

**EFFECT OF INVESTMENT IN INFORMATION AND COMMUNICATION TECHNOLOGY ON FINANCIAL PERFORMANCE OF LISTED INSURANCE COMPANIES IN NIGERIA**

**NWALA, MAURIE NNEKA<sup>1</sup>,**  
07031567777  
[maurienwala@gmail.com](mailto:maurienwala@gmail.com)

**ABUBAKAR, IDRIS AYOKANMI<sup>2</sup>**  
[abubakaridris663@gmail.com](mailto:abubakaridris663@gmail.com)  
&  
**ONIBIYO, EZEKIEL ROTIMI<sup>3</sup>**  
[temiowa@yahoo.com](mailto:temiowa@yahoo.com)

<sup>1,2&3</sup>*Department of Banking & Finance, Nasarawa State University, Keffi*

**ABSTRACT**

Human activities have been greatly enhanced by the development of science and technology, however these innovations in Information and communication technology (ICT) come at a cost to the firm. Therefore, this study evaluates the effect of investments in ICT on financial performance of listed insurance companies in Nigeria. The population of this study is made up of 25 listed insurance companies on the Nigerian Stock Exchange from year 2012 to 2018. Insurance companies that have complete data set for the periods of 2012-2018 were selected purposively for this study, the sampled insurance companies were 16 in number. Secondary data in the form of panel data are used for this study. The data are collected from the 16 selected insurance companies annual financial reports and accounts. Based on the result of the Hausman specification test, the study adopted the Random effect regression and it revealed that Investment in ICT Hardware and software have significant positive effect on financial performance of listed insurance companies in Nigeria. The study concludes on a general note that investment in ICT improves the financial performance of listed insurance companies in Nigeria. The study therefore, recommends that listed insurance companies in Nigeria should be proactive in adoption of ICT as investments in ICT does not erode profitability.

**Keywords:** ICT Investment, Financial Performance, hardware, Software and Return on Asset.

**JEL Classification:** D25, G32, L25, N27

**1. INTRODUCTION**

Information and communication Technology (ICT) is vital and essential in all facets of life. The usage of ICT as a centerpiece of global developments causes things to be done exceptionally,

especially in the financial sector. Human activities have been greatly enhanced by the development of science and technology including activities in the insurance industry. Impressively, studies at the company and country levels have shown that ICT is positively related to corporate and national economic performance (Calderon, Seo & Kim, 2001).

ICT is emerging as a phenomenon with its own attractions and has an important role in insurance market. Development of e-trade makes insurers more than product orientation to customer orientation. Since search costs for policy holders is less, transparency in pricing, products quality and insurance services increases. The usage of ICT in insurance industry increases production capacity, specialization of activities and improves speed and quality of services. In general perspective, electronic insurance provides customers access to insurance services by using safe intermediates and without physical presence. E-insurance is application of information technology and redesigning business procedure in order to provide optimal insurance services and facilitating inter-action between people and insurance industry.

The adoption of new technologies and in particular the Internet has transformed insurance industry and allows stakeholders to do business better and efficiently. Evidence of this change is shown in the involvement and utilization of modern technology in virtually every aspect of business transactions (Akinade, 2013). Through ICT, electronic insurance also called e-insurance has developed. ICT has proven to be majorly advantageous in the service sector such as banking, marketing, trade, education, health and tourism. Applying ICT in the insurance industry for rapid access of information and using it for decision making and planning is essential because Insurance services are sensitive to information, which means that the flow of information between different customers and insurance companies is necessary. It is against this backdrop that this study seeks to analyse the effects of investments in ICT on the financial performance of Insurance companies in Nigeria.

Despite the benefits of ICT, many business enterprises have not adopted or integrated ICT into their operations. Available studies on ICT in Nigeria have focused mainly on either the banking sector (Osabuohien, 2008; Dauda & Akingbade, 2011; Emmanuel, 2011; Obasan, 2011); or on small medium scale industries (Adewoye & Akanbi, 2012).

