

Assessing the Relationship Between IT Capabilities and Performance: A Study in Banking Industry of Bangladesh

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Abstract

In every economic system banking institutions play important role to accelerate the growth of economy. As the advancement of IT is incredibly increase day by day so it is necessary to assess the impact of IT capabilities on the performance of banking activities. This study demonstrates the relationship between IT capabilities and performance of bank in Bangladesh. The sample size of the study was 15 commercial banks which were randomly selected from the listed commercial banks of Dhaka Stock Exchange. A structured questionnaire was asked to key personnel of selected banks to achieve research objectives. After examining previous studies it was identified that IT capabilities has mixed relationship with firm performance. The study has taken process oriented dynamic capabilities (PDC) to identify the relationship between IT and performance of banks and treat business processes of bank as mediating factors between IT capabilities and bank performance. Here collective effects of IT Capabilities at both the process level and the firm level are examined. To measure the performance at firm level the study has taken Balance Score Card (BSC) method which considers all perspectives to evaluate performance. Study result shows that IT capabilities have significant positive impact on the business process level of bank which in turn positively impact on the performance of bank. Among the components of IT capabilities, IT management capabilities and IT personnel skills have insignificant effect on IT infrastructure flexibility. However, IT personnel skills have statistically significant effect on IT management skills. The major findings of the study facilitate banking organization to understand that IT improves business performance through process improvements which are considered as mediating factors.

Keywords: IT Capabilities, Process Oriented Dynamic Capabilities (PDC), Balance Score Card, Mediating Factors, Business Process.

1. Introduction

As IT is used widely in business firm therefore it is major concern of many IS researchers to find out whether IT capabilities improve firm performance or not. Currently the crucial research issue is to identify linkage between IT and firm performance that represent the value of Information Systems (IS) research (Devaraj & Kohli, 2003). Though investing in IT generates economic return which is usually assumed by firm but it generates mixed result. In Bangladesh, banking industry is using IT to make them competitive in turbulent business environment. Hence investors need to know the impact of IT in business performance. From the late 1980s much investigated performed to identify relationship between IT, firm performance and competitive advantage but they can't come in a single conclusion. Most of the IS literature did not account the aggregated effect of IT rather examined the direct effects of IT. The study has used process oriented dynamic capabilities (PDC) approach to assess relationship between IT and performance of bank. Survey conducted on the listed commercial banks of Bangladesh to understand impact of IT on performance. The findings of the study provide deeper understanding about the contribution of IT Capabilities towards firm's performance.

2. Objectives of the study

The main purpose of this study is to assessing the relationship between IT capabilities and the performance of bank in Bangladesh. The other secondary objectives of the study are following:

- To discover whether IT capabilities effect is positively significant or insignificant on the performance at business process level of bank and which components of IT capabilities have significant impact.
- To discover the mediating effect of business process level performance on the relationship between IT capabilities and performance of bank.
- To identify Inter-relationship among different components of IT capabilities.

3. Literature Review

Prior studies examined impact of IT investment on productivity at the firm level, industry and economy levels. One of the most prior literatures on the topic of the relationship between IT and productivity was "Productivity Paradox" which found no positive relationship between spending IT and productivity. Productivity paradox is supported by many prior studies such as Roach (1987), Strassmann (1990), Barua et. al. (1995). But a study conducted by Brynjolfsson & Hitt (1996) found that there was positive relation between IT investment and productivity. Brynjolfsson & Yang (1996) concluded that impact of IT investment not only found in productivity but also in much more area. Firm's final performance usually not affected by IT investment rather IT affected

many intermediate outputs such as improved quality, new products, customer service etc. which was not considered by prior studies (Brynjolfsson & Hitt 2000).

D'Este (2002) conducted a study to assess the relationship between technological capabilities of firms and firm performance which based on 67 Spanish domestic pharmaceutical firms. He concluded that firms with traditional strategies can differentiate themselves from competitors when they build technological capabilities to enhance products quality.

Studies that focus firm level analysis did not consider the effect of IT on intermediate processes. Mooney et al. (1996) asserted that considering only firm level output limited the understanding of how IT creates value for business. Barua et al. (1995) concluded that IT has first order effects on intermediate process and Firm level performance affected by the intermediate level process performance. McAfee & Brynjolfsson (2008) argued that understanding the effects of IT on firm performance is perfect and valid when firm consider the effects of IT capabilities at the process level.

