

THE RELATIONSHIP BETWEEN INFORMATION TECHNOLOGY INVESTMENT AND FINANCIAL PERFORMANCE OF COMPANIES LISTED AT THE NAIROBI SECURITIES EXCHANGE

By: Cyprus Ojiambo Oluochi Olumbe¹, CPA, Dr. Winnie Nyamute (PhD)², CPA, Dr.
Herick Ondigo (PhD)³ and Dr. Angela Kithinji (PhD)⁴

Abstract

This study sought to establish the effect of information technology investment on financial performance of companies listed at the Nairobi Securities Exchange. The entire 64 firms listed at the Nairobi Securities Exchange formed the population of the study with earnings per share as a measure of financial performance. The 2010 to 2019 quantitative secondary data was extracted from the firm's websites. Using linear regression analysis and Pearson correlation, the study found that the relationship between information technology investment and firm financial performance is positive and not statistically significant but further tests reveal that information technology investment is a direct predictor of firm financial performance. As a contribution to theory, the study provides evidence suggesting that transaction cost theory in itself is in the interest of shareholders that agency theory advocates hence the evidence that agency theory is complemented by stakeholder theory and transaction cost theory in advancing shareholders interest far from the thought that stakeholder theory and transaction cost theory come at a cost that reduces shareholder's wealth. The study recommends the need for more research on optimal use of information technology and communication resources as opposed to embarking on more investments hence a strategically driven information technology contributions.

Key Words: *Information Technology Investment, Financial Performance, Companies Listed at the Nairobi Securities Exchange*

1.0 Background of the Study

Although it is now a while when the world has been and still is experiencing digital revolution it is still only really in the early stages. Ullah, Algarni and Kholsa, (2018) posits that all over the developed world companies are leveraging the great opportunities that information

¹ *PhD Candidate, School of Business, University of Nairobi, Kenya (cyprus@mareba.co.ke)*

² *Senior Lecturer, Department of Finance and Accounting, School of Business, University of Nairobi, Kenya*

³ *Senior Lecturer, Department of Finance and Accounting, School of Business, University of Nairobi, Kenya*

⁴ *Senior Lecturer, Department of Finance and Accounting, School of Business, University of Nairobi, Kenya*

technology industry growth has to offer but in the developing world many are yet to start embracing Information Technology (IT). Theoretically, the business world believes that to ensure the survival and progress of a company, it is crucial to adopt and leverage on technologies and tools to gradually incorporate IT into the fabric of the firm's processes and daily tasks (Muawanah & Gunadi, 2018). The notion of Information Technology Investment (ITI) in firms has been widely considered in many studies. Regarding the role of ITI on firm performance, scholars have reported mixed results. In that context, it encourages that the important character of ITI from the viewpoint of firm performance requires systematic exploration. Whereas companies are busy investing in IT with a long held view that IT injects efficiency and effectiveness by automating company process hence increased productivity that resonates into better financial performance by the investing companies, firms are still collapsing and or making losses, casting doubt if ITI has any effect on firm financial performance (Nolan, 2020). The cardinal question today is in what aspect of firm performance and under what circumstances ITI could play a significant role.

1.1 Information Technology Investment

Johnson (2005) describes information technology investment as the automation of processes, controls and production of information by use of computers, software and ancillary equipment. Gupta, Yash and Toni (1996) define ITI as application and processing of data, the advancement and use of procedures, software, hardware, telecommunications, firmware, internet related to information technology. Ullah et al., (2018) define ITI as a formalization of planning, control, integration and organization of IT functions and suggest that Information System (IS) that function well in companies with higher maturity levels might have advanced to strategic IS having evolved from data processing orientation.

Information technology investment on firms has been widely discussed in many studies such as Lunardi, Becker, Macada and Dolci (2014), Ko and Fink (2010) and reported mixed results on financial firm performance. In this study the contribution of ITI from the perspective of financial firm performance has been systematically pursued singly to reveal in what facet of financial firm performance and under what circumstances ITI plays a significant role.

