equity (ROE) and return on asset (ROA) has gained acceptance in academic research in last two decades.

Also, Achchuthan, S., & Kajananthan, R. (2013), Klapper & Love (2002) and Velnampy, T.,& Nimalathasan, B. (2007) have taken Return on Investment, Net Profit Margin, Return on Equity and Return on Asset into account for the performance study.

Since the advancement of technology and the awareness of these well-established methods, the operational requirements for conducting these analysis are vastly improved and these methods are widely accepted as well.

3. Hypothesis Development

The study aimed at finding out the relationship between information technology (IT) investment and banks' performance. Bank's performance is measured by NPM, ROE, ROI and ROA of bank. The following hypotheses have been developed to conduct the research:

H01: There is a positive relationship between IT investment and Return on Investment (ROI).
H02: There is a positive relationship between IT investment and Net Profit Margin (NPM).
H03: There is a positive relationship between IT investment and Return on Equity (ROE).
H04: There is a positive relationship between IT investment and Return on Asset (ROA).

4. Research Design and Methods

The study population consists of 30 (thirty) private commercial banks listed on Dhaka stock exchange (DSE). And sample size is randomly selected 5 (five) banks. The study data were collected from the period of 2007-2016 from annual reports. Therefore it is a longitudinal data in nature for a range of years.

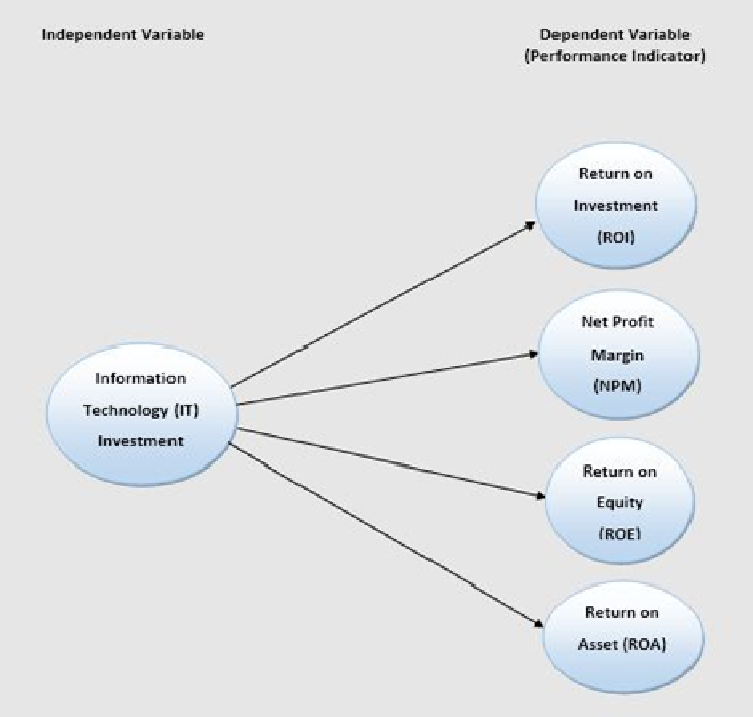

Figure 01: Theoretical Framework of the Study

The IT investment amount may not be comprehensively provided by all the banks. For that reason, IT investment amount is measured by calculating the level of investment in Software, Computer Hardware, Swift/Internet, ATM Booth Establishment and E- Banking system development from annual reports.

Based on the literature review and objective of this study, the above theoretical framework was developed to examine the relationship of Information Technology (IT) investment and bank's performance. (Fig. 1). Independent variable is IT investment amount and dependent variables are ROI, NPM, ROE and ROA since bank's performance is measured by performance indicators such as Return on Investment (ROI), Net Profit Margin (NPM), Return on Equity (ROE) and Return on Asset (ROA).

Statistical Package for Social Sciences (SPSS) software is used to analyze the data to explore the relationship between information technology (IT) investment and banks' performance. There are two methods of analysis used in this study which are correlation and regression analysis techniques. These methods are used to examine the relationship among independent and dependent variables. Since the study data is longitudinal in nature, the regression model is appropriate to measure this relationship.

