

Effect of Information and Communication Technology on Financial Performance of Listed Non-Financial Firms in Nigeria

ENOMATE, Blessing

Department of Accounting,
Bingham University,
Karu, Nasarawa State

E – Mail: enobless04@gmail.com, Phone No: +234 8060468312

AUDU, Ilemona Omonu

Department of Accounting,
Bingham University,
Karu, Nasarawa State, Nigeria

E-Mail: ilemonaaudu@yahoo.co.uk, Phone Number: +234 8027769819

Abstract

The purpose of this study is to examine the effect of information and communication technology (ICT) on financial performance of listed non-financial service firms in Nigeria. To achieve this, a review of the extant literature was made, research questions were raised, and hypotheses were formulated. The theoretical framework adopted in the study is the resource-based theory, which was postulated by Barney (1991). In order to generate the data for the study, a sample of twenty (20) non-financial service companies drawn from foods and beverages, pharmaceuticals, foot wears, chemicals and paints, listed in the Nigeria Stock Exchange for the period of 2016 – 2020, was considered for the study and the ex post facto research design was adopted. The data generated for this study were analysed with both descriptive and inferential statistics using the arithmetic mean, standard deviation, minimum and maximum values, and the Ordinary Least Squares (OLS) regression technique. The findings show that investment in information and communication technology (ICT) infrastructure has a positive effect on the financial performance of listed non-financial firms in Nigeria whereas information and communication technology (ICT) personnel has a positive but insignificant effect on financial performance of listed non-financial service firms in Nigeria. Based on the findings of this study, the following recommendations were made: regular training should be given to the ICT Personnel from time to time to keep them abreast of the current innovations in the use of ICT. This will enhance their efficiency and quality of service delivery that will ensure customers retention and productivity, which will translate to the firm profitability, therefore, listed non-financial service firms should give emphasis on efficient utilization of the ICT equipment such as credit and electronic cards to pay at retail outlets, points of sales (POS), phone banking, among others.

Keywords: Information and Communication Technology (ICT), Infrastructure, Personnel, Net profit margin and Financial Performance

INTRODUCTION

The non-financial service sector is the manufacturing sector, which has been embedded with the potential of transforming the economy of any nation. Its place in economic development can never be downplayed. In a developing nation such as Nigeria, the sector has diverse potential for development, which will invariably reduce the dependence of the economy of the country on crude oil. The major products of manufacturing companies in Nigeria include beverages, footwear, chemical and pharmaceutical products, wood and wood products, and non-metallic products etc. Over 60% of the major manufacturing companies in Nigeria are operating around Lagos State. These companies operate either as a micro enterprises, small and medium scale enterprises or large enterprises. The manufacturing sector in Nigeria has shown strong growth in recent years. Nonetheless, the sector faces on-going challenges, including an increasing cost of production emanated from high tariff, inadequate electricity supply and increased cost of energy input, insufficient working capital, insecurity of lives and properties, reliance on poor and inadequate public sector infrastructures and rising cost of import, non-implementation of government policies, and heavy dependency on agricultural inputs, which themselves are vulnerable to shocks.

Effect of Information and Communication Technology on Financial Performance of Listed Non-Financial Firms in Nigeria

Information and communication technology (ICT), which refers to a wide range of computerized technologies that enables communication and the electronic capturing, processing, and transmission of information, enables industries to develop and maintain a competitive edge in the global market to practice its services to rejuvenate the innovative trends (Standish Group, 2006). These technologies include products & service such as desktop computers, laptops, hand-held devices, wired or wireless connectivity, business productivity software, data storage & security, network security, other related protocols, etc. (Ashrafi&Murtaza, 2008). The emergence of ICT has opened multiple facets of enterprises that collectively interact with geographically dispersed workstations to carry out business activities more efficiently, over digital networks (Buhalis, 2003). ICT has contributed openly to eliminate time, distance and space constraints in order to furnish the Business activities with ease and efficiency by integrating the capability of high speed devices with high speed communication links carrying multimedia information. ICT deals with the collection, storage, manipulation and transfer of information using electronic means. Communication technology refers to the physical devices and software that link with various hardware components and transfer data from one physical location to another. Application of ICT to enhance the performance of organization of all types around the world and do not only help to cut cost and improve efficiency (Spanos, 2002).

It is very clear today that ICT has now being accepted as the backbone for all organizations ranging from small to big, public to private, micro to macro scale industries, education to finance etc. ICT has the ability to enhance, coordinate and control the operations of many organizations and can also increase the use of financial management. Generally ICT is considered one of the most reliable means of providing a strong platform for effective system of internal control over financial reporting. It stands to reason that a sound ICT system provides a sure and guarantee medium of financial information delivery that covers the entire accounting cycle of the firm. ICT creates conducive atmosphere that integrates all financial transactions with the help of accounting software to generate financial report which thereto, would have very difficult to prepare. O'Brien and Marakas (2010) hinted that accounting information system are the oldest and the most widely used information system in business. Computer-based accounting system record and also generate reports on cash flow through an organization on a historical basis and produce important financial forecast of future conditions. ICT has therefore contributed a lot in eliminating the problem faced by SMEs in generation of accurate accounting information. Preece (2003) stressed that the exploration of ICT tools and their integration with customer relationship management applications are expected to bring several benefits such as improved product and service quality, customer satisfaction, higher productivity, improved financial performance and creation of barriers to entry, enhanced convenience and customer service through the advent of new product and various delivery/service channels. In order to lend support to this claim, this study is being consummated.

