INTELLECTUAL CAPITAL AND ECONOMIC VALUE ADDED OF QUOTED INFORMATION COMMUNICATION AND TECHNOLOGY FIRMS IN NIGERIA

Tom-West Richma[1]; Okoye, Pius Vincent Chukwubuikem[1]; Amahalu, Nestor Ndubuisi[1]

[1]Department of Accountancy, Nnamdi Azikiwe University Awka, Anambra State, Nigeria.

IJMSSSR 2021
VOLUME 3
ISSUE 5 SEPTEMBER - OCTOBER **ISSN: 2582 - 0265**

Abstract: The aim of this study is to ascertain Intellectual Capital (IC) performance and its relationship with Economic Value Added (EVA) of quoted Information, Communication and Technology (ICT) firms in Nigeria for the periods of 2010-2019. This research relies on an empirical model using Value Added Intellectual Coefficient (VAIC™) to measure IC performance through predictive analysis. VAIC™ has three major components Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE). Using data drawn from the sample size of eight (8) quoted ICT companies' annual reports and accounts, this study employed inferential statistics using Correlation coefficient, Panel Least Square (PLS) regression models, Granger Causality test and Hausman test to examine the relationship between Intellectual Capital effiency and firms' Economic Value Added via E-Views 9.0 statistical software. Ex-Post facto research design was adopted. The empirical results revealed that Human Capital Efficiency (HCE) has a significant positive relationship with Economic Valued Added at (P <0.05), Structural Capital Efficiency (SCE) exhibited a significant positive relationship with Economic Valued Added at (P<0.05) and Capital Employed Efficiency (CEE) exhibited a significant positive relationship with Economic Valued Added at (P<0.05). It was suggested inter alia that ICT firms should invest more on IC to enable them get more per unit value of human capital, structural value and capital employed.

Keywords: Human Capital Efficiency, Structural Capital Efficiency, Capital Employed Efficiency, Economic Value Added

Introduction

In the knowledge-based economy, the intellectual capital (IC) of the organization is to create value in today's world; the success of any organization depends upon the ability to manage these assets. Today, the growing importance of intellectual capital as an effective tool is for enhancing the competitiveness of our companies. Measuring intellectual capital in order to compare different companies is necessary to determine their true value and improve their controls. Knowledge of today's top tools of economics is, where heroic acts economics, science and technology, there is increasing use of information. Knowledge-based companies have a large proportion of their investments in intangible assets and for finance and accounting management for companies that traditionally have unobtrusive performance in different financial situations did not reflect a real challenge of remains. Intellectual capital assets are strategic resources that should be properly managed in order to derive maximum benefits from them. Effective management of these assets helps in their recognition, measurement and reporting (Amahalu, Okoye, Obi & Iliemena, 2019). Measuring the benefits gained from possessing intellectual capital and the value of these assets has both internal and external purposes. In terms of internal purposes, a company would measure intellectual capital in order to manage its resources more effectively, and will, thereby, minimise costs. On the other hand, measuring intellectual capital for external purposes would require verifiable information that signals the expected growth of the company to existing and potential investors, and to other external users of the information. Management, investors and other stakeholders need to be aware of a company's performance to enable them to make informed decisions about the future. Measuring the financial performance of a company is therefore important. The variety of performance measurements and the diversity of companies make this a complex task. The measure decided on by an organisation will be determined by what a business is trying to achieve and the performance being measured (Ogbodo Amahalu & Abiahu, 2017)..

Economic Value Added (EVA™) is one of a number of measures available to determine an organisation's performance. EVA™ reflects the residual wealth calculated by deducting cost of capital from the operating profit (adjusted for taxes on a cash basis) (Stewart, 1990). The true benefits of the EVA™ measurement are realised

when management understands what the profitability of their organisation entails and they become motivated to improve such profitability based on the findings of the measure. The goal of all companies is to create value for the shareholders. In addition, (Iliemena, Goodluck & Amahalu, 2019) states that, when long-term EVA™ is maximised, the company will be maximising its own value. According to Stewart (1990), EVA™ may be viewed as a measure of value as well as a measure of performance. EVA™ can be used to set goals, evaluate performance, determine bonuses, communicate with investors and budget for capital expenditure (Stewart, 1990). The purpose of the study on which this study is based was to determine the extent to which EVA™ is used as a performance measure by Information, Communication and Technology (ICT) organisations in Nigeria. Furthermore, this investigation focused on why EVA™ is implemented or not implemented by companies in Nigeria. Some sub-problems that were identified and investigated are the understanding of organisations of the definition of EVA™, the way organisations calculate EVA™ and deviations from the Stern Stewart EVA™ model as well as hybrid forms of EVA™ used by organisations.