5. Findings

	IT Investment
ROI	0.717
NPM	0.801
ROE	0.709
ROA	0.766

Table 01: Result of Correlation Test

In Table 01, Correlation coefficients reveal the strong relationship between independent and dependent variables. The correlation between IT investment and ROI is .717 which indicates positive relationship among these variables. The correlation between IT investment and net profit margin is .801 indicates strong positive relationship. Correlation between IT investment and ROE is .709 and between IT investment and ROA is .766 which show positive relationship. Since bank's performance is measured by ROI, NPM, ROE and ROA in this study, the correlation test shows the positive relationship between IT Investment and banks' performance.

Hypothesis	**R^2**	**β**	**t-statistics**	**Sig.**	**Comment**
H01-ROI	.514	.717	2.910	.020	Accepted
H02-NPM	.642	.801	3.785	.005	Accepted
H03-ROE	.503	.709	2.843	.022	Accepted
H04-ROA	.586	.766	3.367	.010	Accepted

Table 02: Test of Hypotheses

In Table 02, the regression analytical tool shows the result of the test of hypotheses.

H01: There is a positive relationship between IT investment and Return on Investment (ROI).

For this hypothesis, the value of R square is 51.4% which implies that 51.4% of the variations in the dependent variable (ROI) are explained by the independent variable (IT Investment) and the significance level is 2% (less than 5%). Hence, this hypothesis is accepted and it indicates the positive relationship between IT investment and Return on Investment (ROI).

H02: There is a positive relationship between IT investment and Net Profit Margin (NPM).

For this hypothesis, the value of R square is 64.2% which implies that 64.2% of the variations in the dependent variable (NPM) are explained by the independent variable (IT Investment) and the significance level is 0.5% (less than 5%). Hence, this hypothesis is accepted and it indicates the positive relationship between IT investment and Net Profit Margin (NPM).

H03: There is a positive relationship between IT investment and Return on Equity (ROE).

For this hypothesis, the value of R square is 50.3% which implies that 50.3% of the variations in the dependent variable (ROE) are explained by the independent variable (IT Investment) and the significance level is 2.2% (less than 5%). Hence, this hypothesis is accepted and it indicates the positive relationship between IT investment and Return on Equity (ROE).

H04: There is a positive relationship between IT investment and Return on Asset (ROA).

For this hypothesis, the value of R square is 58.6% which implies that 58.6% of the variations in the dependent variable (ROA) are explained by the independent variable (IT Investment) and the significance level is 1% (less than 5%). Hence, this hypothesis is accepted and it indicates the positive relationship between IT investment and Return on Asset (ROA).

6. Discussion

The findings of the study show that the relationships between IT investment and return on investment, net profit margin, return on equity & return on asset of banks are statistically significant which indicate a positive relationship between IT investment and banks performance.

The results imply that the investment of IT in the banking industry has significant positive impact on the performance of banks. The bank that invests the most in ICT is expected to have superior performance in the long run. This finding is also in line with the findings of Carlson et al (2000), Brynjolfsson and Hitt (2000), Furst et al (2002), Kozak (2005) and Milne (2006).

7. Conclusion and Future Scope

At present, Information Technology provides substantial positive impact on banks' performance which leads to speed up banking services. Since the banking industry serves as a lubricant to the nation's economy, the government of Bangladesh has put significant emphasis on the automation program of the banking sector led by Bangladesh Bank which is considered as a positive sign for the prospects of technology driven banking in Bangladesh.

This study focuses on only the DSE listed banks of Bangladesh. So, Research can be conducted on non-dse listed and other specialized banks as well as non-financial institutions (NFI) through using both qualitative and quantitative analytical tools. Another research can be conducted on how the existing technology driven banking services can be enhanced and can be provided in a more efficient way.

References

Acharya, R. N., Kagan, A., Lingam, S. R., & Gray, K. (2008, June). Impact of Website Usability on Performance: A Heuristic Evaluation of Community Bank Homepage Implementation. *Journal of Business & Economics Research*, 6(6).

Achchuthan, S., & Kajananthan, R. (2013). Corporate Governance Practices and Firm Performance: Evidence from Sri Lanka. *European Journal of Business and Management*, 5(1), 19-26.

Akpan, N. (2008, February 27). E-payment Solutions: Are Banks Getting It Right? Business day, Wednesday.

Ali, M. M. (2010). E-Business and on line banking in Bangladesh: An Analysis. *AIUB Business and Economics Working* Paper Series, Retrieved on November 27, 2011 from http://orp.aiub.edu/FileZone/OtherFiles/orpadmin8589994138230180310/AIUB-BUS-ECON-2010-03.pdf.