In recent times, there has been a tremendous increase in the use of information and communication technology (ICT) by corporate entities. It usually has various products such as security investment, internet banking and electronic payments (Berger 2003). Firms can improve earnings by delivering high quality services to clients. According to recent research ICT has shown promising effect on corporate performance. Usually, operational expenses have been cut down by the use of information technology thus improvement in performance. It has been noted that through the use of ICT, organization's services have been standardized, self-services transaction have been made possible by use of internet and mobile banking. In this regard therefore information communication technology will assist banks concentrate on important transactions like investment banking and personal trust services. Information Technology and communication (ICT) benefits the business world by allowing organization to work more efficiently and maximize productivity, faster communication, electronic storage and electric record are the few popular practices. Since the ubiquity of ICT has increased across the boundaries it has now become an inevitable domain to incorporate ICT in all workstations to tackle all the activities in efficient and effective fashion. Technology is an essential partner in management for business, regardless of the kind of enterprise you operate. Whether you need computers for storage, transfers, retrieval or transmission of information, you can manage your business with greater accuracy and efficiency with the assistance of information

technology and computer applications. The benefits of using ICT are tangible and can be measured. The business benefits arising from effective ICT generally relate to the reliable and consistent matching of ICT services to user needs i.e. service quality. Which in turn contribute to the overall success of the organization's business through higher productivity. These benefits are achieved through increasing service availability and quality to users, better match of capacity of requirements, more efficient handling of problems and reduce risk of failure.

The relationship between ICT and performance has attracted the attention of researchers in recent times. Several studies have been conducted to investigate this relationship. It is however worthy of note that there has never been a consensus on whether ICT contribute to organizational performance or not. Therefore previous findings are mixed. More so, most of the prior studies on the link between ICT and financial performance of companies have focused attention mainly on the financial sector thereby resulting to paucity of empirical evidence in non-financial service sector. It is upon this premise that this present study is conducted to investigate the effect of information and communication technology (ICT) on financial performance of non-financial service firms in Nigeria. The main purpose of this study is to examine the effect of information and communication technology (ICT) on financial performance of listed non-financial service firms in Nigeria. Specifically, the study is aimed to; Investigate the effect of information and communication technology (ICT) infrastructure on financial performance of listed non-financial service firms in Nigeria; and explore the relationship between information and communication technology (ICT) personnel and financial performance of listed non-financial service firms in Nigeria. The following null hypotheses were stated in this study:

- (i) There is no significant effect of information and communication technology (ICT) infrastructure on financial performance of listed non-financial service firms in Nigeria.
- (ii) There is no significant relationship between information and communication technology (ICT) personnel and financial performance of listed non-financial service firms in Nigeria.

LITERATURE REVIEW

Conceptual Clarifications

Information and Communication Technology

Information is like the blood which is circulating in the body of an organization and gives life to it. Information can feed the decision making process regarding the structure, technology and innovation and also information is like the life vessel that connects an organization to the suppliers of raw materials and customers. Information technology development such as computers and telecommunication devices has transformed the nature of so many office tasks and works. The networks of work from home and becoming automated have made possible the minimization of some departments and reducing the number of employees in an organization. From these phenomena (information technology) it can be deduced that large organizations become smaller and inclination toward more flexible and smaller organization become stronger (Damianides, 2004). Of course, at first, accepting this is not easy for the managers of organizations and treating information equal as resources such as human resources, raw material, financial resources is not possible and easy. Even for so many of the managers at the executive level also, considering an intangible element as the main source of the vital facilities is so much difficult. However, if we will look at this correctly, we can see that how these intangible elements increases productivity and profitability in every organization and affect the optimization of decision making of strategic manager. Information can play an important role in the life and survival of every organization. In fact, information is the instrument and tool that makes possible the better and more appropriate use of the tangible resources of an organization for the management. The first step for using information technology can be considered as the managers' awareness from its potential value. Like the management principles that a more active role of managers facilitated the application of its principles, with valuing the role of information in an organization we will become more aware of the application of information technologies and the role it has and can have in management decisions and strategies and how to utilize it (DeHaes & Grembergen, 2009).