Specifically, most of the previous studies employed primary data for their investigation whereas this study makes use of secondary data over a period of six years in a panel environment. Moreover, there are few documented studies that have investigated the effect of ICT investments on insurance firms performance, the few studies conducted in this area of study are the studies conducted by Jimoh (2012) and that of Fadun (2013). Identifiably, Jimoh (2012) employed the use of primary data using questionnaires distributed to only Royal Exchange insurance company staff and one on one interviews. The use of Primary data by Jimoh (2012) cannot be relied upon as primary data are biased, emotional and subjective.

Fadun (2013) also used primary data in gathering and analyzing the hypotheses. In as much as primary data gives firsthand information, it is saddled with the problem of being biased and also

unverified and therefore less reliable. But this study makes use of secondary data over a period of six years in a panel environment. This method is viewed more as unbiased, more verifiable and consequently more reliable. Also the use of panel data environment makes it clearer to identify year by year, the information regarding investments in ICT and financial performance of insurance companies in Nigeria. However, the latest work on this subject matter was done in 2013; this study identified and showed the effects of investments in ICT on the performance of Insurance companies in Nigeria from 2012 to 2018 which exposes more current information regarding investment in ICT.

The study, therefore, fills this gap and contributes to knowledge on effect of investment in ICT on insurance companies' performance in Nigeria. Consequently, the study is imperative in view of the need for insurance companies' in Nigeria to develop and maintain a higher level of ICT usage in order to meet the nation's insurance needs, to enhance their profitability and to contribute positively to the economy.

The major objective of this study is to examine the effect of ICT investments on the financial performance of listed insurance companies in Nigeria. The specific objectives are to assess the effect of investment in ICT hardware and investment in ICT Software on financial performance of listed insurance companies in Nigeria.

## **2. LITERATURE REVIEW**

### **2.1 Conceptual Review**

#### **ICT Investment**

ICT investment is the amount of money/capital that financial institutions spend on ICT. Although ICT expenditure is regarded as costly and risky, financial institutions are one of the largest investors in ICT. An interesting finding of Morton (1991) supported by Brynjolfsson and Hitt (1996), is that benefits from ICT do in fact exist, but are not captured by the organization. Use of and investment in ICT requires complementary investments in skills, organization and innovation; however, investment and change entails risks and costs as well as bringing potential benefits.

According to Saleem, Salim, Al-Ghamdi and Ullah (2015), the investment is not only for software and hardware resources, but also for human resources in terms of ICT professionals. Thus, investment not only serves to enhance technology, but is also used for upgrading all resources connected to running the project. Therefore, investments to buy or rent ICT resources has become a necessary custom of almost every organization seeking to provide consumers as well as employees with the latest technology.

Schniederjans (2010) argued that ICT investment does not mean just one thing; several things must be thoroughly considered, such as application software, personnel, programming languages, system software, and hardware. In addition, (Byrd & Turner, 2000) pointed out a similar point in the way that shared and joint ICT systems consist of ICT resources, data, software and hardware, several core applications, human skills, knowledge, standards,

commitments, and values, where the combination of all these factors can improve the values and credibility of the organization.

Investments in ICT can be thought of as consisting of four facets: hardware, software, internal spending and telecommunication investments. For the purposes of this study, software investment refers to total country spending on software packages, database systems, utility software and programming tools. Hardware investment is the total computer hardware spending in a country (Kim et al., 2008). Internal spending refers to the total national amount spent on software customization, human capital development and other miscellaneous ICT related expenses. Telecommunication spending refers to local and long distance wire-line and wireless communication investments in a country.