Berger, A. N. (2003). The Economic Effects of Technological Progress: Evidence from the Banking Industry. *Journal of Money, Credit, Banking*, 35(2), 141-176.

Botchkarev, A., & Andru, P. (2011). A Return on Investment as a Metric for Evaluating Information Systems: Taxonomy and Application. *Interdisciplinary Journal of Information, Knowledge, and Management*, Volume 6, Page 245-269.

Brynjolfsson, E., & Hitt, L. M. (2000). Beyond Computation: Information Technology, Organizational Tranformation and Business Performance. *Journal of Economic Perspectives*, 14(4), 23-48.

Carlson, J. et al. (2000). Internet Banking: Markets Developments and Issues. Economic and Policy Analysis, Working Papers. *Office of the Controller of the Currency*.

Chandrasekhar, M., & Sonar, R. M. (2008, July-September). Impact of Information Technology on the Efficiency and Total Factor Productivity of Indian Banks. *South Asian Journal of Management*, 15(3), 74-95.

Furst, K., Lang, W., & Nolle, D. (1998). Technology Innovation in Banking and Payments; Industry Trends, Implication for Banks. *Quarterly journal* September, 17 (3).

Furst, K., Lang, W., & Nolle, D. (2002). Internet Banking. *Journal of Financial Services Research*, 22, 95-117.

Huda, S., Chisty, K., & Rashid, M. (2007). An Evaluation of the Role of Technology and Relationship in Banking: Study on Bangladesh. *BRAC University Journal*, IV (2), 41-53.

Huda, S., Momen, M. A., & Ahmed, M. (2004). On-Line Banking System. *Finance and Banking*, (6,1 & 2).

Irechukwu, G. (2000). Enhancing the Performance of Banking Operations through Appropriate Information Technology in the Nigerian Banking Industry. Ibadan: Spectrum Books.

Johnson, M. (2005, April/June). Overview of Electronic Payment Systems in Nigeria: Strategic and Technical Issues. *Central Bank of Nigeria Bullion*, 29(2).

Klapper, L., & Love. I. (2002). Corporate governance, investor protection, and performance in emerging markets. Washington, DC. United States: World Bank. Mimeographed document.

Kozak, S. J. (2005). The Role of Information Technology in the Profit and Cost Efficiency Improvements of the Banking Sector. *Journal of Academy of Business and Economics.*

Kumar, R. (2000). Understanding the Value of Information Technology Enabled Responsiveness. *Electronic Journal of Information System Evaluation 1*.

Lin, B. W. (2008). Information Technology Capability and Value Creation: Evidence from the US Banking Industry. *Technology in Society*, 29: 93–106.

Lynch, J. E. (1996). BRP: A Marketing Perspective. *In Managing Business Process: BRP and Beyond* (pp. Chapter 10, 103-114). Chichester.

Mashal, A. (2006). Impact of Information Technology Investment on Productivity and Profitability. *Journal of information technology case and application research*, 8, 4, page 25-46.

Milne, A. (2006). What is in it for us? Network Effects and Bank Payment Innovation. *Journal of banking and finance*, 1613-1630.

Powell, P. (1992). Information Technology Evaluation: Is IT Different? *Journal of Operational Research Society*, 43: 29-42.

Rahman, A. (2010, January 13). Digital Bangladesh Bank. *The Daily Star*.

Shamsuddoha, M. (2008). Electronic Banking in Bangladesh. *Journal of Business Solutions*, Retrieved from http://www.itu.int/ITU-D/ict/statistics/.

Sharma, A. K., & Kumar, S. (2012). EVA Versus Convenational Performance Measures – Empirical Evidence from India, *Paper presented at the ASBBS Annual Conference*: Las Vegas.

Siam, A. Z. (2006). Role of Electronic Banking Service on the Profit of Jordan banks. *American journal of applied science.*

Ugwuanyi, W., & Ugwuanyi, G. O. (2013). Evaluation of IT investments on Banks Returns; Evidence from Nigeria banks. *Research journal of science and accounting*. , Vol. 4. No.4.

Velnampy, T., & Nimalathasan, B. (2007). Organizational growth and profitability: a case study analysis of bank of Ceylon. *Journal of Business Studies*, 3, 224-235.