Ullah et al. (2018) argue that ITI existed so long as people have been in existence. The bone of contention being that people communicated through technology available at that point in time. As companies undergo remarkable changes in terms of leverage on information technology

investment, Gupta et al. (1996) research on ITI proposes the use of managerial practices with respect to planning, organizing, and control characteristics of information systems as the key variables to depict the companies' progress.

ITI can be operationalized by examining companies' investment in hardware, software, and infrastructure. Hardware being servers, desktops, laptops and related computer accessories. Software is operating systems, databases and enterprise resource planning systems that run off the hardware while infrastructure is cabled network and wifi to provide wide area network and or local area network usually in the form of intranet and extranet. However, from the literature reviewed, there exists evidence that many firms concerned with the fall of technology, get involved in ITI without deriving any benefits (Nolan, 1994). The research adopted Gupta et al. (1996) three criteria to measure ITI projects of firms quoted at the Nairobi Securities Exchange (NSE); Investment in hardware, software and infrastructure.

Firm Financial Performance

Hingorani and Ramanathan (1973) define financial performance as the causative relationship that exists between the firm's financial position and profitability as a result of data collection, recording, relation and evaluation of the financial statements. Pandey (2015) posits that the techniques of evaluating the firm's strength and threats by associating various financial statements of a firm is called financial performance analysis. Arora (2016) explains that financial performance is the underlying relationship among the different financial segments in the business entity as displayed by a single financial statement and interpretation of business trends.

Cochran and Wood (1984) categorizes company financial performance into profits and the dividends paid to the investors. The lack of more research on this categorization has led to a misunderstanding and therefore confusion in the measure of the phenomenon. On the other hand, Gasparetto (2004) emphasizes that company financial performance is information which accounting institutions should show responsibility. Orlitzky, Rynes and Schmidt (2003) in their literature review, conclude that company financial performance can be seen in three ways. The first being the level of business efficiency via accounting measures. The second is the market measures reflecting satisfaction by shareholders and the third being surveys with estimated financial performance.

Seemingly current researchers use the definition of firm financial performance to mean measurement of company's equity owners' satisfaction, estimates of financial performance, effectiveness as in meeting the objective and efficiency as in cost saving. Since companies' main goal is to reward equity holders, the firm financial performance as Gasparetto (2004) believes, means measures like market value, return to shareholders and profitability.

Prasad and Ahmed (2011), argue that every firm's shareholder and investor is concerned with the companies' financial health. They maintain that different studies have been carried out in the last three decades to establish the financial position with the aid of different financial ratios through application of statistical analysis tools. Firms must understand the trend in their performance in order to analyze, come up with solutions and develop plans aimed at their operational efficiency.

To gauge financial performance, Owiredu and Kwakye (2020) used earnings per share and return on asset but return on equity and return on sales are also other measures of firm financial performance. This study uses earnings per share as a measure of financial performance as used by (Owiredu & kwakye,2020). It is calculated by taking net income subtract dividends and divide by the weighted average shares outstanding (Kapoor & Sandhu, 2010).

1.2 Research Problem

Committee of Sponsoring Organization (COSO) (1992) post public exposure version, states that the numerous financial scandals that hit financial institutions and investors at large did contribute to the appreciation of the most important role of the governance of firms. The global financial crisis that busted in 2007-2008 is still fresh. Moreover, the companies' delisting from NSE, posting of losses or reduced earnings in unclear circumstances could mean that the economy is doing less than expected hence encourages the important character of ITI, from the viewpoint of firm performance, requires systematic exploration. The media coverage of supposedly expected economic recession in 2020 cannot be underestimated.

In the context of the assumption that IT injects efficiency and effectiveness beside conversion of different world markets into a global village, companies are busy investing in IT with a long held view that by automating company process will bring about increased productivity that resonates into better financial performance by the investing companies. Regardless companies are still collapsing and or making losses, casting doubt if ITI has any effect on firm financial

performance (Nolan, 2020). As corporate governance engages to leverage on information technology investment, and that in accordance with Gupta et al., (1996) research on ITI that proposes the use of ITI to garner efficiency and effectiveness as a corporate governance strategy towards better firm financial performance, available literature is conflicting.