Information technology is an integral and fundamental part for supporting, maintaining and growing a business. With this knowledge, companies are making huge investments in the field of information technology. Gartner (2010) reports that in spite of the Rapidly declining economy, currently the expenses made on information technology at the global level in 2010 reaches 3.4 Trillion that comparing to 2009 which has an increase of 4.6%, while a large part of the made investment on information technology don't have a guarantee of high return. Standish Group (2006) reports that around 67% of all the information technology projects have been unsuccessful or face problem and challenge in justifying the made investments. Companies make large and huge investments on information technology and have high reliance on it and put themselves at high levels of risks. Hence, organizations should constantly review and protect their information technology assets against disasters and risks. ICT is a combination of information technology and communication technology. It merges computing with high speed communication link carrying data, sound and video (Alabi, 2005). It deals with the collection, storage, manipulation and transfer of information using electronic means. Communication technology refers to the physical devices and software that link various computer hardware components and transfer data from one physical location to another (Laudon, 2001). Information and Communication Technology (ICT) refers to a wide range of computerized technologies that enables communication and the electronic capturing, processing, and transmission of information. These technologies include products and services such as desktop computers, laptops, hand-held devices, wired or wireless intranet, business productivity software, data storage and security, network security etc. (Ashrafi&Murtaza, 2008). With the use of ICT, businesses can interact more efficiently, and it enables businesses to be digitally networked (Buhalis, 2003). With the use of ICT, the time constraint, and distance barrier to accessing relevant information is eliminated or drastically reduced hence it improves coordination of activities within organizational boundaries (Spanos, 2001). ICT enables industries to develop and maintain a competitive edge in the global market to practice its services to rejuvenate the innovative trends. ICT refers to a wide range of computerized technologies that enables communication and the electronic capturing, processing, and transmission of information. These technologies include products & service such as desktop computers, laptops, hand-held devices, wired or wireless connectivity, business productivity software, data storage & security, network security, other related protocols, etc. (Ashrafi & Murtaza, 2008).

Financial Performance

Financial performance presented in the financial statements prepared periodically by companies is meant to provide users reliable information about the company's performance and financial position (Akinmulegun & Oluwole, 2014). Although measuring financial performance is considered a simpler task, it also has its specific complications. In measuring financial performance of organizations, many researchers use market measures, others put forth accounting measures and some adopt both of these. Broadly, financial performance of an entity can be measured in two ways, financial and non-financial. The two measures which represent different perspectives of how to evaluate a firm's financial performance, have different theoretical implications (Okwuosa, 2005) and each are subject to particular biases (McGuire, 1988). The financial indicators of financial performance of an organisation include profitability, sales turnover, return on investment, shareholders fund/net asset, profit before tax, profit after tax and cash flow; while the non-financial ways are market share, number of employees, and the number of products. Standard measurements of profitability of an organisation are gross profit margin, operating margin, net profit margin and net asset or shareholders fund.

In the summary of financial performance presented in the published annual report of organisations, sales turnover, operating profit, profit before tax, taxation, profit after taxation, dividend, retained profit for the year, and earnings per share are the common components that organisations use in assessing their financial performance. The use of different measures in measuring financial performance, needless to say, complicates the comparison of the results of different studies. In other words, accounting measures capture only historical aspects of firm performance. They are subject, moreover, to bias from managerial manipulation and differences in accounting procedures.

Effect of Information and Communication Technology on Financial Performance of Listed Non-Financial Firms in Nigeria

Market measures are forward looking and focus on market performance. But the stock-market-based measures of performance also yield obstacles. The use of market measures suggests that an investor's valuation of firm's performance is a proper performance measure (. Studies on financial performance of organisations have been mostly based on ratios, with little studies focusing on measures used by organisations in their financial summary report(McGuire, 1988).

Empirical Literature

Akinboade (2020) conducted to investigate the usage of ICT and its impact of ICT on financial performance manufacturing companies in Lagos State, Nigeria. The study focused on quoted manufacturing companies in Lagos State, Nigeria. Survey design was adopted in conducting this study. To achieve the objective of this research primary and secondary data were used. Primary data was collected via interview and questionnaire, while secondary data for 10 years was retrieved from the published annual reports of the companies. In all, 44 companies were sampled in this study. Although 44 companies were sampled, questionnaires from only 31 of the companies were returned. It was found that quoted companies sampled in this study have deployed ICT to different departments in these organizations; the level of usage however differs; investment in ICT had positive relationship with financial performance. More so, it has been empirically established that the use of ICT has brought about a significant difference in the sales turnover, profit before tax, profit after tax and net asset/shareholders fund. However, the use of ICT has not brought about any significant difference in the earnings per share of these companies. It is recommended that future studies can be conducted using other financial variables and more financial data to determine the effect of ICT use on pre ICT adoption and post ICT adoption of quoted manufacturing companies in Nigeria. Al-Qudah (2019) identified the relationship between information technology and Jordanian industrial company's financial performance listed on Amman Financial Market (AFM). To achieve the objectives of the study the researcher followed the descriptive and analytical statistical techniques. The research population includes Jordanian industrial companies which have been used computer- software programs and implementing new technology. The participants of the study were company's managers, financial managers, and IT managers. One hundred & twenty questionnaires were distributed; One hundred questionnaires were returned and valid for statistical analysis. The results indicated that there was positive relationship between the Jordanian industrial company's financial performance and information technology. Since the Jordanian industrial companies work in a competitive market they should look for implementing new and up to date technology that may help the company stay in such a market, and pay more attention on technology improvement to take advantage of such changes in order to ease its work in relation to knowledge of information technology, software programs, performance measurement, and human resources.

