



Intellectual Capital and Organisational Performance of the Financial Sector: Evidence from Nigeria

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Abstract: The world economy is moving to a knowledge-based economy from the industrial era. Prior studies have shown that reliance on physical and financial capital is not enough for sustained improved performance. Improved performance will continue to be of interest to management of organisations and to researchers and businesses should utilise strategic resources especially intangible ones (intellectual capital) to achieve competitive advantage. The study examined the effect of intellectual capital on organisational performance of financial companies quoted in Nigeria. The study adopted ex-post facto research design. The population was 53 financial companies listed on the Nigerian Stock Exchange (NSE) in 2019, from which 35 were purposively selected. The audited financial statements from 2010 to 2019 validated by the external auditors' report were the data source. Descriptive and inferential statistics using regression analyses were employed. The Value-Added Intellectual Coefficient (VAIC) was used to measure intellectual capital (IC) and organizational performance had five measures of return of assets (ROA), return on equity (ROE), Leverage (Lev), Assets Turnover (ATO), and Market to Book Ratio (MB ratio). The study concluded that intellectual capital impacts positively on organizational performance, but firm size do not play a significant role. The study recommended that financial institutions should develop competencies by replacing the less-qualified performers, assist employees learn new management and technical skills through regular training and mentoring. Management should devise ways to improve employee's competence in technical and information technology, in customer relation, suppliers' management, projecting bank's image, and a positive organizational culture to improve their intellectual capital stock.

Keywords: Capital Employed, Financial Sector, Human Capital, Intellectual Capital, Structural Capital, Value-added Intellectual Coefficient (VAIC)

1. Introduction

The development of science, information, and communication technology in the last two decades have changed the business landscape leading to intense global competition [1]. In the value-creation process, all contributors (including intangible assets) should be clearly measured and disclosed as this serves a key basis for organisational performance [2]. Business leaders grappled with the transformational shifts from factory and assembly line production to a knowledge society [3]. According to Akintoye [4] four resources deployed in an enterprise (men, materials, machines, money) are represented as assets in the balance sheet, but little is said of the "coordinator" (men) of

these resources in the financial statements. The resource-based view posits that businesses should own and utilise strategic resources especially intangible ones as a means of achieving competitive advantage and high-level performance [1]. Human capital is important in enhancing productivity and performance and management should do holistic transformation of this important asset [5].

For organisations to survive in the new global competitive environment, they should operate on conditions of strong performance and assessing the performance of organisations has thus engage the attention of management and researchers [6]. The main problem of organisational performance is the

low degree of performance. According to the World Bank Nigeria Economic Update [7], sectoral cases of increased revenue and profitability did not represent real growth when inflation and exchange rate depreciations are considered. The low performance has affected various stakeholders as they are not getting commensurate returns and ultimately the society is sub-optimal. Various reforms have been undertaken in the past to address the problem of performance in the larger economy and in particular the financial sector. The major reforms in the financial sector have centred on increase in capital base. According to Orea and Kumbhakar [8], the assumption is that when the capital base of an organisation is increased, the potentiality of achieving efficiency and growth would also be increased. However, various reforms in the banking sector and insurance sector in Nigeria largely centred on increased capitalisation have not worked as intended. McKinsey [9] examined the top 10 banks from 2010 to 2019 and concluded that while earnings have increased, actual growth has been significantly lower. On the economy front, the real GDP rate on a year-to-year basis declined from 2.7% in 2015 to 2.0% in 2019 [6].

Intellectual Capital is now accepted as a strategy for improved value added and performance in organisations [10, 11], and thus increasing attention should be paid to its efficient management. Proper management of intellectual capital is expected to lead to improved organisational performance [12]. While the challenge to organisational performance is global, the effects are more pronounced in emerging and developing economies like Nigeria. The World Bank Emerging Countries Classification put Nigeria in the lower middle-income economies which are those with a GNI per capita of between \$4,096 and \$12,695. Therefore, this study examined the causal relationship of intellectual capital and performance of companies in Nigeria with focus on financial companies on the Nigerian Stock Exchange. The research question was, does possession of intellectual capital has any relationship with organisational performance? This led to the main objective of the study which was to examine the effect of Intellectual Capital on Organisational performance of financial companies quoted in Nigeria. The significance is that the efficient performance of financial sector is key to a country's economic growth [13].