Statement of the Problem

The emergence of a knowledge-based economy has changed the corporate nature of work. There are changes in the value of corporate performance parameters, as well as their perception. In this century, business communities across the globe agree that knowledge assets are becoming more critical to the corporate value creation process than physical production factors. This is particularly true for knowledge-intensive sectors, such as information communication and technology sector. Unfortunately, traditional accounting conventions are unable to accommodate the need to report knowledge assets. Thus, this phenomenon has created a significant disparity between a company's market and book values. As many researchers have noted, the large gap between a company's book and market values results from failures to report some 'hidden value' in the annual report. One could argue that this gap reflects excessive speculations by market players. However, in the long run, the discrepancy between market value and book value may be better explained by the change in the sources of value creation as economies have moved from tangible assets to intellectual capital (IC). Assessing the performance of IC is important because it measures the efficiency of value creation activities, which is not reflected in financial statements under the traditional reporting system. In an attempt to bridge the gap in performance measurement, this present study employed the use of modern value-based performance measurement (Economic Value Added); for the sectoral gap; this study focused on Information Communication and Technology (ICT) sector for a ten year period ranging from 2010 to 2019. Unlike prior studies (for instance, Olayinka & Uwalomwa, 2011; Banimahd, Mohammadrezaei & Mohammadrezaei, 2012; Baker, 2014, Ogbodo, Amahalu & Abiahu, 2017) that employed traditional accounting performance measures, such as Earnings per Share (EPS), Earnings on Invested Capital (EOIC), Return on Investment (ROI), Return on Assets (ROA) and Return on Equity (ROE) with a major concentration on financial institutions.

Objectives of the Study

The main objective of this study is to establish the relationship between Intellectual Capital (IC) and Economic Value Added of quoted ICT firms in Nigeria.

Specifically, this study determined:

i. The relationship between Human Capital Efficiency (HCE) and Economic Value Added of quoted ICT firms in Nigeria.
ii. How Structural Capital Efficiency (SCE) relates with Economic Value Added of quoted ICT firms in Nigeria.
iii. The relationship between Capital Employed Efficiency (CEE) and Economic Value Added of quoted ICT firms in Nigeria.

Research Hypotheses

In line with the research questions above, the following null hypotheses were hypothesized:

H_{o1}: There is no significant relationship between Human Capital Efficiency (HCE) and Economic Value Added (EVA) of quoted ICT firms in Nigeria.

H_{o2}: There is no significant relationship between Structural Capital Efficiency (SCE) and Economic Value Added (EVA) of quoted ICT firms in Nigeria.

H_{o3}: There is no significant relationship between Capital Employed Efficiency (CEE) and Economic Value Added (EVA) of quoted ICT firms in Nigeria.

Review of Related Literature

Intellectual Capital

Edvinsson and Malone (1997), define intellectual capital as the sum of human capital and structural capital. It involves applied experience, organizational technology, customer relationships and professional skills that provide an organization with a competitive advantage.

Intellectual capital is a concept that classifies all intangible resources as well as their interconnections. Intellectual capital constitutes resource created, purchased, or maintained by an enterprise, which possess no material form; these resources, together with material and financial assets of the enterprise, help to create added value.

Human Capital

Human capital is defined as the knowledge that employees take with them when they leave the firm. It includes the knowledge, skills, experiences and abilities of people. Some of this knowledge is unique to the individual, some may be generic. This includes individual capabilities, competencies, talents, communications, knowledge and experience of staff and managers (Okoye, Okoye, Amahalu & Obi, 2014). Human capital is established and used when the employee devote much of their time and talent to the activities that lead to innovation. Human capital can grow in two ways: when the organization mostly uses the knowledge of individuals or when individuals are useful for the organization beyond the level of their knowledge (Stewart, 1997).

Structural Capital

Structural capital is defined as the pool of knowledge that stays with the firm at the end of the working day. It comprises the organisational routines, procedures, systems, cultures, databases and so on (Ecowas. Omojolaibi, Oladipupo & Okudo. 2019).. Some of them may be legally protected and become Intellectual Property Rights, legally owned by the firm under separate title. It is the knowledge that exists in the organization. This asset belongs to the whole company and it can be reproduced and traded with others. Capital structure includes technologies, inventions, innovations, publications and business processes. (Stewart 1997).

Customer Capital (Relational Capital)

Relational capital is defined as all resources linked to the external relationships of the firm such as customers, suppliers or Research and Development partners. It comprises that part of Human and Structural Capital dealing with the company's relations with stakeholders (investors, creditors, customers, suppliers), plus the perceptions that they hold about the company. This capital represents the value of current and ongoing relationships with individuals or organizations that provide them with services (Amahalu, Okoye, & Obi, 2018).. Customer capital indicators include market share, customers' maintenance, and profit gained from each client. customer capital, which plays the role of intervening bridge in the process of intellectual capital, is the main determinant in the transformation of intellectual capital to market value and the organization's business performance (Qelichlee, 2005).