Penalba et al (2015) focused on the effect of information and communication technology in innovation level: The Panama SMEs case". The essential objective of this research work is to analyze existing effects between information and communication technologies in the level of innovation in small and medium-sized enterprises, using a sample of (615) micro, small and medium-sized enterprises in Panama. The information and Communication technology play an essential role in the development in the level of innovation in Enterprise, not only large corporations, but also micro, small and medium-sized enterprises, they also facilitate the growth and development of the organizations in a highly, globalized and competitive world, as the one that characterizes the current century. The results obtained show that information and communication technologies have significant positive effects in innovation activities of companies. Tanaka and Sithole (2015) the study showed the impact of information technology knowledge and skills accounting graduates need. The research investigated accounting graduates (IT) skills and knowledge relevant to their roles in providing competent and professional services. Data was obtained from employers on 10 (IT) skills and knowledge areas applicable to accounting graduates. Results of the survey research suggest that students are better trained in word-processing and knowledge of communications software skills, yet employers expect entry level accounting graduates to possess accounting packages knowledge and spreadsheet competencies. The results provide useful information

Effect of Information and Communication Technology on Financial Performance of Listed Non-Financial Firms in Nigeria

for academics and administrators that are making changes to their curricula. Saban and Efeoglu (2015) in their study focused on an examination of the effects of information technology on managerial accounting in the Turkish iron and steel industry. The objective of the study was to examine the effect upon managerial accounting and managerial accountants in the iron and steel businesses, which closely follow and adopt the information technologies and operate in Turkey. The study examined the technological developments that have led to changes in managerial accounting and the extent of these changes. Examining the effects upon the managerial accounting applications and managerial accountants theoretically, a field work was performed using the survey method. These changes were determined using the responses to surveys that had been administered to managerial accountants in Turkish iron and steel production companies.

Adekunle and Rafiu (2014) investigated the impact of Information and Communication Technology Cost Efficiency (ICTCE) on the performance of banks as well. The study assessed the impact of ICT on the performance of South African banking industry using annual data over the period 1990-2012 published by Bank scope – World banking information source. Data analysis is carried out in a dynamic panel environment using the orthogonal transformation approach. The robustness of the results was affirmed by residual cointegration regression analysis using both Pedroni and Kao methods. The findings of the study indicated that the use of ICT increases return on capital employed as well as return on assets of the South African banking industry. The study discovers that more of the contribution to performance comes from information and communication technology cost efficiency compared to investment in information and communication technology. The study recommends that banks emphasize policies that will enhance proper utilization of existing ICT equipment rather than additional investments. Sadeghimanesh and Samadi (2013) examined the effect of information technology on the financial performance of the banks listed on Tehran Stock Exchange. For this purpose, 183 of the staff experts of information technology and finance departments of the banks listed on Tehran Stock Exchange have been selected as research sample by using simple random sampling method and responded to the questionnaire. In the end, the obtained data from these questionnaires were analyzed by using two-variable linear regression test and the results indicated that information technology dimensions including IT knowledge, IT operations and IT infrastructures have significant effect ($p < 0.01$) on financial performance of the banks listed on Tehran Stock Exchange. The results from Friedman's test also indicated that infrastructures of information technology (with average rating = 2.24) has the first rank, information technology knowledge (with average rating = 2.04) has the second rank and information technology operations (with average rating = 1.72) has the third rank. It is recommended that banks should establish an official department of Management Information Systems and also using computer systems for analyzing customer and market information.

Osei and Harvey (2011) in their study covering fifteen banks over a period of ten years on investments in ICT and bank business performance in Ghana find that investment in ICT tend to increase profitability (ROA and ROE) for high ICT level banks than for lower ICT level banks. In his study on analysis of the values of return on asset (ROA) arising from ICT investment in the US, Kozak (2005) finds that the value of the return on asset for the US banking sector has increased by 51% thereby suggesting that improvement in ICT investment, associated with extensive office networks and range of offered services have helped to generate additional revenues for banks thus pointing to the fact that a huge number of diverse operations require higher ICT investment. In their study conducted to examine technological progress and its effects in the banking industry using relevant data, Berger et al. (2003) find that ICT investment leads to improvements in costs. The improvement was hinged on productivity increase in form of improved "back-office" technologies which is in form of organization-related benefits such as reduced costs of operation as well as improved "front-office" technologies which is in form of benefits to customers such as improved quality and variety of banking services. Bitler (2001) investigated the relationship between information and communication technology investments and small firms' performance. His study reveals that there was a significant performance difference between firms that adopt ICT and those that do not adopt the technology.

Theoretical Framework

Effect of Information and Communication Technology on Financial Performance of Listed Non-Financial Firms in Nigeria

Different theoretical approaches have been adopted by researchers to investigate the nature of the relationship between ICT and firm performance over the years. Transaction cost theory (Williamson, 1975); Value chain analysis (Porter, 1985); and Resource-based view which is a more recent theory that is widely embraced by many such as Bharadwaj (2000), Wade and Hulland (2004), Kim et al. (2006), Rai et al. (2006), Wu et al. (2006), Ordanini and Rubera (2010), Lee, Koo and Nam (2010), Fahy and Hooley (2011). This present study is anchored on resource-based theory, which was postulated by Barney (1991). The theory states that firms compete on the basis of “unique” corporate resources that are considered to be valuable, rare, difficult to either imitate or substituted by other resources. It argues that when an organization is in possession of strategic resources it is able to compete well as compared to its competitors. The theory stemmed from the area of strategic management research and widely attracts attention as a suitable tool to examine the value delivered by IT resources (Melville, 2004; Wade & Holland, 2004). The resource-based theory rationalizes firm’s superior performance to organizational resources and capabilities. The resource-based view of the firm links the performance of organizations to resources and skills that are firm specific, rare and difficult to imitate or substitute (Barney, 1991).