Bharadwaj et al; 1999 categorized IT capabilities as: IT infrastructure (tangible resources), human IT resources and intangible IT resources (knowledge assets, customers' orientation). She found that firm having superior effective IT capabilities was able to obtain superior financial performance. Santhanam & Hartono (2003) supported the findings of Bharadwaj (2000) that firms having strong IT capabilities had superior current and sustained performance when compared to average industry performance.

However, Shin (2006) found out that only GroupWare and SCM significantly affect firm productivity whereas ERP (Enterprise Resource Planning), CRM (Customer Relationship Management), KM (Knowledge Management), and EAI (Enterprise Application Integration) software packages have insignificant or even negative effects on productivity. A study conducted by Kim et al (2011) and they proposed Process oriented dynamic capabilities (PDC) which enhance knowledge about how IT creates business value by offering a holistic view of the relationship among IT capabilities, PDCs and firm financial performance. PDC is defined by Kim et al (2011) where they stated that PDC is a firm's ability to change its business process than its competitors. They only consider financial performance which limited the measurement of firm's performance.

By examining prior studies it is seen that earliest studies considered only effect of IT on firm level performance and ignored process level performance. Earlier studies treated financial improvement as firm performance indicators which did not measure holistic firm performance. This research used Balanced Score Card (BSC) method to measure performance at firm level and also considers aggregate effects of IT capabilities where not only IT infrastructure, hardware, software are considered but also considers IT management capabilities and IT personnel skills. During IT conversion Change Management dimension is included in IT management Capabilities that was not considered in any previous studies rather earlier studies considered IT planning, IT controlling and IT coordination that was traditional management aspects.

4. Research Methodology

This study used quantitative research method and a structured questionnaire was used as data collection instrument. Likert 7 point scale was used to get opinion from the respondents. Here target respondents were key personnel of commercial banks. To conduct survey 15 commercial banks were randomly selected. Total listed bank in Dhaka Stock Exchange was 30 and the sample size of the study was 15 so sample size is 50 percent of total population. To achieve research objectives this study mainly based on primary data. Secondary data were also collected from various related articles, journals etc. SPSS software was used to analysis collected survey data. By developing hypothesis the study aims to assess relationship between IT capabilities and performance of bank. The hypotheses of this article are following:

- H1:** IT Capabilities have a significant positive effect on performance improvement at the process level.
- H2:** IT Capabilities have a significant positive effect on performance improvement at the firm level.
- H3:** IT capabilities have positive indirect effect on firm performance which is mediated through a positive effect on performance at process level.
- H4:** Firm's IT personnel expertise positively related with its IT management capability.
- H5:** Firm's IT personnel expertise positively related with its IT infrastructure flexibility.
- H6:** Firm's IT management capability positively related with its IT infrastructure flexibility.

4.1 Research Construct

The major research construct of this study are discussed in this section. IT capability is the combination of three interrelated attributes which are IT expertise with business knowledge, flexible IT infrastructure and an effective use process (Cheng, Zhang & Tian, 2008).

IT capabilities consist of three dimensions such as:

- IT Management Capabilities.
- IT Personnel Expertise.
- IT Infrastructure Flexibility.

IT management capabilities refers the ability of IT personnel and business manager governing IT resources and transform IT resources to create business value. IT personnel expertise will be intangible asset for firm when they possess skills, knowledge of IT elements and knowledge of technology management and to better understand how firm's strategies are combined with IT skills(Ross et al; 1996, Feeny & Willcocks 1998). IT infrastructure is crucial for alignment of IT resources to business strategies. IT infrastructure flexibility enable firm to merge old technology with new technology as well as quickly adapt new technology.

Performance improvement at process level can be classified into three dimensions such as: Automation effect, Information effect and Transformation effect. Automation effect refers to the replacing human labor by utilizing IT in the firms that create efficiencies in business process. Informational effect follows from IT's capability to collect, store, process and disseminate information. Transformational effect refers to the value derived from IT capabilities to facilitate and enable process innovation and transformation.

Effects of IT capability at firm level mean influences of IT capabilities on individual business firm's financial, customer, internal operation and learning aspects. Contemporary approaches to measure performance include the intangible dimensions (Francisco et al., 2003). Today, there is a general consensus that the old financial measures are still valid and relevant (Yip et al., 2009), but these need to be balanced with more contemporary, intangible and externally oriented measures.