Economic Value Added (EVA)

EVA measures the difference between the return on company's capital and the cost of that capital. EVA is a measurement of the true economic profit generated by a firm (Stewart, 1997) and is calculated by comparing a

firm's net operating profit after tax (NOPAT) to the total cost all its forms of capital which includes debt as well. If NOPAT exceeds the cost of capital, it gives a positive EVA and on the other hand, if the NOPAT is less than the cost of capital, it gives a negative EVA. The word capital includes all the assets invested in the firm taking into consideration the deduction of the current liabilities which are not entitled to any interest from those assets and the equity (Amahalu, Nweze, & Obi, 2017). Accordingly, EVA represents company's profit which is net of the cost of both debt and equity capital invested in the business (Stewart, 1997).

Human Capital Efficiency and Economic Value Added

Human capital is the components that emerged from the concept of intellectual capital (Bontis, William & Richardson, 2000; Tan, David & Hancock, 2007). Human capital is the most important asset that exists within a firm. It represents the human factor in an organisation where by combination of intelligence, skills, knowledge, aptitudes and expertise that gives the organisation its distinctive character which those traits contributing to production and profitability, thus improve organizational performance (Okudo & Ndubuisi, 2021). Additionally, Yusuf (2013) argued that the ability of a corporate organization to successfully implement business strategies solely depends on efficient use of intangibles asset, particularly human capital. Previous studies have shown that there is a significant relationship between human capital efficiency and organizational performance (Amahalu, Abiahu, Obi & Okika, 2016). According to Parham and Heling (2015) human capital positively affects organizational performance because it can generate significant value for companies and provide them with sustainable competitive advantage.

Structural Capital Efficiency and Economic Value Added

Structural capital is the supportive infrastructure that enables the rest of an organization to function in a repeatable, scalable way. It is owned by an organization and remains with an organization even when people leave (Okoye, Okoye & Amahalu, 2015). Structural capital includes processes, data, systems, designs, and knowledge. Some structural capital qualifies for special legal protection as intellectual property such as patents, trademarks, copyrights and trade secrets (Okudo, Omojolaibi & Oladele, 2021). Chu, Lin, Hsiung, and Liu, (2006) studied the relationship between the components of intellectual capital and value with the value/performance of the Industrial Technology Research Institute. They found that intellectual capital is positively associated with performance and that intellectual capital is highly relevant to the value creation process and warrant strategic accumulation for R&D organizations. Tseng (2006) studied the relationship between human capital, innovation capital, and organizational performance companies. The results showed that Research and Development intensity and the number of patents have significant effects on organizational performance and that the interactive impact between the number of patents and salary per employee is significantly related to organizational performance.

Capital Employed Efficiency and Economic Value Added

Traditionally land, labor and capital were considered to be the most valuable assets in economics. Since time conventional physical assets were considered to be the main determinants of the performance of any economic activity. But the fast expansion of science, technology and finally the globalization altered the pattern and structure of the production system (Omojolaibi, Okudo & Shojobi, 2019). Companies like software, finance, pharmaceutical; banking, hotel etc. depend to a considerable extent on the intellectual capital for earning revenues. Production or Manufacturing companies use Intellectual Capital with its physical assets to sharpen their competitive edge. Amahalu, Abiahu, Nweze and Obi (2017) found that enterprises, which have managed their intellectual capital better, had achieved stronger competitive advantage than the general enterprises. Also they reported that companies which had strengthened their own intellectual capital management compared to the others had performed better. Makki and Lodhi (2009) claimed that intellectual capital management played an important role on the long-term business performance of an enterprise.

Theoretical Framework

Knowledge-Based Theory

The knowledge-based theory of the firm considers knowledge as the most strategically significant resource of a firm. Its proponents argue that because knowledge-based resources are usually difficult to imitate and socially

complex, heterogenous knowledge bases and capabilities among firms are the major determinants of sustained competitive advantage and superior corporate performance. This knowledge is embedded and carried through multiple entities including organizational culture and identity, policies, routines, documents, systems, and employees. Originating from the strategic management literature, this perspective builds upon and extends the resource-based view of the firm (RBV) initially promoted by Penrose (1959) and later expanded by others (Wernerfelt 1984, Barney 1991).

Empirical Studies

Yusuf (2013) investigated the relationship between human capital efficiency and financial performance of quoted Nigerian banks. Two hypotheses Human capital efficiency has no significant impact on the EPS of Nigerian banks and Human capital efficiency has no significant impact on the ROE of Nigerian banks were tested. The study found that efficient utilisation of human capital does not have any significant impact on the return of equity of banks. Also the size of a bank has no significant impact on it return on equity, while the return on equity of banks cannot be predicted by human capital efficiency and size of the banks.