METHODOLOGY

In this study, the dependent variable (financial performance) was measured by net profit margin (NPM) while the dimensions used for the independent variable (ICT) are number of ICT infrastructure and number of ICT personnel as used in the works of Qulak (2011) and Henshaw and Smith (2017). The data for these variables were obtained from the annual reports and financial statements of twenty (20) non-financial service companies drawn from foods and beverages, pharmaceuticals, foot wears, chemicals and paints, listed in the Nigeria Stock Exchange for the period of 2016 – 2020, thereby qualifying the study as a panel data study, hence the adoption of ex post facto research design. In view of the fact that most panel data like time series data are not stationary, using non-stationary data in the model might lead to spurious regression which cannot be used for precise prediction (Gujarati, 2003). Thus, the prerequisite for co-integration test is the stationarity of each individual panel data over. Therefore, before turning to the analysis of the long-run relationships between the variables, the study examined the unit root properties of each panel data, as non-stationary behaviour is a prerequisite for including them in the co-integration analysis. If the panel data are stationary in their levels, then they are said to be integrated of order zero, i.e., I (0); if they are stationary in their first differences, then they are said to be integrated of order one, i.e., I (1); if stationary in their second differences, then they are integrated of order two, i.e., I (2). The order of integration of the variables was investigated using the Augmented Dickey-Fuller (ADF) tests. The data generated for this study were analysed with both descriptive and inferential statistics using the arithmetic mean, standard deviation, minimum and maximum values, and the Ordinary Least Squares (OLS) regression technique. These were computed with the aid of E-Views version 10.

Model Specification and Estimation

The model specification for this study is given in functional form as:

$$FP = f(ICT-INF, ICT-P) \text{ ----- (i)}$$

In econometric form, the model becomes:

$$FP = \alpha_0 + \beta_1 ICT-INF + \beta_2 ICT-P + \mu \text{ ----- (ii)}$$

Where:

FP	=	Financial performance (net profit margin)
ICT-P	=	ICT Personnel
ICT-INF	=	ICT Infrastructure
α	=	Regression Constant
β	=	Regression Coefficient
μ	=	Stochastic term

In this study, our a priori expectation is that investment in ICT will bring about increase in financial performance of listed non-financial service firms in Nigeria. In summary, it is expected that $\beta_1, \beta_2, > 0$.

RESULT AND DISCUSSION

Descriptive Analysis

This section presents the descriptive statistics of each dependent and independent variables included in this research. The dependent variable of this study is Financial Performance (measured by Net Profit Margin) and the independent variable is ICT (measured by ICT personnel and ICT infrastructure). The total observation for each dependent and independent variable is 20 (data for the period 2016-2020). The descriptive statistics include minimum, maximum, mean and standard deviation of all research variables. Accordingly, the summary statistics for all variables are presented below in Table 4.

Table 1 Descriptive Analysis

	NPM	ICT_P	ICT_INF
Mean	0.44650	12.65000	7.90000
Median	0.46500	13.00000	8.00000
Maximum	0.78000	18.00000	12.00000
Minimum	0.19000	8.00000	4.00000
Std. Dev.	0.166363	2.83354	2.403944
Skewness	0.112602	0.237437	0.143663
Kurtosis	2.137315	2.188621	1.9678
Jarque-Bera	0.662452	0.736535	0.95666
Probability	0.718043	0.691932	0.619818
Sum	8.93	253	158
Sum Sq. Dev.	0.525855	152.55	109.8
Observations	20	20	20

The descriptive statistics of the dependent and independent variables in the model are displayed in table 1. From 2016 to 2020, the average value of Net Profit Margin (NPM), ICT-Personnel and ICT-Infrastructure are 0.44650, 12.65000 and 7.90000 respectively. These figures may be compared with the maximum values of NPM, ICT-P and ICT-INF which are 0.78000, 18.00000, and 12.00000 respectively. It can be concluded that the means of all the variables are significantly lower than its maximum values. Kurtosis which depicts how peaked or how flat a distribution is. With a value of 3 means the distribution is normal, that is, mesokurtic all the variables indicating that each of the distributions is platykurtic that is less than 3. Leptokurtic means that the variables in our study have more values higher than the sample mean. Platykurtic means that the variables in our study have more values lower than the sample mean. The Jacque-Bera statistic, with respect to the normal distribution, is a measure of the difference between the skewness and kurtosis of the variables. The probability of the Jacque-Bera statistic allows us to accept or reject, at 0.05 level, the null hypothesis of a normal distribution. That is, the Jacque-Bera statistic and its corresponding p-value allow us to ascertain whether our variables are normally distributed or not. We accept that a variable is normally distributed when the p-value of the Jacque-Bera statistic is more/greater/higher than 5% and reject this normality hypothesis when the p-value of the Jacque-Bera statistic is less/smaller/lower than 5%. Table 1 above shows that NPM, ICT-P and ICT-INF are normally distributed because the probability values are greater than 5%.