### **Financial Performance**

Financial performance can be described as a measure that reveals the position of an organization. It helps to tell how far and well an organization has improved in terms of its profitability as a result of its services delivery. Financial Performance of a business can be identified using different proxies. The study by Abaenewe, Ogbulu and Ndugbu (2002) proxy performance using return on asset (ROA) and return on equity (ROE). However, it is important to note that firms' profitability is not the only performance indicator of an organization. Thus, studies like that of Ibukunle and James (2012), Olorunsegun (2010) and some others have identified performance in a different perspective; such as increase in productivity, increase in sales, cost reduction, competitiveness, efficiency and effectiveness.

This study used return on asset to measure financial performance, ROA is of the widely used accounting based measures of corporate performance in literature is ROA. It assesses the effectiveness of capital employed and provides a basis in which investors can measure the earnings generated by the firm from its investment in capital assets (Epps & Cereola, 2008). The ROA is a measure which shows the amount of earnings that have been generated from invested capital. It is an indication of the number of kobo earned on each naira worth of assets. It allows users, stakeholders and monitoring agencies to assess how well a firm's corporate governance mechanism is in securing and motivating efficient management of the firm (Chagbadari, 2011). This study examines one key accounting measures of firms' financial performance which is Return on Assets. The ROA is utilized in this study because it is simple to use, easy to understand, and it is based on audited figures. ROA is the ratio of annual net income to total assets of a business during a financial year.

## **2.2 Theoretical Framework**

### **Socio-Technical Systems Theory**

The term socio-technical systems was originally developed by Emery Trist (1960) to describe systems that involve a complex interaction between humans, machines and the environmental aspects of the work system—nowadays, this interaction is true of most enterprise systems.

The socio-technical systems perspective has become influential in the analysis of the organizational impact of information technology. The theory views any organization as an open system of interdependent sub-units transforming inputs to desired outputs. The gainful

employment of any technology hinges on the ability and willingness of users to employ it for worthwhile tasks (i.e., those deemed central to the organization's goals). Socio-technical systems theory has given birth to a framework for technology design that emphasizes holistic job satisfaction (rather than just task performance) and user participation throughout the development process.

Thus, socio-technical theorists recommend the analysis of all stakeholders, not just the direct users of a technology, the formation of planning groups to oversee the design, the performance of prototyping exercises, and the analysis of likely impact the technology will have on the organization. In studying technology acceptance, socio-technical theorists conceptualize acceptance in terms of two competing forces: control and enhancement. Control factors are those that impose rules or structures upon the users, thereby removing autonomy (control over their own actions) from them. Among the control issues raised with respect to technology design are: access, reliability, confidentiality, monitoring, pacing, stress, social contact. Low or high presence of certain factors (e.g., low reliability, high pacing) with the introduction of a new technology is likely to reduce the user's perception of control and thus increase the risk of resistance (Connor, 1997).

### **Technological Diffusion Theory**

This theory originated in communication to explain how an idea or product gains momentum and spreads through a specific population or social system and was developed by Rogers (1962). Technology diffusion theory is the common lens through which theorists study the adoption and development of new ideas. Diffusion is defined basically as the process by which an innovation is adopted and gains acceptance by individuals or members of a community. The Diffusion theory represents a complex number of sub-theories that collectively study the processes of adoption. The most famous account of diffusion research by Rogers (1995) where the definition of diffusion comprises of four elements which are defined as innovation, communication channels, time and social system.

Rogers (1995) also came up with the perceived attributes theory that assumes that innovation bears the following characteristics: Relative advantage: degree in which an advantage is perceived as better than the idea it supersedes, Compatibility: degree that an innovation is seen to be consistent with existing values and norms, Complexity: the degree in which an innovation is seen to be difficult or easy to understand and use.