Bahman and Mohsen (2015) investigated the relationship among intellectual capital, social capital and staff's productivity in bank on 185 staff using simple randomized method. Data was collected using questionnaire and was analyzed using Pearson correlation and regression coefficient. Their findings showed a high positive correlation between social capital dimensions, intellectual capital dimensions and productivity of human resources.

Momeni and Esmaeli (2015) investigated the effect of intellectual capital on shareholders' equity and debt costs. Pulic model was used, using data collected from the financial statements of 67 firms listed in Tehran Stock Exchange from 2003 to 2013, with the use of regression method. Their results indicated that there is a negative relationship between intellectual capital and share holders' equity and with debt costs.

Ogbodo, Amahalu and Abiahu (2017) determined the effect of intellectual capital on the financial performance of quoted commercial banks in Nigeria. This study adopted panel data analysis of all the banks quoted on the Nigerian Stock Exchange as at 31st December 2015 for a period of six years (2010 – 2015). The population is made up of the 15 banks listed on the floor of the Nigerian Stock Exchange as at 31st December, 2015. This study made use ex-post facto research design. Data were gotten from secondary sources obtained from fact books, annual reports and accounts of the selected quoted commercial banks in Nigeria as at 31st December, 2015. The relevant data obtained were subjected to statistical analysis using Pearson coefficient of correlation, ordinary least square regression, heteroskedasticity test and Hausman test. The analysis of data was done using the Value Added Intellectual Coefficient (VAIC) made to measure the efficiency of value added of tangible and intangible assets used by a firm in its operation. The results of this study revealed that there is a positive and statistically significant relationship between Intellectual Capital and financial performance of deposit money banks in Nigeria at 5% level of significance. The study recommended the recognition of intellectual capital as an important business resource.

Methodology

This study was treated as *ex-post facto* research since it would rely on historical data. This would be appropriate because *ex-post facto* research aims at measuring and establishing the relationship between one variable and another or the effect of one variable on another, in which the variables involved are not manipulated by the researcher.

Population of the Study

The population of this study consists of all the eleven (11) ICT companies trading on the floor of Nigeria Stock Exchange as at 31st December, 2019. They include; Chams Plc, Courtville Business Solutions Plc, CWG Plc, E-Tranzact International Plc, Mass Telecommunication Innovations Plc, MTECH Communications Plc, NCR (Nigeria) Plc, Omatek Ventures Plc, Tripple Gee and Company Plc, Starcomms Plc, IHS Plc.

Sample Size and Sampling Method

Eight (8) ICT companies were purposively selected as the sample size of this study with the utilization of Purposive sampling method. They include: Chams Plc, Courtville Business Solutions Plc, E-Tranzact International Plc, Mass Telecommunication Innovations Plc, MTECH Communications Plc, NCR (Nigeria) Plc, Omatek Ventures Plc, Tripple Gee and Company Plc.

Source of Data

This study made use of secondary data precisely. The data were sourced from publications of the Nigerian stock exchange (NSE), fact books and the annual report and accounts of the selected quoted ICT companies

Measurement of Variables

Independent Variables

This study includes three independent variables: Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE), are components of the Value Added Intellectual Coefficient (VAIC), which is a measure of the company's IC in this research.

$$VAIC_i™ = HCE_i + SCE_i + CEE_i \quad (1)$$

Where;

$VAIC™_i$ = Value added intellectual coefficient for company i

HCE_i = Human capital efficiency for company i= VA/HC [a]

SCE_i = Structural capital efficiency for company i = SC/VA [b]

CEE_i = Capital employed efficiency for company i = VA/CE [c]

The VAIC™ value is based on three main sources of efficiency: human capital efficiency (HCE), structural capital efficiency (SCE) and capital employed efficiency (CEE). The first step in calculating VAIC™ is to determine the company's value added. Value added (VA) is defined as output less input and represents the value created by the company in a particular financial period.

Human capital (HC), structural capital (SC) and capital employed (CE) for company i are calculated as follows:

HC_i (Human capital) = salaries and wages

SC_i (Structural capital) = $VA_i - HC_i$

CE_i (capital employed) = Total tangible assets less total liabilities

The HCE_i ratio is derived by dividing VA_i created by the company over its total salaries and wages (HC_i) [a]. This calculation assumes that HC_i is an investment rather than an expense, which is consistent with recognising all human capital as an asset. Thus, salaries and wages should no longer be in an item in the profit and loss account. Instead, they should be recognised as assets on the balance sheet (Pulic, 2000). Accordingly, the ratio indicates the company's value added for every unit of money invested in human capital in the current year.

Structural capital (SC_i) is computed by subtracting HC_i from VA_i. Pulic (1998) argues that there is a proportionate inverse relationship between HC_i and SC_i. Thus, structural capital efficiency ratio (SCE_i) is obtained by dividing SC_i over VA_i [b]. Likewise, the SCE_i ratio shows the ratio of structural capital to a unit of the company's value added money.