Stationarity Test

When time series data is non-stationary and used for analysis, it may give spurious results which cannot be used for any meaningful inferences, since estimates obtained from such data will possess non constant mean and variance

Table. 2 Summary of Unit Root Test

Effect of Information and Communication Technology on Financial Performance of Listed Non-Financial Firms in Nigeria

Variables	ADF STAT	5% Critical Value	Remark
log_NPM	-3.67315	-3.02997	Stationary
Log ICT_P	-6.893067	-3.02997	Stationary
Log ICT_INF	-5.150369	-3.02997	Stationary

Table 2 shows the unit root test for stationary using Augmented Dickey-Fuller. The result shows that the log of NPM, ICT-P and ICT-INF are stationary at levels. This permit us to use the Ordinary Least Square model (OLS) to test the hypothesis of the study.

Regression Estimate

The OLS model is used to analyze the effect of ICT-Personal, ICT-Infrastructure on Net Profit Margin for this study, the OLS model is the best model to be used in testing the hypothesis because the variables are integrated at levels. The result obtained from the equation estimation regression shall be analyzed and interpreted on the basis of 5% significance level.

Regression Estimate (OLS Model)

Dependent Variable: LOG_NPM

Method: Least Squares

Sample: 1 20

Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.383492	0.741620	-4.562299	0.0003
LOG ICT_P	0.278334	0.301909	0.921915	0.3695
LOG ICT_INF	0.892606	0.214755	4.156383	0.0007
R-squared	0.577194	Mean dependent var	-0.880751	
Adjusted R-squared	0.527452	S.D. dependent var	0.410800	
S.E. of regression	0.282393	Akaike info criterion	0.446444	
Sum squared resid	1.355675	Schwarz criterion	0.595804	
Log likelihood	-1.464441	Hannan-Quinn criter.	0.475601	
F-statistic	11.60377	Durbin-Watson stat	1.822817	
Prob(F-statistic)	0.000664			

Source: Eviews version 10

HO₁: There is no significant effect of information and communication technology (ICT) infrastructure on financial performance of non-financial service firms in Nigeria.

According to the result in Table 3 shows that ICT Infrastructure having a positive coefficient of 0.892606 shows that ICT Infrastructure has a positive effect on NPM. This means that a unit increase in ICT Infrastructure will lead to 0.892606 increase in NPM. ICT Infrastructure having a p-value of 0.0007 shows that ICT Infrastructure has a significant effect on NPM of non-financial service firms in Nigeria. Since the p-value is less than 5% the null hypotheses is therefore rejected and the alternate hypotheses is accepted. The value of the Adjusted R-Squared of 0.527452 implies ICT-P and ICT-INF explained about 52.7% systematic variations in the dependent variable (NPM) over the observed years while the remaining 47.3% variations are explained by other determining variables outside the model.

The F-statistic shows a significant probability value (0.000664<0.05). This means that the effect of the independent variables (ICT-P and ICT-INF) on the dependent variable (NPM) did not happen by chance. The Durbin-Watson statistic of 1.822817 indicates absence of autocorrelation.

HO₂: There is no significant relationship between information and communication technology (ICT) personnel and financial performance of non-financial service firms in Nigeria

According to the results, in Table 3, ICT Personnel has a positive coefficient of 0.278334 which is insignificant with a p-value of 0.3695. The interpretation of the positive coefficients of ICT Personnel indicates that an increase in ICT Personnel by a unit will lead 0.278334 units increase in NPM of Non-financial service firms in Nigeria. Since the probability value of ICT Personnel of 0.3695 is greater than the 5% level of significance, the null hypothesis is hereby accepted.

Serial correlation

Serial correlation is used in statistics to describe the relationship between observations of the same variable over specific periods. If a variable's serial correlation is measured as zero, there is no correlation, and each of the observations is independent of one another. Conversely, if a variable's serial correlation skews toward one, the observations are serially correlated, and future observations are affected by past values. The serial correlation test is conducted to establish the model robustness

Table 4: Serial correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.077552	Prob. F(2,15)	0.9257
Obs*R-squared	0.204688	Prob. Chi-Square(2)	0.9027

Table 4 is the Breusch-Godfrey serial correlation test result. Under the hypothesis of no serial correlation, the result shows that the null hypothesis is to be accepted, meaning that there is no serial correlation in the residual of the model with the P-value of the observed R2 being greater than 5%.