4. Result and Discussion

Statistical regression model was used to examine hypotheses which were developed by this article paper. The result of the H1 is shown in the following Table 1. Result demonstrates that IT capabilities (ITC) have a statistically significant effect on performance at process level (PPL).

Table 1. Effect of IT Capabilities (ITC) on Performance at Process Level (PPL)

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.697	.356		-1.958	.060
	ITC	1.116	.070	.949	15.947	.000

a. Dependent Variable: PPL

It is stated earlier that IT capabilities consist of three elements and the study aims to demonstrate which elements impact significantly on the process level performance. The following Table 2 shows that IT infrastructure flexibility has significant effect on process level performance compare with other two components of IT capabilities.

Table 2. Effect of components of IT capabilities on Performance at Process level (PPL)

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.861	.395		-2.177	.039
	ITMC	.312	.198	.281	1.576	.127
	ITPS	.337	.161	.353	2.101	.046
	ITIF	.496	.101	.410	4.898	.000

a. Dependent Variable: PPL

By using linear regression model the following Table 3 shows that IT Capabilities ($\beta = .916$, $p < 0.001$) have a statistically positive significant effect on performance at firm level. Therefore H2 was accepted.

Table 3. Effect of IT Capabilities (ITC) on Performance at Firm Level (PFL)

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.321	.465		-.689	.497
	ITC	.962	.100	.916	9.662	.000

a. Dependent Variable: PFL

This study used process oriented dynamic capabilities and considered business process level as mediating factors between IT and performance of bank. As it is mentioned earlier that effect of IT capabilities should be examined aggregately therefore mediation analysis was used to estimate indirect effects of IT capabilities on performance at firm level. The study estimates the indirect effects of IT capabilities on performance at firm level through mediated effects of performance at process level. Multiple regression analysis was used to find out the result of H3.

Table 4. Effect of IT Capabilities on Performance at Firm Level (PFL) through mediating factors of Performance at process level (PPL)

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.353	.323		1.093	.284
	ITC	.043	.189	.041	.225	.824
	PPL	.819	.161	.917	5.086	.000

a. Dependent Variable: PFL

It is shown from the above Table 4 that the effect of IT capabilities on performance improvements at the firm level is insignificant ($\beta = .041$, $p > 0.05$) whereas the effect of process level on the performance improvements at the firm level is significant ($\beta = .917$, $p < 0.001$). That means IT capabilities influence on the performance at firm level are mediated through process level performance. The implication of this result is that firms utilize IT to change or improve business process to adapt with turbulent business environment. IT capabilities influence these business process changes or improvements. Therefore process level improvement eventually affects the performance at firm level.

However, Table 5 shows that IT personnel skills have a statistically significant effect on IT management capabilities ($\beta = .93$, $p < 0.001$) which supports H4. This result implies that skilled IT staff can make sure better IT management practices in the organization.

Table 5. Effect of IT Personnel Skills (ITPS) on IT Management Capabilities (ITMC)

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.020	.293		3.481	.002
	ITPS	.803	.058	.934	13.846	.000

a. Dependent Variable: ITMC

To test H5 & H6 multiple regression analysis was used and the result shows at Table 6. Both IT management capabilities and IT personnel skills have an insignificant effect on IT infrastructure flexibility.

Table 6. Effect of IT Management Capabilities (ITMC), IT Personnel Skills (ITPS) on IT Infrastructure Flexibility (ITIF)

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.888	.658		2.870	.008
	ITMC	.660	.355	.718	1.862	.074
	ITPS	-.016	.305	-.020	-.052	.959

a. Dependent Variable: ITIF

5. Conclusion

Much more research have taken to demonstrate association between IT and performance improvements of firms. Previously IS researchers found mixed result about relationship between IT and performance of firm because they followed direct effect of IT on firm performance. Indeed, impact of IT has both direct and indirect effect on firm performance. Therefore this study measures aggregate effects of IT capabilities on performance of the selected listed banks in Bangladesh. IT capabilities mainly influence performance at business process level which in turn influences performance at firm level. Another finding of the study is that IT management capabilities and IT personnel expertise have no significant impact on the IT infrastructure flexibility but IT personnel expertise significantly impact on IT management capabilities. If banking institutions hire highly expertise IT personnel they can ensure better IT management capabilities.

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