### **2.3 Empirical Review**

The study of Beccalli (2005) investigated whether investment in information technology (IT) influences the performance of banking, using a sample of 737 European banks over the period 1994 – 2000. Using simple correlation coefficients, the findings revealed a negative and statistically significant correlation between profit efficiency and information technology. The study of Ho and Mallick (2006) affirmed the findings of Beccalli (2005). The study analyzed how IT-related spending affect bank profits via competition in financial services that are offered by the banks. The study utilized a Hotelling model to examine the differential effects of the IT on moderating the relationship between costs and revenue. The impact of IT on profitability was

estimated using a panel of 68 US banks over 20 years. The study found that bank profits declined due to the adoption and diffusion of IT investment, reflecting negative network effects in the banking industry. To corroborate this view Hernando and Nieto (2006) found that the impact of ICT investment on bank's performance takes time to appear. They studied 27 commercial banks operating over a period of 9 years using Panel regression analysis to determine Return on Asset, Return on Equity, ICT cost, and Marketing costs. The investment in ICT becomes significant after one and half years in for ROA and after three years for ROE.

Mashal (2006) examined the effect of IT investment in the profitability of the Arab Bank in Jordan, during the period 1985 to 2004. The results indicated that there are substantial returns due to an increase in investment in IT capital, a fact which incentivizes the bank's management to shift its emphasis on IT investment from labour to capital. Similarly, Casolaro and Gobbi (2007) analyzed the effects of investment in IT on the financial sector using micro-data from a panel of 600 Italian banks from the period between 1989 and 2000. Stochastic cost and profit functions were estimated allowing for individual banks' displacements from the best practice frontier and for non-neutral technological change. The results showed that both cost and profit frontier shifts were strongly correlated with IT capital accumulation. Furthermore, Stella (2010) assessed the impact of ICT on the productivity of the Nigerian banking sector. The Transcendental Logarithmic Production function and the CAMEL rating were used for the study. The Results showed that bank output such as loans and other assets increased significantly with changes in expenditure on ICT. ICT labour expenses impacted more on bank output than capital expenditure on ICT gadgets. Abdulrahman and Altmimi (2015) evaluated the effect of investment in information and communication technologies on the profitability and performance of the Jordanian commercial banks. The study used Cobb-Douglas production function as a proxy to measure these effects. The study used two measures of profit: ROA and ROE as dependent variables for this purpose, depending on the annual reports of the sample Jordanian commercial banks as a source for the raw data that was used in the analysis for the period between 2006 and 2013. Multiple regression was used as a statistical tool for the analysis. From the analysis of the study, the study found that there is a positive effect of investment in information and technologies on the profitability and performance of the sample Jordanian commercial banks used in this research. However, this present study concentrates on the effects of ICT on the performance of listed insurance companies in Nigeria using ROA as performance proxy.

Most of the studies conducted in Nigeria on the impact of ICT investment and firm performance focused more on the banking sector. Majority of the studies found positive and significant relationship between both variables. Adejola (2011) investigated Information and Communication investments in Nigerian Financial institutions with emphasis on their impact on earnings. Annual statements of accounts of eight (8) sampled banks were used to collect data on net income (the dependent variable) against the various investments of banks, which include ICT investments, investments in non-ICT labour and other investments for a period of ten years (1998 to 2007). Multiple regression analysis was used to test the hypothesis on whether or not ICT applications and investments significantly contribute to the net income of Nigerian financial institutions. The study revealed that ICT investments do not contribute significantly to the

earnings of Nigerian banks. Ugwuanyi and Ugwuanyi (2013) also found that information technology expenditure has a negative relationship with bank profitability indicating that IT expenditures of all the studied banks do not increase bank profitability, but rather decreases it insignificantly. The study evaluated the effect of information technology investment on bank returns. Employing OLS stated in a multiple form was applied to data generated from a sample of banks that survived the 2005 regulatory bank consolidation exercise in Nigeria.