Heteroskedasticity Test

Heteroscedasticity test is a test carried out to show whether the variance of the errors from a regression is dependent on the values of the independent variables. This test is performed using the fitted values of the mode. The decision rule for **homoskedasticity** test is that if the p_value is less than 0.05 you reject the null and infer the presence of heteroskedasticity

Table 5: Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	3.571968	Prob. F(2,17)	0.0507
Obs*R-squared	5.917789	Prob. Chi-Square(2)	0.0519
Scaled explained SS	3.364329	Prob. Chi-Square(2)	0.1860

Table 5 shows the test of heteroskedasticity. The Probability Chi-Square value for observed R-squared is 0.1860 (18.60%) which is more than 5 percent meaning that the null hypothesis that there is no heteroscedasticity in the model is accepted. This shows that there is no evidence for the presence of heteroskedasticity since the p-values are considerably in excess of 0.05.

Discussion of Findings

The main objective of this study is to examine the impact of information and communication technology (ICT) on the financial performance of listed non-financial firms in Nigeria. In order to do that some important variables such as ICT Infrastructure and ICT Personnel were regressed on net profit margin. The results from the Ordinary Least Square (OLS) model shows that the use of ICT infrastructure in non-financial firms improves performance of the selected firms. This finding is in

Effect of Information and Communication Technology on Financial Performance of Listed Non-Financial Firms in Nigeria

linewith the findings of Sadeghimanesh and Samadi (2013) which result indicated that information technology dimensions including IT knowledge, IT operations and IT infrastructures have significant effect ($p < 0.01$) on financial performance. The findings may be useful for assessing the effect of investments in ICT Infrastructure on firms' productivity. Presumably, if ICT infrastructure increases profitability, firms that invest the most in ICT infrastructure is expected to have superior efficiency at any point in time.

This study also shows that ICT Personnel has a positive but insignificant effect on financial performance of listed non-financial firms in Nigeria. Akinboade (2020) empirically established that the use of ICT has brought about a significant difference in the financial performance of a firm. The objective of this study is to identify whether information and communication technology (ICT) improves performance of non-financial firms in Nigeria. Previous findings indicate that the use of ICT improves financial performance, but does not specify the actual performance measure. In order to contribute to this debate, this study uses Ordinary Least Square (OLS) model to know the actual effect of ICT Personnel and ICT Infrastructure on the financial performance of non-financial firms in Nigeria. The findings are summarized as follows; Investment in Information and communication technology infrastructure has a positive effect on the financial performance of non-financial firms in Nigeria and; an information and communication technology personnel has a positive but insignificant effect on financial performance of non-financial firms in Nigeria.

CONCLUSION AND RECOMMENDATIONS

Technological developments particularly in the area of information and communication technology are revolutionizing the way business is done in Nigeria. This has resulted to changes in trade, interconnection and business transaction in the national and international market places and set in motion a revolution in the banking sector. This study seeks to investigate the effect of Information and communication Technology (ICT) on the financial performance of listed non-financial firms in Nigeria. However, this study concludes that the performance of non-financial firms is influenced by both ICT infrastructure and ICT Personnel. It is worthy of note that the impact of ICT Infrastructure on performance of non-financial firms is more than that of ICT personnel. The implication of these findings underscores the need for policymakers to emphasize policies that enhance optimal utilization of ICT infrastructure rather than embark on additional investments. The results also suggest that improving the service quality of ICT Personnel through ICT experience will improve the overall customer perception of the quality of service provided by the firm. Adoption of ICT enables operations of commercial banks and non-financial institutions to be more efficient through making financial services more available and reducing their costs. This is mostly achieved by technological innovation such as ATM, smart cards, MICR, electronic fund transfer, electronic home banking and electronic office banking. Financial products that are delivered through ICT are user friendly and promote firm's revenues, increase profits, increase liquidity and lower the risks related to the use of financial services. Some financial innovations decrease risk and volatility associated with globalizing markets. With greater globalization, firms, investors and governments are exposed to new risks such as exchange, interest rate and political risks which ICT seeks to manage. Based on the findings of this study, the following recommendations were made:

- i. Regular training should be given to the ICT Personnel from time to time to keep them abreast of the current innovations in the use of ICT. This will enhance their efficiency and quality of service delivery that will ensure customers retention and productivity, which will translate to the firm profitability, *ceteris paribus*. This stance is essential especially in this era of reforms in the nation's financial sector where attention is no longer on the firm that has the required capital. The key issue at moment is the ability of firm to retain their current customers as well as attract potential customers. This is mainly feasible in their efficient service delivery, which depend largely, on the premium placed on the use of ICT.
- ii. Since the findings of this study indicate that investment in ICT Infrastructure enhance Nigerian non-financial firms performance, non-financial firms should give emphasis on efficient utilization of the ICT

Effect of Information and Communication Technology on Financial Performance of Listed Non-Financial Firms in Nigeria

equipment such as credit and electronic cards to pay at retail outlets, points of sales (POS), phone banking, electronic payment debit, cash withdrawal machines, home banking, internet banking, mobile banking, and personal digital assistant banking.