Finally, capital employed (CE_i) is the net sum of physical and financial assets. The capital employed efficiency ratio (CEE_i) is CE_i [c] divided by VA_i. A large CEE ratio reflects a large contribution by a unit of money invested in

physical assets to the company's value added and vice versa. The overall measure of value added efficiency generated by the entire resource base (proxied by VAIC™ value) is obtained by adding HCE, SCE and CEE.

Dependent Variables

The dependent variable in this study is Economic Value Added (EVA):

EVA = NOPAT – Capital Costs
→ NOP (1-T) – Capital Employed x Cost of Capital
→ Adjusted NOP (1-T) – Capital Employed x WACC
→Adjusted NOP (I-T) – Capital Employed x $\{R_e \times \frac{E}{CE}) + (R_d \times \frac{D}{CE})(I-T) + \ldots\}$
→Return – Capital Employed x WACC

→(Rate of ROI – WACC) Capital Employed …(eq i)

Model Specification

$EVA_{it} = \beta_0 + \beta_1 HCE_{it} + E_{it}$ - - - - **Model 1**

$EVA_{it} = \beta_0 + \beta_1 SCE_{it} + E_{it}$ - - - - **Model 2**

$EVA_{it} = \beta_0 + \beta_1 CEE_{it} + E_{it}$ - - - - **Model 3**

Legend:

β_o = Constant term (intercept)

β_{it} = Coefficients to be estimated for firm i in period t

E_{it} = Error term/unexplained variable(s) for firm i in period t

EVA = Economic Value Added for firm i in period t

HCE = Human capital efficiency

CEE: Capital Employed Efficiency

SCE: Structural Capital efficiency

Data Presentation and Analysis

Table 1 Pearson Correlation Matrix

	EVA	HCE	SCE	CEE
EVA	1.000	0.145	0.350	0.279
HCE	0.145	1.000	0.418	-0.146
SCE	0.350	0.418	1.000	0.252
CEE	0.279	-0.146	0.252	1.000

Source: E-Views 9.0 Output, 2021

Interpretation of Correlation Analysis

The Pearson correlation analyses in table 1 shows that, under the univariate correlation, EVA is positively related with HCE (0.145), SCE (0.350) and CEE (0.279).

Test of Hypotheses

Test of Hypothesis I

H_{o1}: There is no significant relationship between Human Capital Efficiency (HCE) and Economic Value Added (EVA) of quoted ICT firms in Nigeria.

H_1: There is significant relationship between Human Capital Efficiency (HCE) and Economic Value Added (EVA) of quoted ICT firms in Nigeria.

Table 2: Panel Least Regression analysis showing the relationship between EVA and HCE

Dependent Variable: EVA
Method: Panel Least Squares
Date: 03/10/21 Time: 07:00
Sample: 2010 2019
Periods included: 10
Cross-sections included: 8
Total panel (balanced) observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.030935	0.010374	2.981940	0.0038
HCE	0.008390	0.004859	5.726639	0.0000

R-squared	0.436814	Mean dependent var	0.047759
Adjusted R-squared	0.424466	S.D. dependent var	0.032261
S.E. of regression	0.031864	Akaike info criterion	-4.029977
Sum squared resid	0.079196	Schwarz criterion	-3.970426
Log likelihood	163.1991	Hannan-Quinn criter.	-4.006101
F-statistic	10.98281	Durbin-Watson stat	1.855882
Prob(F-statistic)	0.000019		

Source: E-Views Regression output, 2021

Interpretation of Regression Coefficient Result

The following regression equation was obtained from table 2:
EVA = 0.030935 + 0.008390HCE
Using the above model, it is possible to determine the relationship between EVA and HCE. Holding all other factors constant, an increase in one unit/naira of the explanatory variable (HCE) results into a corresponding increase in one unit of EVA, this means that a positive relationship exists between the explanatory variable and EVA.

The slope coefficient shows that that the probability values: $P(x_1=0.0000<0.05)$ is less than the critical P-value of 0.05. This implies that HCE has a significant positive relationship with EVA at 5% significant level Results in

table 4.3 indicate that the R-squared for the model is 0.437, meaning that the regression model used for this study is a good predictor. The independent variables explained 43.7% of the variation in SE. Only 56.3% of variation in EVA is not explained by the regression model. The Durbin-Watson value of 1.855882 indicates the absence of serial correlation in the model. The P-Value of the test Prob(F-statistic) = 0.000000 is less than the α-value of 0.05; therefore H_1 is accepted and Ho is rejected.