Overview of the Financial Sector in Nigeria

The financial sector comprises three major categories: banking, insurance, and the pension fund sectors. Banks are regulated by the Central Bank of Nigeria (CBN) and according to its various publications, the sector is comprised of Commercial Banks (22), Mortgage Banks (35) and Development Banks (6) as of 31 December 2020. The industry structure as of May 2021 comprises Composite Insurance Companies (13), General Insurance (29), Life Assurance (16), Reinsurance (3), and Takaful -Islamic Insurance- (4), Licensed Brokers (510) and Licensed Loss Adjusters (36) according to data extracted from the website of National Insurance Commission (NAICOM) established in 1997 to regulate the insurance business in Nigeria. The

Pension sector gained attention with the enactment of the Pension Reform Act of 2004 to address the challenges of unfunded defined benefits in public and private sectors and accumulated arrears in payment of pension. The Act was further strengthened in 2014. The industry regulator is the Pension Commission of Nigeria (PENCOM). According to data obtained from the Commission website, the structure of the sector as of June 2021 are Pension Fund Administrators (22), Pension Fund Custodians (4), and Closed Pension Fund Administrators (6). As data for individual companies in the Pension Sector is not publicly available, this study will focus on banking and insurance sectors of the Nigeria economy.

2. Literature Review

2.1. Conceptual Review

The concept of performance attracts various definitions due to its subjective nature. Nayer [14] stated that performance consists in "achieving the goals that were given to you in convergence of enterprise orientations". According to Folan's theory [15], "performance is influenced by the environment, the objectives to be achieved and the relevant and recognizable features". To most authors, performance is related closely to efficiency and effectiveness. Organizational performance could be said to have three specific areas of firm outcomes: (a) financial performance (b) product market performance, and (c) shareholder return. Rostam et al [16] described performance management as "a set of measures and information that is used to increase the level of optimal utilization of facilities and resources to achieve goals in an economically efficient and effective way". Generally, there are two main streams of approaches to quantify corporate performance: accounting-based measures and market-based measures. To enhance the quality of research output, previous literature has often incorporated both sets of measures and this study will adopt same approach.

The word "intellectual capital" was used first by Galbraith in 1969 to represent "intellectual contribution owned by individuals". Edvinsson [17] described IC as "the possession of the knowledge, applied experience, organizational technology, customer relationships, and professional skills that give a company competitive edge in the market". "IC includes knowledge, information, intellectual property, and experience that can be used to create value for a firm" [18]. All definitions tend to focus on the importance of the people involved in production or service delivery.

Stewart [18] explained the "three elements of IC: human capital, structural capital, and customer capital". Other authors follow suit and later customer capital was changed to relational capital. Human Capital is the skills and knowledge possessed by employees, structural capital refers to policies and procedures, systems, databases, and other infrastructure that support human capital to work properly. Relational capital, also customer capital, is the relationships of the firm with its stakeholders. Some scholars have introduced

additional variants of IC as Social Capital, Innovation (Technological) Capital, and Spiritual Capital.

To manage and report IC, it is essential for its measurement. management A widely used method for the study of IC impact on corporate performance is the *Value-Added Intellectual Coefficient (VAIC)* model postulated by Ante Pulic [19, 20]. It measures efficiencies of physical, financial capital, and IC of a firm. That is, it measures “human capital efficiency (HCE), structural capital efficiency (SCE) and efficiency of capital employed (CEE)” enabling comparison between firms, industries, and economies [19]. The equation developed by Pulic (1998) is described as:

$$\text{“Value Added Intellectual Capital} = \text{HCE} + \text{SCE} + \text{CEE”}$$

HCE: Human Capital Efficiency; SCE: Structural Capital Efficiency; CEE: Capital Employed Efficiency. Due to its usefulness, ease of understanding and ability to enable comparison, the VAIC model has been used extensively in the literature to measure IC efficiency.