However, Dandago and Farouk (2012) investigated the impact of investment in information technology on the return on assets of selected banks in Nigeria for the period 2000-2010, using independent variables which comprise of software, hardware investment, and number of ATMs, while the financial performance as a variable is proxied by the return on assets. The study employed secondary data generated from annual reports and accounts of selected banks quoted in the NSE. The data were analyzed using multivariate regression analysis. It was found that investment in ICT software, hardware investment and number of ATMs had a significant impact on financial performance of Nigeria. Upholding the study of Dandago and Farouk (2012) Hassan (2013) examined the relationship between IT investment and corporate performance in the Nigerian banking sector. The study made use of secondary data sourced from the Central Bank of Nigeria statistical bulletin, the National Bureau of Statistics and archives of the four (4) selected banks (using their websites) for the variables between 1986 and 2011. The model for the study has as its dependent variable the banks' net income and its explanatory variables are investments on ICT, investment on other assets and annual operating cost. Using the Pooled regression techniques; the study revealed that there is a strong positive relationship between the banks' net income and the annual investment in ICT by the selected banks. That is, ICT has greatly impacted positively and significantly on bank operations in Nigeria given the period of study.

Empirical studies on ICT and Insurance companies focused more on the effect of ICT adoption on profitability not on the effect of investment on ICT. Jimoh (2012) examined the impact of the information system on insurance business in Nigeria. The study collected data from Royal Exchange Insurance Nigeria Plc using primary sources of Questionnaire and Interview methods. 50 copies of questionnaire were administered among the staff of the Kano branch of the insurance company. The study used the 30 copies of the questionnaire that were valid. Simple percentage descriptive statistics method was used for data presentation. The study used Chi Square method to analyze the data and test the hypothesis. The study concludes from the test that information system has a significant impact on insurance business. Also, Fadun (2013) examined the impact of ICT on insurance companies' profitability which identifies the imperatives for adoption of ICT to promoting effective and efficient service delivery in the insurance industry as a strategy for attainment of the profit maximization objectives of insurance companies in Nigeria. The study is an empirical design which utilizes responses of structured questionnaire of 152 respondents from 18 insurance companies to explore the impact of ICT adoption on quality of service delivery and profitability of insurance companies in Nigeria. The study concludes that there is a positive relationship between ICT adoption and insurance companies' profitability in Nigeria. The limitation of this study is its use of survey design which

could be bias and subjective. On the contrary Malit and Muendo (2017) found that ICT investment cost affects the performance of insurance sector in Kenya negatively even though it offers potential for significant organizational improvement and competitive advantage. ICT investment does not always translate into monetary rewards in insurance sector. The study set out to establish the effect of information communication technology strategy implementation on performance of insurance sector in Kenya. The study adopted a descriptive cross-sectional survey. The population of study was 50 insurance companies and a sample of 150 respondent in Kenya.

### **3. METHODOLOGY**

Ex-post Facto research design is adopted for this study. The population of this study is made up of the 25 listed insurance companies on the Nigerian Stock Exchange from year 2012 to 2018. In this study, statistical sampling technique was not used due to the small size of the population; however listed insurance companies studied are selected based on filtering method using the criterion stated below:

- i. The insurance firm to be selected as part of the sample size must have been listed on the Nigerian stock Exchange all through the period under consideration that is, 1<sup>st</sup> January 2012 to 31<sup>st</sup> December 2018.
- ii. Insurance companies that have complete data set for the periods of 2012-2018 were selected for this study.

Given the criteria stated above only sixteen (16) listed insurance companies were able to fulfill this criterion, and were examined. The data are collected from the 16 selected insurance companies annual financial reports and Fact books covering the period 2012– 2018. The data comprises of return on assets as proxy for financial performance, investment in ICT Hardware and investment in ICT Software as proxies for ICT investment of selected quoted insurance firms.