Table 3: Hausman Test Result

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	10.22459	1	0.0084

Source: E-Views Regression Output 9.0, 2021

Panel Hausman Test Rule

H_O: Random effect model is preferred to fixed effect model
H_1: Fixed effect model is preferred to Random effect model

Interpretation

If the P-value > 5% Accept H_O
If the P-value < 5% Accept H_1

Table reveals that that P-value = 0.0084 is less than 5%. Hence, fixed effect model is preferred to random effect model, thus, H_1 is accepted. Conclusively, HCE has a significant positive relationship with EVA of quoted ICT firms in Nigeria at 5% level of significance.

Test of Hypothesis II

H_{o2}: There is no significant relationship between Structural Capital Efficiency (SCE) and Economic Value Added (EVA) of quoted ICT firms in Nigeria.

H_2: There is significant relationship between Structural Capital Efficiency (SCE) and Economic Value Added (EVA) of quoted ICT firms in Nigeria.

Table 4: Panel Least Regression analysis showing the relationship between EVA and SCE

Dependent Variable: EVA
Method: Panel Least Squares
Date: 03/10/21 Time: 07:07
Sample: 2010 2019
Periods included: 10
Cross-sections included: 8
Total panel (balanced) observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.045615	0.006226	7.326265	0.0000
SCE	0.023366	0.007949	5.423490	0.0000

R-squared	0.522294	Mean dependent var	0.047759
Adjusted R-squared	0.500497	S.D. dependent var	0.032261
S.E. of regression	0.032430	Akaike info criterion	-3.994764
Sum squared resid	0.082035	Schwarz criterion	-3.935213
Log likelihood	161.7906	Hannan-Quinn criter.	-3.970888
F-statistic	14.19344	Durbin-Watson stat	1.817093
Prob(F-statistic)	0.000000		

Source: E-Views 9.0. Regression Output, 2021

Interpretation of Regressed Result

The regressed coefficient correlation result in table 4 shows the existence of a positive relationship between SCE (β_1=0.023366) and EVA. The probability value of the slope coefficient shows that P(x_1=0.0000<0.05). This implies that SCE has a positive and statistically significant relationship with EVA at 5% level of significance. Furthermore, the R- squared which is the coefficient of determination shows the magnitude of variations caused on EVA by the explanatory variable (SCE) to be about 0.522. This indicates that about 52.2% variation in EVA is attributed to the influence of the explanatory variable while the remaining 47.8% is caused by other explanatory factors outside this model and this is captured by the error term. The Durbin-Watson value of 1.817093 indicates the absence of serial correlation in the model. The value of Prob(F-statistic) at 0.000000 indicates that the overall regression model is statistically significant and is useful for prediction purposes at 5% significance level.

Model Specification:

EVA= 0.045615 + 0.023366SCE
The model shows that for there to be one unit/naira increase in EVA, there will be 0.023366 multiplying effect of SCE. The P-value of the test (Prob > F = 0.000000) is less than 0.05. In view of the rule of thumb, H_1 will be accepted and H_0 rejected.

Table 5: Hausman Test Result

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	11.63431	1	0.0042

Source: E-Views 9.0 Regression Output, 2021

Table 5 reveals that that P-value = 0.0042 is less than 5%. Hence, fixed effect model is preferred to random effect model, thus, H_1 is accepted. Conclusively, this study upholds that SCE has a significant positive relationship with EVA of quoted ICT firms in Nigeria at 5% level of significance.

Test of Hypothesis III

H_{o3}: There is no significant relationship between Capital Employed Efficiency (CEE) and Economic Value Added (EVA) of quoted ICT firms in Nigeria.

H_3: There is significant relationship between Capital Employed Efficiency (CEE) and Economic Value Added (EVA) of quoted ICT firms in Nigeria.

Table 6: Panel Least Regression analysis showing the relationship between EVA and SCE

Dependent Variable: EVA

Method: Panel Least Squares

Date: 03/10/21 Time: 07:14

Sample: 2010 2019

Periods included: 10

Cross-sections included: 8

Total panel (balanced) observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.041516	0.004159	9.982279	0.0000
CEE	0.082136	0.030185	2.721084	0.0080

R-squared	0.486697	Mean dependent var	0.047759
Adjusted R-squared	0.474988	S.D. dependent var	0.032261
S.E. of regression	0.031028	Akaike info criterion	-4.083155
Sum squared resid	0.075095	Schwarz criterion	-4.023604
Log likelihood	165.3262	Hannan-Quinn criter.	-4.059279
F-statistic	7.404299	Durbin-Watson stat	1.891166
Prob(F-statistic)	0.008021		

Source: E-Views 9.0, 2021

Interpretation of Regressed Result

Table 6 shows a positive and statistically significant relationship between EVA and CEE as indicated by the coefficient factor; β_1= 0.082136. The coefficient of determination obtained which is commonly referred to as R-squared is 0. 487. The cumulative test of hypothesis using R^2 to draw statistical inference about the explanatory variable employed in this regression equation, shows that 48.7% of the systematic variations in the dependant variable (EVA) can be predicted by the CEE while 51.3% was explained by unknown variables that were not included in the model. The prob. (F-statistic) which is used to test the overall significance of a model reveals that the tested variables have a statistically significant relationship at 5% level of significance. The overall significance of the model (Prob > F-statistic) = 0.008021 is statistically significant at 5%. The P-value of the test (Prob > F = 0.008021) is less than 0.05. In view of the rule of thumb, H_1 is accepted and H_0 rejected.