Bharadwaj (2000) examined the role of information technology in increasing transparency and concluded that IT enhances the companies' financial performance. Bitler (2001) surveyed the association between ICT investment and financial performance of firms in the USA and found increased financial performance in firms that adopted ITI compared to those that did not. To the contrary, Tam (1998) found that IT failed to improve business performance for some firms while others show marked improvement. The conflicting findings in the midst of companies listed at NSE still posting losses and or others being delisted yet they have invested in ITI calls for more research. In any case the role of ITI in a company, due to conflicting research findings is not clear. Gupta et al (1996) research on ITI suggesting that firms use ITI to garner efficiency and effectiveness as a corporate governance strategy towards better firm financial performance is not conclusive instead points to contextual, conceptual and methodological gaps. The question if information technology investment has any effect on financial performance is still unanswered.

1.3 Research Objective

The study sought to investigate the effect of information technology investment on financial performance of companies listed at the Nairobi Securities Exchange.

1.4 Theoretical Review

This study reviews transaction cost theory of IT as a fundamental theory underlying information technology investment.

1.4.1 Transaction Cost Theory

Ciborra (1981) is the first scholar to suggest Transaction Cost Theory (TCT) as a methodology to design computer based information system and that TCT can be used to explain scholarly thoughts that had initially been used to analyze the usefulness of IT on organizations. TCT brings out the economic transactional multifaceted activities such as the use of IT to support markets, coherent agents' action and the idea of mediating technologies. Ciborra (1981) concludes that IT has the ability to lower the costs of transacting. However, Ko and Fink (2010)

caution that IT is not yet fully developed field hence additional work on theoretical and practical aspect of IT is necessary before certain conclusion can be made.

Information technology investment influences the quality and the cost of acquiring information so much so that the firms shrink in size because IT reduces transaction cost being the cost incurred when a company buys on the market place what it cannot produce by itself. According to TCT, companies seek to economize on transaction costs in the same way they economize on cost of production and that is thought to enable companies to find low cost supplies online world over (Kenneth & Jane, 2017).

The management of a firm can, under primary focus of IT governance, steward IT resources such as information to create information asymmetry among various stakeholders as envisaged under stakeholder theory to highlight the firm's CSI activities as a strategy to create brand loyalty, which may result in long-term profits. Transaction cost theory is applicable to this study as posited by Kenneth and Jane (2017) explanation that companies invest in IT so as to shrink transaction costs and subsequently reduce the cost of transaction by shifting the transaction cost curve inward that leads to revenue growth without blowing up size, or revenue accompanied by shrinking size.

1.5 Empirical Literature Review

Nwala, Nneka, Abubakar, Onibiyo, and Rotimi (2020) evaluated the effect of investment in IT on financial performance of insurance companies listed at the Nigeria Stock Exchange by taking a sample of 16 insurance companies data from the websites annual financial reports and accounts for the year 2012- 2018. Using Hausman specification test random effect regression, the results showed first that investment in IT attributes such as hardware, software and infrastructure have positive and statistically significant effect on financial performance of insurance companies listed at the Nigeria Stock Exchange. Second that investment in IT improved financial performance of insurance companies listed at Nigerian Stock Exchange and that such investment does not erode profitability. This was a study on insurance companies whose use of IT is quite different from that of other companies say in the manufacturing industry hence more research is required beyond insurance companies. There is still room for more study to test the effect of information technology investment on firm financial performance.

Nurulfajri (2018) researched on the effect of ITI on the relationship between corporate governance and firm financial performance either simultaneously or partially. The study used 68 samples of manufacturing companies listed at the Indonesian Stock Exchange for the period 2013- 2016. Using multiple linear regression analysis, the study showed that ITI influences firm performance but had no relationship with board size. The study used a single corporate governance attribute which may not necessarily give conclusive results. Whereas the study found ITI to influence firm financial performance, it was selectively based on manufacturing sector hence need for more study cutting across all industries.

Muawanah and Gunadi (2018) analyzed the effect of ITI on the nexus between CG and FP of a firm measured by return on assets. Two proxies were used for ITI adoption that is company expenses on ITI and the level of the organization managing ITI. Using multiple linear regression models, collected and analyzed data from annual reports of all banks listed at the Indonesia Stock Exchange from 2011 to 2013. The research shows that corporate governance improves the effectiveness of ITI adoption in improving firm financial performance. The research implies that better CG practices in providing direction and monitoring on ITI leads to better firm financial performance. The study covered three years which may not be enough for companies to have started getting ITI benefits. This study's 10-year period supplements the findings.