#### **Model Specification**

This study used panel regression to analyse the data because the data collected was over a period of time (7 years) for 16 listed insurance companies. This method was adopted because it provides more informative data; Increase in the sample size; allows for the study of dynamic changes in cross-sectional units over time; Study of more complicated behavioral models, including study of time-invariant variables; it reduces collinearity among the variables; gives more degrees of freedom; and controls individual heterogeneity

The regression model for panel data is usually expressed as follow:

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$$

Where:

*i* represent the cross-section; and

*t* represent the time series



Panel regression can be carried out using: Pooled regression, fixed effect or Random effect. In order to determine the panel regression model to be used will depend on the assumptions that is made about the:

1. Intercept ( $\alpha$ ),
2. The slope coefficient ( $\beta$ ) and
3. The error term ( $\varepsilon_{it}$ ).

In order to determine the panel regression model to use the Hausman test would be conducted in making the choice between the fixed effects and random effects approaches. For the panel data, the appropriate choice between the fixed effects and the random effects methods involves investigating whether the regressors are correlated with the individual (unobserved in most cases) effect. The Hausman test investigates whether random effects estimation could be almost as good as the fixed effect model. According to Ahn and Moon (2001), the Hausman statistic may be viewed as a distance measure between the fixed effects and the random effects estimators. The matrix version of the Hausman test is expressed as:

$$[\beta_{RE} - \beta_{FE}] [V(\beta_{FE}) - V(\beta_{RE})]^{-1} [\beta_{RE} - \beta_{FE}]' \sim \chi^2_k$$

Where

K = number of covariates in the specification (excluding the constant)

FE = fixed effects

RE = random effects

$$[\beta_{RE} - \beta_{FE}] [V(\beta_{FE}) - V(\beta_{RE})]^{-1} [\beta_{RE} - \beta_{FE}]' \sim \chi^2_k$$

Thus, we actually test:

**H<sub>0</sub>:** Random effects are consistent and efficient, versus;

**H<sub>1</sub>:** Random effects are inconsistent (as the fixed effects will be always consistent).

The test statistic has an asymptotic (i.e., large sample)  $\chi^2$  distribution with df equal to number of regressors in the model. If the computed chi-square value exceeds the critical chi-square value for given df and the level of significance, we conclude that REM is not appropriate because the random error term are probably correlated with one or more regressors.

**Decision rule:**

1. If Hausman Test accept H<sub>0</sub> or p value > 0.05 then random effect model is chosen.

If Hausman Test accepts H<sub>1</sub> or p value < 0.05 then method we choose is fixed effect

The following model will be analysed:

$$ROA_{it} = \beta_0 + \beta_1 \log(IHW_{it}) + \beta_2 \log(ISW_{it}) + \varepsilon_{it}$$

Where:

$i =$  Number of Firms in the industry, Sixteen (16) insurance companies

$t =$  Period Covered, 7 years

ROA = Return on asset

$\beta_0 =$  Constant parameter

IHW= ICT investment in Hardware

ISW = ICT investment in Software

$\varepsilon =$  Error term

#### **4. RESULTS AND DISCUSSION**

##### **Descriptive Statistics of Variables**

The Table 1 indicates that the mean value of Return on Asset (ROA), investment in ICT hardware (IHW), investment in ICT software (ISW) are 0.349457, 10.13907 and 9.636678 respectively.

A comparison of the mean responses with the maximum values for each of the variables indicates that the insurance industry presently operates at a Return on Asset (ROA) of 34%, investment in ICT hardware (IHW) of 900% and investment in ICT software (ISW) of 1000%. The table also shows the standard deviation of Return on Asset (ROA) to be 1.54, the minimum and maximum values of -2.269 and 7.53 respectively. It implies that the deviation from both sides of the mean is 1.54. This suggests that the data are not widely dispersed from the mean because the standard deviation is less than the mean value. The table also indicates a minimum value of investment in ICT software (ISW) to be 6.905753, and maximum value of 13.07348. The standard deviation value of 1.263961, it implies that the deviation from both sides of the mean is 1.263961. This implies that the data are not widely dispersed from the mean, because the standard deviation is less than the mean value.