Table 7: Hausman Test Result

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	6.046042	3	0.0431

Source: E-Views 9.0 Regression Output, 2021

Table 7 reveals that that P-value = 0.0431 is less than 5%. Hence, fixed effect model is preferred to random effect model, thus, H_1 is accepted. Conclusively, this study upholds that CEE has a significant positive relationship with EVA of quoted ICT firms in Nigeria at 5% level of significance.

Findings, Conclusion and Recommendations

Findings

In line with the analysis of data, the following findings were deduced:

i. There is a significant positive relationship between HCE and EVA of ICT firms listed on Nigeria Stock Exchange at 5% significant level.
ii. There is a significant positive relationship between SCE and EVA of ICT firms listed on Nigeria Stock Exchange at 5% significant level.
iii. There is a significant positive relationship between CEE and EVA of ICT firms listed on Nigeria Stock Exchange at 5% significant level.

Conclusion

This study examined the nexus between efficiency of value added of the major components of VAIC and EVA as a modern dimension of corporate performance. Data were drawn from a sample of 8 ICT firms listed on Nigeria Stock Exchange from the period 2010 to 2019. The method of analysis used was the one introduced by Pulic (1998, 2001) to measure intellectual capital efficiency and panel data analysis to see the relationship between VAIC components (HCE, SCE and CEE) and EVA over the 10 years period. The univariate regression and results indicated that intellectual capital has positive and significant relationships with economic value added at 5% level of significance.

Recommendations

The following recommendations are made in line with the findings and conclusion of this study:

i. Since HCE significantly relate with EVA, ICT firms should invest more on HCE to enable them get more per unit value of human capital.

ii. Based on the specific finding that SCE positively relates with EVA, then, there is need for the recognition, identification, measurement and development of intellectual capital by business executives.

iii. Regulators of the capital market should thoroughly monitor the factors associated with the efficiency of value creation investments in ICT companies listed on the Nigeria Stock Exchange, since CEE is significantly associated with EVA.