Mahboub (2018) collected secondary data from annual reports of a sample of 50 Lebanese banks for the period 2009- 2016 to study the effect of investment in information and communication technology on the association of corporate governance and the financial performance of Lebanese banks. Using Multivariate model, the study showed that investment in IT has a positive effect on financial performance of Lebanese banks and more so the application of mobile banking and offering of debt and credit cards to customers significantly and directly affects performance of banks in Lebanon. Lebanese banking model may not be used to generalize the study findings. In any case, ITI use cuts across the wider global industry hence more study on the effect of use of ITI to improve firm performance is necessary in support of this study.

Harelimana (2017) conducted a case study in Rwanda on the impact of information communication and technology utilization on the financial performance of Reseau Interdiocesain de Microfinance Ltd from 2011-2015. Descriptive survey based on purposive

and simple random sampling using both qualitative and quantitative methods for a total sample size of 132 was used to collect both primary and secondary data which was analyzed using SPSS version 16.00. The study showed that Information Technology and Communication (ICT) positively influences financial sustainability and profitability as well as financial efficiency, productivity and on portfolio quality. The study findings may not be seen to be conclusive as simple regression method was used. In this case increase in ICT usage and increase in financial performance under simple regression may easily be coincidental. More research using other methods such as Pearson coefficient of correlation is necessary in support of the study.

Ho, Wu and Xu (2011) investigated the effect of corporate governance, on the relation between ITI and firm financial performance in the Taiwanese electronics industry. Collected secondary data for the period 2001- 2005 from Taiwanese Institute for information industry, financial report database compiled by Taiwan Economic Journal and TEJ' Corporate Database. Using multiple linear regression model, found a positive moderating effect of board independence on the ITI firm financial performance relation. In addition, the greater the foreign ownership in small firms, the more positive the ITI-firm financial performance relation, meaning that foreign investors bring IT expertise to help small firms reap the benefits of IT. Further research beyond foreign ownership is necessary to collaborate the findings.

Adekunle (2003), by way of descriptive and regression analysis investigated the impact of ICT on four big commercial banks' performance in South Africa. Using ROA, measured annual data over the period of 1990-2012 and concluded that the banks' performance is affected by both ICT investment and ICT cost efficiency and stressed that cost effective in ICT investment has more impact on bank performance than that of ICT investment. Similarly, existing evidence shows that many firms whose corporate governance lie behind the technology curve indulge in high IT investments but derive fewer benefits from IT (Nolan, 1994). The inference of these results underlines the need for more research on optimal use of ICT resources as opposed to embarking on more investments, which the researcher took cognizance of in the study.

Bitler (2001) surveyed the association between ICT investments and the performance of small firms in the USA and found a major difference in performance between firms that adopt ICT and those that do not. Using investment in IT as a measure to correlate IT to firm performance, given that firms do not necessarily realize IT benefits the same year that investment occurred,

creates a research gap. Moreover, Banker, Kauffman, and Morey (1990) found that no direct link exists between IT and the performance of the company.

Bharadwaj (2000) developed the concept of IT as an indicator of firm capabilities and empirically examined the link between IT capability and performance of the firm. Firm specific IT resources as determined by corporate governance include human IT resources, IT-enabled intangibles and IT infrastructure. The study used IT rankings of sample constituting all firms listed in the USA that were classified as IT leaders in the years 1991 to 1994. The results depict that companies with high IT capability registered higher performance as shown by the different performance indicators. The study used external rankings of IT leaders as a proxy of superior IT capability. There is need for similar study with the control sample that includes non IT leaders for comparison.

1.6 Research Hypothesis

There is no relationship between information technology investment and financial performance of companies listed at the Nairobi Securities Exchange

1.7 Methodology

This research used descriptive design to investigate the relationship between information technology investment and financial performance of the 64 companies listed at the NSE. Cooper and Schindler (2014) explain that descriptive research can describe data with its characteristics in a population or phenomenon being studied and that the design allows the classification of phenomena as factual as well as enable the researcher to study the elements in the population or sample as is without alteration.