2.2. Review of Extant Literature and Hypothesis Development

IC and organisation performance studies have been conducted across varied geographical and industries boundaries. The following have shown positive relationship between intellectual and organisational performance in financial institutions. Rehman et al [21] investigated the efficiency of intellectual capital of performance of Islamic banks and provided evidence that the performance of Islamic banks (IBs) is driven primarily by investment in IC. Yassen and Al-Amaneh [22] examined the intellectual capital and financial performance of listed banks in an emerging economy using the Amman Stock Exchange from 2005 to 2018 and concluded a significant and positive relationship between VAIC and banks profitability represented by return on assets (ROA). Similarly, positive significant relationship between VAIC and banks’ performances from 2012 to 2016 in Bangladesh [23].

Tu D and Nguyen [24] investigated the intellectual capital and bank profitability in Vietnam. between 2007 and 2019 and findings showed the positive impact of Value-added intellectual coefficient (VAIC). Nazir and Nazir [25] examined the intellectual capital performance in China, Hong Kong, and Taiwan financial sectors from 2006 to 2016 and concluded that IC efficiency impacts positively on the profitability of the financial companies.

In a study investigating the effect of IC on profitability and productivity of financial institutions in Pakistan using 111 financial institutions from 2007 to 2018, it was concluded that there was “an inverted U-shaped relationship between IC and performance”, Yao et al [26] suggested that increase in IC performance leads to increased profitability and productivity. However, at certain level, a further increase in IC performance leads to decreased profitability and productivity”.

VAIC had an impact on the financial performance of

Sharia-compliant banks in Saudi Arabia according to Naushad [27] in a study on intellectual capital and financial performance of sharia-compliant banks from 2013 to 2018. For Islamic banks operating in the Gulf Cooperation Countries during the years 2011 to 2013, investigation by Ousama [28] supports that IC had a positive impact on the financial performance of Islamic banks. However, the study by Onyekwelu et al [29] examined the financial performance of banks in Nigeria from 2004 to 2013 and concluded that the banks showed different intellectual capital and financial performance indicators. Banks exhibiting high IC show high financial performance.

Ozkan et al [30] examined intellectual capital effects on financial performance of banks operating in Turkey using a sample of 44 between 2005 and 2014 and concluded that IC influences bank’s profitability. Thakur [31] examined intellectual capital effects on the financial performance of Indian public and private sector banks from 2013 to 2015. The results showed that intellectual capital performance of Indian banks is better than in other countries, but with a slowdown from 2013 to 2015. Another study by AbdullRazak and Al-Johani [32] on intellectual capital and financial performance of Saudi insurance company from 2013 to 2015 concluded a positive influence on the chosen performance indicator of ROA.

VAIC showed positive relationship with ROA in a study by Tahir et al [33] on banks in Pakistan from 2007 to 2015. Ahmad and Ahmed [34] investigated the intellectual capital (IC)’s performance and its impact on the financial performance of 78 listed financial industries of Pakistan from 2008 to 2013. The results indicated IC as an important determinant of the financial efficiency of Pakistani financial firms. Sherif and Elsayed [35] concluded on a direct relationship between IC and the performance of listed insurance companies in Egypt. Intellectual capital had a positive relationship with financial performance of Tanzanian banks according to a study conducted by Isanzu [36] from 2010 to 2013. Zin et al [37] examined intellectual capital impact amongst Malaysia banks from 2008 to 2012 and concluded that IC and the banks performances were positively related.

Despite these positive outcomes, a recent study showed a negative relationship between IC and organisational performance. [12] examined how disclosure of intellectual capital affects firm value in banks listed on the Indonesia Stock Exchange from 2015 to 2019 and concluded that there is a positive impact on firm value, while there is none on intellectual capital.

The followings are some studies with mixed results on the influence of intellectual capital on organisational performance. Soewarno and Tjahjadi [1] investigated the effect of intellectual capital on financial performance of Indonesian banks from 2012 to 2017 and concluded that VAIC model or the A-VAIC model did not support some hypotheses. Rosita et al [38] examined the intellectual capital and financial performance of state-owned banks in Indonesia from 2012 to 2016 with results showing that VAIC has

relationship with ROA, except CEE. For ROE, there is no relationship with all IC efficiency measures. John-Akamelu and Iyidiobi [39] examined intellectual capital effects on bank performance using six Nigerian banks from 2010-2015 and concluded on a relationship between VAIC Indices (HCE, SCE and CEE) and Employee Productivity (Log EP) but a negative relationship with growth in revenue (GR). The study on the influence of the components of intellectual capital on the financial performance of quoted banks in Nigeria revealed mixed results. Some Intellectual Capital elements were not related to growth in revenue and return on investment [40].