The standard deviation of investment in investment in ICT hardware (IHW) is 1.694388, the minimum and maximum values of 4.927254 and 12.44164 respectively. It implies that the deviation from both sides of the mean is 1.694388. This suggests that the data are not widely dispersed from the mean, because the standard deviation is less than the mean value. The probability value of Jarque-Bera test of ROA and IHW are 0.000 and 0.00649 which are less than 5%. It indicates that they are not normally distributed. While ISW has a probability value of 0.496237, it indicates that ISW is normally distributed.

**Table 1: Descriptive Statistics**

|        | ROA      | IHW      | ISW      |
|--------|----------|----------|----------|
| Mean   | 3.025023 | 38515.45 | 57740.96 |
| Median | 3.134732 | 15535.50 | 28723.50 |

|           |           |          |          |
|-----------|-----------|----------|----------|
| Maximum   | 21.03527  | 253125.0 | 476144.0 |
| Minimum   | -28.88107 | 138.0000 | 600.0000 |
| Std. Dev. | 2.082480  | 17270.44 | 35971.99 |

**Source:** Eview 10 Output, 2019.

**Correlation Matrix and Multicollinearity Analysis**  
**Table 2: Correlation Matrix**

|     | ROA       | ISW       | IHW |
|-----|-----------|-----------|-----|
| ROA | 1         |           |     |
| ISW | -0.083233 | 1         |     |
| IHW | -0.095150 | 0.3294636 | 1   |

**Source:** Eview 10 Output, 2019

The correlation matrix is used to determine the correlation between the dependent and independent variables of the study. The table below represents the correlation matrix for the sample observations. Table 2 presents the correlation matrix of the dependent and independents variables. It is observed that the variables correlate fairly well (between - 0.09 and 0.32). There is no correlation coefficient greater than 0.8, hence there is no problem of collinearity of data.

**Post Residual Diagnostic Test**  
**Variance Inflation Factor**

**Table 3: Variance Inflation Factor Table**

| Variable | VIF      | 1/VIF    |
|----------|----------|----------|
| C        | NA       | 0.048851 |
| ISW      | 1.121763 | 0.125412 |
| IHW      | 1.121763 | 0.325611 |

**Source:** Eview 9 Output, 2019

Table 3 presents the variance factor (VIF) and tolerance coefficients of each of the explanatory variables. It is observed that the collinearity diagnosis revealed a VIF well below 10, a tolerance above 0.2. This shows that there is no threat of multicollinearity or independent errors. Researchers suggested that multicollinearity does not constitute a problem when the VIF does not exceed 10 and when the tolerance for each of the variable is above 0.2 (Wasserman & Kutner, 1990).

Table 4 table shows the results of Random panel multiple regressions. The result indicates that the P value of F-statistics is 0.000512 which is less than 5%, this shows that the model is fit and that the model is statistically significant as it implies that all the independent variables are statistically significant. The R square value of 0.35 means that the independent variable contributes 35% to the dependent variable. It also indicates that 35 percent of the variation in return on asset (ROA) can be explained by variability in investment in ICT hardware (IHW) and investment in ICT software (ISW). The remaining 65% are the value of other variables that are not captured in the model. The adjusted R square of 0.31 indicates that any variations that can occur as a result of the introduction of additional independent variable are being taken care of and cannot affect the R square more than 31%. Durbin-Watson value of 2.47 shows there is no serial or auto correlation. Durbin (1970), states that when the Durbin Watson statistic value is above 0.5 or 50 percent, independent observation is assumed. In other words, there is no auto correlation among the residuals of the study. The Durbin Watson statistic value of 2.47 therefore indicates that there is no autocorrelation among the residuals of this study. But the presence of serial correlation will be confirmed with Breusch Godfrey LM serial correlation test.