The design involves collection followed by analysis of data so as to describe a phenomenon as is where is. This design saves time making it possible to obtain current and factual information (Cooper and Schindler, 2014). In this case it saved time for data collection from the companies’ websites. However, confidentiality, human error and bias are the main weaknesses of descriptive research.

Table 1: Operationalization of the Study Variables

Variable	Indicator	Measurement	Scale	Source of Data	Comparable Study
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Information Technology Investment	Hardware Investment	Annual financial reports disclosure for items pertaining to investment in hardware were extracted and composite ratio of hardware value to total assets was computed.	Ratio	Annual Reports	Gupta et al. (1996)
	Infrastructure Investment	Annual financial reports disclosure for items pertaining to investment in infrastructure were extracted and composite ratio of infrastructure value to total assets was computed	Ratio	Annual Reports	Gupta et al. (1996)
	Software Investment	Annual financial reports disclosure for items pertaining to investment in software were extracted and composite ratio of software value to total assets was computed	Ratio	Annual Reports	Gupta et al. (1996)
Financial Performance	Earnings Per Share	Earnings per share measures share earnings of a company as a weighted average common outstanding shares. It is a ratio of net income minus the expected dividends divided by weighted average of common shares outstanding was used.	Ratio	Annual Reports.	Muhammad et al. (2017)

Source: Researcher 2018

1.8 Data Analysis, Results and Discussion

After collection of the data from the annual reports, the data was decoded, regrouped, tabulated, condensed and displayed for easy analysis and interpretation of findings (Bryman, 2014). The data was coded and summarized into relevant research objective then condensed for ease of display and analysis. The study adopted descriptive statistics to quantify features of the variable using mean, median, standard deviation and percentage as used by (Manini & Abdillahi, 2015).

1.9 Descriptive Analysis and Results

Descriptive Statistics

Descriptive statistics was performed using statistical techniques in conjunction with frequencies, percentages, means as well as standard deviation to summarize the variables of the study.

1.10 Information Technology Investment

Table 2 presents the summary of descriptive statistics for information technology investment attributes that is investment in hardware, software and infrastructure in Kenya Shillings (‘000). The data covers 47 firms quoted at the NSE for the period between 2010 to 2019. Table 2 depicts the mean, standard deviation, minima, maxima and the observation count.

Table 2

Descriptive Statistics for Total Assets and Information Technology Investment in Kenya Shillings (000’000’000)

Variable	Obs	Mean	SD	Min	Max
TA	463	301	2,470	0.01	24,900
HW	463	0.39	1.54	0	13.90
INF	463	1.60	10.9	0	84.90
SW	463	48.50	425	0	4,760

Where:

- TA is the total assets
- HW is investment in hardware
- INF is investment in infrastructure
- SW is investment in software

Table 3:
Summary of Descriptive Statistics

Information Technology Investment

Variable/ Measure	Obs	Mean	Std. Deviation	Min	Max
Total Assets	463	301	2,470	0.01	24,900
Hardware Investment	463	0.39	1.54	0	13.90
Infrastructure Investment	463	1.60	10.9	0	84.90
Software Investment	463	48.50	425	0	4,760
Firm Financial Performance					
Earnings Per Share	463	-161.911	4151.712	-88714.9	10248.18

1.11 Discussion and Summary of Findings

The objective of the study was to investigate the effect of information technology investment on financial performance of companies listed NSE with the hypothesis that: There is no relationship between information technology investment and financial performance of companies listed at the Nairobi Securities Exchange.

Using simple regression analysis results showed the relationship between FP and information technology investment is very weak, positive and non-statistically significant ($r = 0.0351$, $p < 0.05$). Meaning that changes in firm financial performance are not correlated with changes in ITI. This differs from the findings of Harelimana (2017) study in Rwanda on the effect of ITI on the association of CG and financial performance which found that ICT positively and directly influences FP as well as financial efficiency, productivity and on portfolio quality. Harelimana (2017) study findings may not be seen to be conclusive as simple regression method was used. In this case increase in ICT usage and increase in financial performance under simple regression may easily be coincidental.