Given the preponderance of the conclusions, it is assumed that IC gives a firm competitive advantage, which aids financial performance. The authors then proposed and tested the following hypothesis in null form:

Ho1: Intellectual capital has no significant effect on organisational performance of financial companies quoted in Nigeria.

Ho2: Firm's size has no significant controlling effect on intellectual capital impact on organisational performance of financial companies quoted in Nigeria.

2.3. Theoretical Review

The relevant theories to the independent variable and the dependent variables can be categorized into four. Voluntary disclosure theories, Intellectual Capital theories, Performance theories, and Motivation theories. This study adopts the mix of Resource-based theory, Signaling theory and Motivation theories. The resource-based theory emphasizes how intangible assets (represented by intellectual capital) is a key resource for competitive advantage and superior performance. Signaling theory as an important theory in voluntary encourages firms to disclose more to reduce information asymmetry and satisfy the information requirements of the stakeholders. The premise is that more disclosure signifies quality and high-performance organisations. The link with motivations is that the best of intellectual capital stock in an organization needs to be motivated to perform at their best. Motivated employees are more willing and committed to taking on tasks. So, managers need to continually retool their structure, policies, and procedures to keep the intellectual

stock motivated for higher performance.

3. Methodology

This study used the *ex-post facto* research design as the impact of the predictors on the dependent variable has already taken place. Secondary data was obtained from annual report of sampled firms from 2010 to 2019. The secondary data are deemed reliable as they are already checked by external auditors and relevant regulatory agencies, including compliance with Nigeria Companies and Allied Matters Act (CAMA 2020) as amended to date. The population was all financial companies (operationally defined as those in the banking and insurance sectors) on the Nigerian Stock Exchange (NSE) as of 31 December 2019 made up of 54 companies. The listed companies were chosen because of their significant role in the Nigerian economy, their probable usage of intellectual capital and the availability of verified data as contained in the audited annual reports. The sample size was 35 companies (Banks: 12 and Insurance: 23) representing 65% of the population. The multiple regression analysis was done to ascertain the extent of causal relationship of the two variables.

We proposed the following hypothesis in null form:

Ho1: There is no significant positive relationship between Value Added Intellectual Capital (VAIC) and its elements (HCE, SCE, and CEE) and organizational performance (ROA, ROE, LEV, ATO, M/B) of quoted financial companies in Nigeria

Ho2: Firm Size has no significant controlling influence on intellectual capital impact on organizational performance of quoted financial companies in Nigeria.

The following is the general model:

$$Y_{it} = \beta + \beta_1 X_{it} + \beta_2 C_{it} + \varepsilon$$

where:

Y_{it} – Dependent variables – Organisational Performance (ROE; ROA; LEV, ATO, M/B).

X_{it} – Independent variables (VAIC; HCE; SCE; CEE).

C_{it} – Control variable (FIRM SIZE)

Model Specifications

$$ROA_{it} + ROE_{it} + LEV_{it} + ATO_{it} + MBV_{it} = \alpha + \beta_1 VAIC_{it} + e \quad (1)$$

$$ROA_{it} + ROE_{it} + LEV_{it} + ATO_{it} + MBV_{it} = \alpha + \beta_1 VAIC_{it} + \beta_2 SIZE + e \text{ (controlling effect)} \quad (2)$$

Description and Measurement of Variables

This section discussed the variables (independent and dependent) used in the study and how they were measured. Figure 1.