**Panel Regression Analysis**

**Table 4: Random Effect Model Regression Results**

**Dependent Variable: ROA**

| Variable            | Coefficient | Standard Error | t-statistics                       | Prob     |
|---------------------|-------------|----------------|------------------------------------|----------|
| C                   | 1.185680    | 1.678528       | 0.706381                           | 0.4817   |
| ISW                 | 0.476870    | 0.143653       | 3.535112                           | 0.0068   |
| IHW                 | 0.325897    | 0.136296       | 2.391097                           | 0.0256   |
|                     |             |                |                                    |          |
| R <sup>2</sup>      | 0.35        |                |                                    |          |
| Adj. R <sup>2</sup> | 0.31        |                |                                    |          |
| F-Statistics        | 4.16        |                |                                    |          |
| Prob(F-Statistics)  | 0.000512    |                |                                    |          |
| Hausman Chi2        | 0.600349    |                | Heteroskedasticity                 | 0.4432   |
|                     |             |                | Obs. R-Squared                     |          |
| Hausman Prob>Chi2   | 0.7407      |                | Breusch-Godfrey F-statistic        | 2.957402 |
| Heter. F-statistics | 0.801917    |                | Breusch-Godfrey Observed R-squared | 0.0634   |

**Source: Eview 9 Output, 2019.**

**Test of Hypotheses**

**H<sub>01</sub>:** Investment in ICT Hardware has no Significant Effect on Financial Performance of Listed Insurance Companies in Nigeria.

The regression line  $ROA = 1.185680 + 0.476870IHW + 0.325897ISW$  shows that for every 1percent increase in Investment in ICT Hardware (IHW), ROA increases by 47%. The p-value of 0.0256 is less than the t-value of 0.05. This simply means that the alternative hypothesis is accepted that IHW has significant positive effect on financial performance of listed insurance

companies in Nigeria. It indicates that an increase in Investment in ICT Hardware (IHW) also increase financial performance of listed insurance companies in Nigeria.

**H0<sub>2</sub>:** Investment in ICT Software has no significant effect on Financial Performance of Listed Insurance Companies in Nigeria.

The regression line  $ROA = 1.185680 + 0.476870IHW + 0.325897ISW$  shows that for every 1percent increase in Investment in ICT Software (ISW), ROA increases by 32%. The p-value of 0.0068 is less than t-value of 0.05. This simply means that the alternative hypothesis is accepted that ISW has a significant positive effect on financial performance of listed insurance companies in Nigeria.

The empirical evidence derived from the Panel Random effect regression model indicates that Investment in ICT Hardware and software both have significant positive effect on financial performance of listed insurance companies in Nigeria. It shows that investment in ICT hardware has significantly enhanced their financial performance. The significant positive association between Investment in ICT and financial performance is consistent with prior findings of Mashal (2006); Casolaro and Gobbi (2007); Dandago and Farouk (2012); Hassan (2013); Abdulrahman and Altmimi (2015). But contradicts Lingam (2004); Beccalli (2005); Hernando and Nieto (2006); Ho and Mallick (2006); Adejola (2011); Ugwuanyi and Ugwuanyi (2013) who found that investment in ICT does not improve financial performance of corporate organizations.

Socio-Technical Systems Theory supports the findings of this study because the theory views organizations as an open system of interdependent sub-units transforming inputs to desired outputs. The theory believes that the gainful employment of any technology hinges on the ability and willingness of users to employ it for worthwhile tasks. Socio-technical systems theory has given birth to a framework for technology design that emphasizes holistic job satisfaction and user participation throughout the development process as it has been found by this study that investment in ICT has significant positive effect on financial performance of listed insurance companies in Nigeria.

## **5. CONCLUSION AND POLICY RECOMMENDATIONS**

The study submits that investment in ICT hardware improves the financial performance of listed insurance companies in Nigeria because it was discovered by this study that investment in ICT hardware has a significant positive effect on financial performance of listed insurance companies in Nigeria. The study also concludes that investment in ICT software increase financial performance of listed insurance companies in Nigeria, the level of investment made on ICT software by listed insurance companies in Nigeria increases their profitability.

Based on the conclusions of this study, the study recommends that listed insurance companies in Nigeria should be bold in their adoption and investment in ICT because it would enhance their service delivery and thus increase the profitability.

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