Further tests, Wald Chi-Square test, in Table 5.8 indicate that the model regression coefficient of information technology investment ($\beta = -0.00626$, $p > 0.05$) was not statistically significant.

Table 4

Panel Random-Effects Regression Results, Dependent Variable: Firm Financial Performance, Predictor: Information Technology Investment

VARIABLES	(1) Model 1
ITI	-0.00626 (0.127)
Constant	3.189*** (0.0472)
Observations	424
Number of FIRM_ID	48
R-Squared	0.0012
Wald chi2(1)	0.00
Prob > chi2	0.9607

Robust std errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Research Data

The hypothesis was accepted meaning that there is no relationship between information technology investment and financial performance of companies listed at the Nairobi Securities Exchange.

When the attributes of ITI that is hardware and software were included in the other attributes for corporate governance and corporate social investment, the whole model, as found by Wald Chi-Square 19.43 and p value 0.0127 indicate that all the predictors' regression coefficients taken jointly are significant with R2 0.0548. Which suggests that the joint effect of ITI, corporate governance and corporate social investment account for 5.48% variance in firm financial performance.

1.12 Conclusions

Though the study reveals that the relationship between ITI and FFP is positive and not statistically significant, further tests, when ITI is included with corporate governance and corporate social investment reveal that ITI is a direct predictor of FFP. Mahboub (2018) found the same. Similarly, existing evidence shows that many firms that lie behind the technology curve indulge in high IT investments but derive fewer benefits from ITI (Nolan, 1994). The inference of these results, and thus these study findings too, underlines the need for more research on optimal use of ICT resources as opposed to embarking on more investments. Based on this study findings, the researcher recommends a strategically driven IT investment.

1.13 Contribution of the Study

The study creates need to relook at transaction cost theory by developing more fields hence additional work to match theoretical formulation to practice. The study's specific contribution to knowledge, policy and theory is discussed below.

1.14 Contribution to Knowledge

The study adds to knowledge that information technology investment is an independent predictor of firm financial performance. Moreover, the argument that ITI eats into the companies' profit has been disapproved by this finding. Though investment in IT can be a heavy cost to a business entity, this study shows that company managers can use ITI to improve financial performance of companies.

1.15 Contribution to Policy and Practice

The study's findings aid the board of directors, company management, investors and regulators in decision-making. The study also assists the management to link the effect of management investment decision to FFP. In this regard, the management may have to reconsider areas to invest in as far as ITI is concerned by engaging in strategic ITI. Regulators like NSE and CMA may use the study findings in their supervisory role. In particular, NSE may use the study findings to aid in revision of NSE's rules and guidelines in terms of registration and deregistration of the companies by providing a legislation to guide ITI.

1.16 Contribution to Theory

The study provides evidence suggesting that transaction cost theory in itself is in the interest of shareholders that agency theory advocates. The management of a firm can, under primary

focus of IT governance, steward IT resources such as information to create information asymmetry among various stakeholders as envisaged under stakeholder theory to highlight the firm's philanthropic activities as a strategy to create brand loyalty, which may result in long-term profits. In this regard, the study brings to the fore the evidence that agency theory is complimented by stakeholder theory and transaction cost theory in advancing shareholders interest far from the thought that stakeholder theory and transaction cost theory come at a cost that reduces shareholder's wealth.

1.17 Limitation of the study

Few companies listed at the NSE did not classify, in particular, ITI attributes in order of hardware, software and infrastructure instead clumped such expenditure in other categories of non-current assets. Where efforts to identify and extract such data failed, the companies were excluded from the research due to either incomplete or no data.

1.18 Suggestions for Further Study

The limitations sighted in this study gives rise to numerous suggestions for future study. Further research can be initiated by using different attributes for ITI and FFP to test their relationship. Secondly, this study used financial performance. Similar study could include non-financial performance rather than limit it to FP to widen scope for better collaboration. In any case the study could not include all the study variables though the attributes used for each variable provided adequate data to achieve the study objective. This study focused on companies listed at the NSE. Similar studies can look at both public and private companies including state corporation. Finally, a limited sample of only firms quoted at the NSE may restrict the generalization of the results not to include non-listed companies at the NSE.

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