References

- Adekunle O. B. & Rafiu A. A. (2014). The impact of information and communication technology (ICT) on commercial bank performance: evidence from South Africa. *Problems and Perspectives in Management*, 12(3), 59-68.
- Akinboade, A. A. (2020). Impact of ICT usage on financial performance of quoted manufacturing companies in Lagos State, Nigeria. *Management*, 13(2), 28 – 42.
- Akinmulegun, S.O & Oluwole, F.O. (2014). An assessment of the Nigerian manufacturing sector in the era of globalization. *American Journal of Social and Management Sciences*, 5(1), 27-32.
- Alabi, D. (2005). Information technology and e-marketing: Prospects and challenges for marketing practitioners in an emerging economy. *An Unpublished Paper Delivered at the 2005 MMN Marketing Educator Conference*, University of Lagos, Nigeria.
- AL-Qudah, M.A.A. (2019). The effect of information technology on financial performance of Jordanian industrial companies. *International Journal of Business and Social Science*, 10(11), 11-14.
- Ashrafi, B & Murtuza. M (2008), use of impact of ICT on SMEs in Oman. *Electronic Journal Information System and Evaluation*, 10: 125-138.
- Barney, J.B. (2001). Is the resource-based view a useful perspective for strategic management research? *Academy of Management Review*, 26 (1), 41-56.
- Berger, A.N. & Wharton Financial Institutions Center Philadelphia (2003). The economic effects of technological progress: Evidence from the banking industry. *Journal of Money, Credit, and Banking*, 35 (2), 141-176.
- Bharadwaj, A.S. (2000). A resource-based perspective on information technology capability and firm performance: An empirical investigation. *MIS Quarterly*, 24 (1), 169-196.
- Bitler, M.P. (2001). Small businesses and computers: Adoption and performance, (online). <http://www.frbsf.org/publications/economics/papers/> (accessed 15 July 2021).
- Buhalis, D. (2003). E-airlines: strategic and tactical use of ICTs in the airline industry, *Information and Management*, 41, 805-825.
- Damianides, M. (2004). Sarbanes-Oxley and IT governance: New guidance on IT control and compliance. Available at <www.allbusiness.com>. Accessed in January 2021.
- De Haes, S., & Van Grembergen, W. (2009). Exploring the relationship between IT governance practices and business/IT alignment through extreme case Analysis in Belgian Mid-to-Large Size Financial Enterprises. *Journal of Enterprise Information Management*, 22 (5), 615-637.
- Fahy, J. & Hooley, G. (2011). Sustainable competitive advantage in electronic business: towards a contingency perspective on the resource-based view. *Journal of Strategic Marketing*, 10 (4), 241-253.
- Gartner, M. (2010). Gartner says worldwide IT spending to grow 4.6% in 2010. Available at www.gartner.com/it/page. (accessed 31 May, 2021).
- Henshaw, R. & Smith, W.T. (2017). Effect of technological innovation on strategic positioning in financial modeling. *Journal of Computer Science and Informatics*, 18 (3), 88-95.
- 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*, February.
- Laudon, D.P. & Laudon, J.P. (2001). *Management information systems: Organisation and technology in the network enterprises*. Prentice Hall International in US.
- Lee, A. Koo, R. & Nam, H.E. (2010). Cumulative strategic capability and performance of early movers and followers in the cyber market. *International Journal of Information Management*, 30, 239-255.
- McGuire, J.B., Sundgren, A. & Schneeweis, T. (1998). Corporate social responsibility and firm performance. *The Academy of Management Journal*, 31(4), 854-872..

Effect of Information and Communication Technology on Financial Performance of Listed Non-Financial Firms in Nigeria

- Melville, M., Kraemer, K. &Gurbaxani (2004). Information technology and organizational performance: An integrative model of IT business value, *MIS Quartely*, 28 (2), 283-322.
- O'Brein J.A &Marakas G.M (2010), Enterprise information system, New York, MCGraw Hill.
- Okwuosa,I. (2005). *Advanced financial accounting manual Nigeria*. Lagos: Arnold Consulting Limited.
- Ordanini, A., Rubera, G. (2010). How does the application of an IT service innovation affect firm performance? A theoretical framework and empirical analysis on e-commerce, *Information & Management*, 47, 60-67.
- Porter, M.E. (1985). *Competitive advantage*. New York: Free press.
- Preece, L.J (2003). *Technological change and organization action*. London Routledge.
- Qulak, B. (2011). Evolving ICT governance model in a research study on companies in Jordan. *International Business Review*, 13 (1),112-124.
- Saban, M. &Efeoglu, Z. (2015). An examination of the effects of information technology on managerial accounting in the Turkish iron and steel industry. *International Journal of Business and Social Science*, 3(12), 105 – 117.
- Sadeghimanesh, M. & Samadi, A. (2013). The effect of information technology on financial performance of the banks listed in Tehran stock exchange. *Journal of Natural and Social Sciences: Special Issue on Accounting and Management*, 2 (3), 2911-2919.
- Spanos, Y.E., Prastacos, G. &Poulymenakou, A. (2002). The relationship between information and communication technologies adoption and management. *Information & Management*, 39 (8), 659-675.
- Standish Group (2006). Interview: Jim Johnson of the Standish Group. Available at: www.infoq.com/articles/Interview-Johnson-Standish-CHAOS (accessed on May 2021).
- Wade, M. &Hulland, J. (2004). The resource based view and information systems research: review, extension and suggestions for future research, *MIS Quarterly*, 28 (1),107-142