REFERENCES

1. Amahalu, N.N., Abiahu, M.C., Obi, J.C., & Okika E.C. (2016). Effect of human resource accounting on financial performance of quoted deposit money banks in Nigeria, *The Journal of International Accounting, 1*(2), 13-22.
2. Amahalu, N.N., Abiahu, M.F., Nweze, C.L., & Obi, J.C. (2017). Effect of corporate governance on borrowing cost of quoted brewery firms in Nigeria (2010-2015). *EPH - International Journal of Business & Management Science, 2(3), 31-57*
3. Amahalu, N.N., Nweze, C.L., & Obi, J.C. (2017). Effect of backflush accounting on financial performance of quoted food and beverage firms in Nigeria. *EPH - International Journal of Medical and Health Science, 2(3), 58-80*
4. Amahalu, N.N., Okoye, P.V., & Obi, J.C. (2018). Effect of sustainability reporting on economic value added of quoted brewery firms in Nigeria. *Journal of Accounting, 7*(1), 1-20.
5. Amahalu, N.N., Okoye, P.V., Obi, J.C., & Iliemena, R.O. (2019). Effect of board diversity on financial performance of quoted natural resources firms in Nigeria. *Journal of Global Accounting, 6*(2), 36-56
6. Bahman, P. & Mohsen M. (2015). The relationship among intellectual capital, social capital and human resources productivity of staff in Sepah Bank branches, Golestan Province, Iran. *International Research Journal of Management Sciences, 3*(1) 19-23.
7. Baker. A. (2014). The impact of basic components of intellectual capital on the profitability of Jordanian commercial banks (2007-2012). *European Scientific Journal*.10 (28), 1-11.
8. Banimahd, B., Mohammadrezaei, F. & Mohammadrezaei, M. (2012). The impact of Intellectual capital on profitability, productivity and market valuation: Evidence from Iranian high knowledge-based industries. *Journal of Basic and Applied Scientific Research,* 2 (5), 4477-4484.
9. Barney, J.B. (2001). Is the resource-based view a useful perspective for strategic management research? Yes. *Academy of Management Review* 26(1), 41-56.
10. Bontis, N., William, C., & Richardson, S. (2000). Intellectual capital and business performance in Malaysian industries, *Journal of Intellectual Capital, 1*(1), 85-100.
11. Chu, P.Y., Lin, Y. L., Hsiung, H. H., & Liu, T. Y. (2006). Intellectual capital: An empirical study of ITRI".*Technological Forecasting & Social Change, 73*(7),886-902.
12. Ecowas. J.A., Omojolaibi, A.O., Oladipupo, A.G., & Okudo. A.G. (2019). Fragility and macroeconomic outcomes. *Journal of Economics Library 6* (1), 11-34.
13. Edvinsson, L., & Malone, M.S. (1997). Intellectual capital: Realizing your company's true value by finding its hidden brainpower. *Journal of Intellectual Capital, 2*(1), 98 -105.
14. Iliemena, R.O., Goodluck, H., & Amahalu, N.N. (2019). Human capital efficiency as a paradigm for improved bank performance in Nigeria. *Journal of Global Accounting, 6*(3), 46-57
15. Makki, M, Lodhi, S.A. (2009). Impact of intellectual capital on return on investment in Pakistani corporate sector. "Austr. J. Basic Appl. Sci., 3 (3): 2959-2007.
16. Ogbodo O.C., Amahalu, N.N., & Abiahu, M.C. (2017). Effect of intellectual capital on financial performance of quoted deposit money banks in Nigeria. *Journal of Global Accounting, 5*(1), 114-125.
17. Okoye, E.I, Okoye, P.V., Amahalu, N.N & Obi C.J (2014). Effect of human resource accounting on corporate valuation decisions: a study of quoted banks in Nigeria. Sub-Sahara Africa and the Transformation Question, Faculty of Management Sciences, 2014 Conference Proceedings, 950-977.
18. Okoye, P.C, Okoye, J.N., & Amahalu, N.N. (2015). Impact of human resource accounting on corporate valuation of banks listed on the Nigerian Stock Exchange (2008-2012). *School of Business Multidisciplinary International Journal, 2*, 182-210.
19. Okudo, A.G., & Ndubuisi, A.N. (2021). Corporate governance and carbon disclosure practices of quoted manufacturing firms in Nigeria. *International Journal of Contemporary Research and Review, 12* (07), 20409
20. Okudo, A.G., Omojolaibi, J., & Oladele, M. (2021). Impact of waste recycling on environmental quality and revenue generation: Case Study of University Of Lagos, Nigeria *International Journal of Contemporary Research and Review 12*(8), 20211-20227.
21. Olayinka, M.U., & Uwalomwa, U. (2011). Intellectual capital and business performance: evidence from Nigeria. *Interdisciplinary Journal of Research in Business,* 1(10, 49-56.
22. Omojolaibi, J.A., Okudo, A.G., & Shojobi, D.A.. (2019). Are women financially excluded from formal financial services? Analysis of some selected local government areas in Lagos State, Nigeria. *Journal of Economic and Social Thought, 6*(1), 16-47.
23. Parham S., & Heling G.(2015). The relationship between human capital efficiency and financial

performance of Dutch production companies. *Research Journal of Finance and Accounting; 6*(8), 188-201.
24. Penrose, E.T. (1959). *The Theory of the Growth of the firm,* New York: Wiley.
25. Pulic, A. (1998). *Measuring the performance of intellectual potential in knowledge economy*. http://www.measuring-ip.at/papers/Pulic/Vaictxt/vaictxt. html.
26. Pulic, A. (2000). *MVA and VAICTManalysis of randomly selected companies from FTSE 250.* Available at: www.vaic-on.net/start.htm
27. Qelichlee, B. (2005). The model of measuring and reporting organizations' intellectual capital. *Paper presented at Third International Conference on Management, Tehran.*
28. Stewart, G. B. (1990). *The quest for value: The EVA management guide*, Harper Business, New York.
29. Stewart, T. (1997). Intellectual Capital: New Wealth of Organizations. *Measuring Business Excellence, 8*(1), 141-157.
30. Tan, H.P., David, H., & Hancock, P. (2007). Intellectual capital and financial returns of companies, *Journal of Intellectual Capital,8,* 1, 76-95.
31. Tseng, S. H. (2006).The relationship between human capital, innovation capital, and organizational performance. *available at: http://thesis.lib.ncu.edu.tw/ETD-db/ETD-search/view_etd? URN=944307008*
32. Wernerfelt, B. (1984). The resource-based view of the firm. *Strategic Management Journal,* 5(2), 171-180.
33. Yusuf I. (2013). The relationship between human capital efficiency and financial performance: an empirical examination of quoted Nigerian banks, *Research Journal of Finance and Accounting; 4*(4), 148-154.
34. Yusuf, I. (2013). The relationship between human capital efficiency and financial performance: An empirical investigation of quoted Nigerian banks. *Research Journal of Finance and Accounting, 4*(4), 148-155.