Variables		Measurement	Source	Some References
Independent				
VAIC (Value Added Intellectual Capital Efficiency)		HCE + SCE + CEE	Annual Reports	Rahman <i>et al</i> (2021) Trag & Hong (2020)
	HCE (Human Capital Efficiency)	Total Employees Cost	Annual Reports	Rahim <i>et al</i> (2017) Danjuma & Ajike (2016)
	SCE (Structural Capital Efficiency)	Value Added- Human Capital	Annual Reports	Abdirahman & Tarique (2020)
	CEE (Capital Employed Efficiency)	Total Book Value of Firm	Annual Reports	Zhang & Huo (2020)
Dependent				
Short Term Profitability Performance	ROA (Return on Assets)	Net Income / Total Assets	Annual Reports	Rahman <i>et al</i> (2021)
Long Term Profitability Performance	ROE (Return on Equity)	Net Income / Total Equity	Annual Reports	Lu <i>et al</i> (2021)
Financial Stability	LEV (Financial Leverage)	Total Debts/ Total Assets	Annual Reports	Poh <i>et al</i> (2018), Chang & Lee (2012)
Productivity	ATO (Asset Turnover)	Total Sales / Total Assets	Annual Reports	Poh <i>et al</i> (2018)
Market Performance	MPB (Market Price per Book)	Market Price / Book Value	Annual Reports	Soewarno & Tjahjadi (2020)
Control				
Size		Natural Log of Total Assets	Annual Reports	Rahman <i>et al</i> (2021) Ovechkin <i>et al</i> (2021)

Source: Author's compilation, 2021.

Figure 1. Variables Measurement and Description.

The authors conceptual framework is shown below:

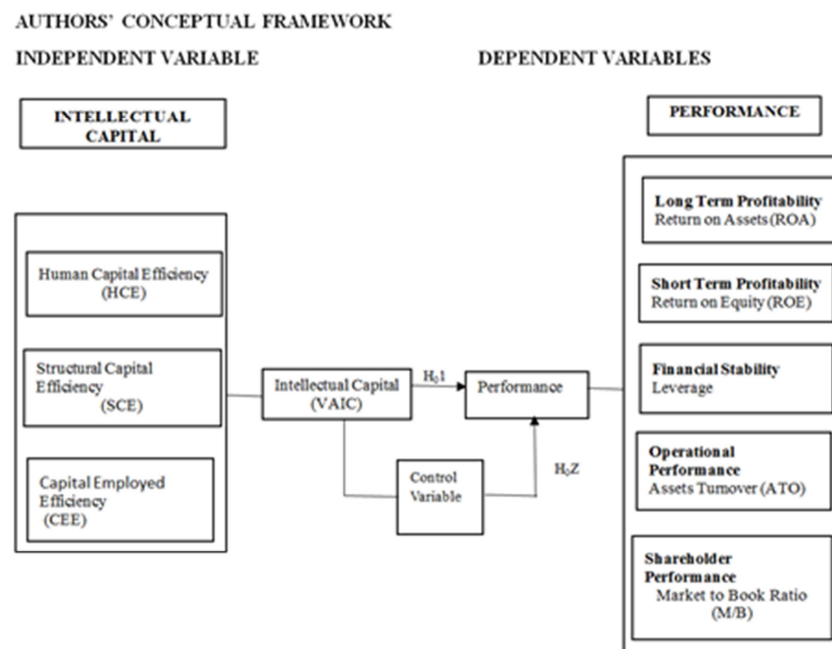


Figure 2. Conceptual Framework.

4. Results and Discussion

The data analysis has three sections: the descriptive statistics, graphical trends, and inferential statistics.

Table 1. Descriptive Statistics.

	OP	HCEE	CEEE	SCEE
Mean	2.00964	5.40986	0.22233	0.71599
Median	2.05722	4.19385	0.193900	0.76215
Maximum	3.73091	50.64120	1.171500	2.95040
Minimum	-0.32039	-0.51270	-0.02300	-1.17200
Std. Dev.	0.42276	4.67735	0.18299	0.25314
Skewness	-0.61051	3.99381	1.37125	-0.27831
Kurtosis	6.56985	31.01615	6.24744	32.46559
Observations	334	334	334	334

Source: Authors computation (2021)

Table 1 summarizes the statistical features of the data under using the mean, maximum and minimum values, standard deviation, skewness, and kurtosis test. The mean statistic is the average of the data gathered for the study's individual variables. The skewness shows negative all through, indicating that (the left tails are extreme) the data series indicates a non-normal data distribution as the series relatively maintains non-normality by being less than the threshold of 0. For kurtosis, some of the measures are

platykurtic in nature (i.e., thinner than normal).

HCE has the highest mean of the three VAIC components. This is an initial indication of the importance of the efficient use of HC by financial institutions compared to CE and SC. HCE has a standard deviation of 4.67764 suggesting a higher volatility compared to other components.

The next part of this section shows the trends of the variables for sampled companies for the years 2010 to 2019.

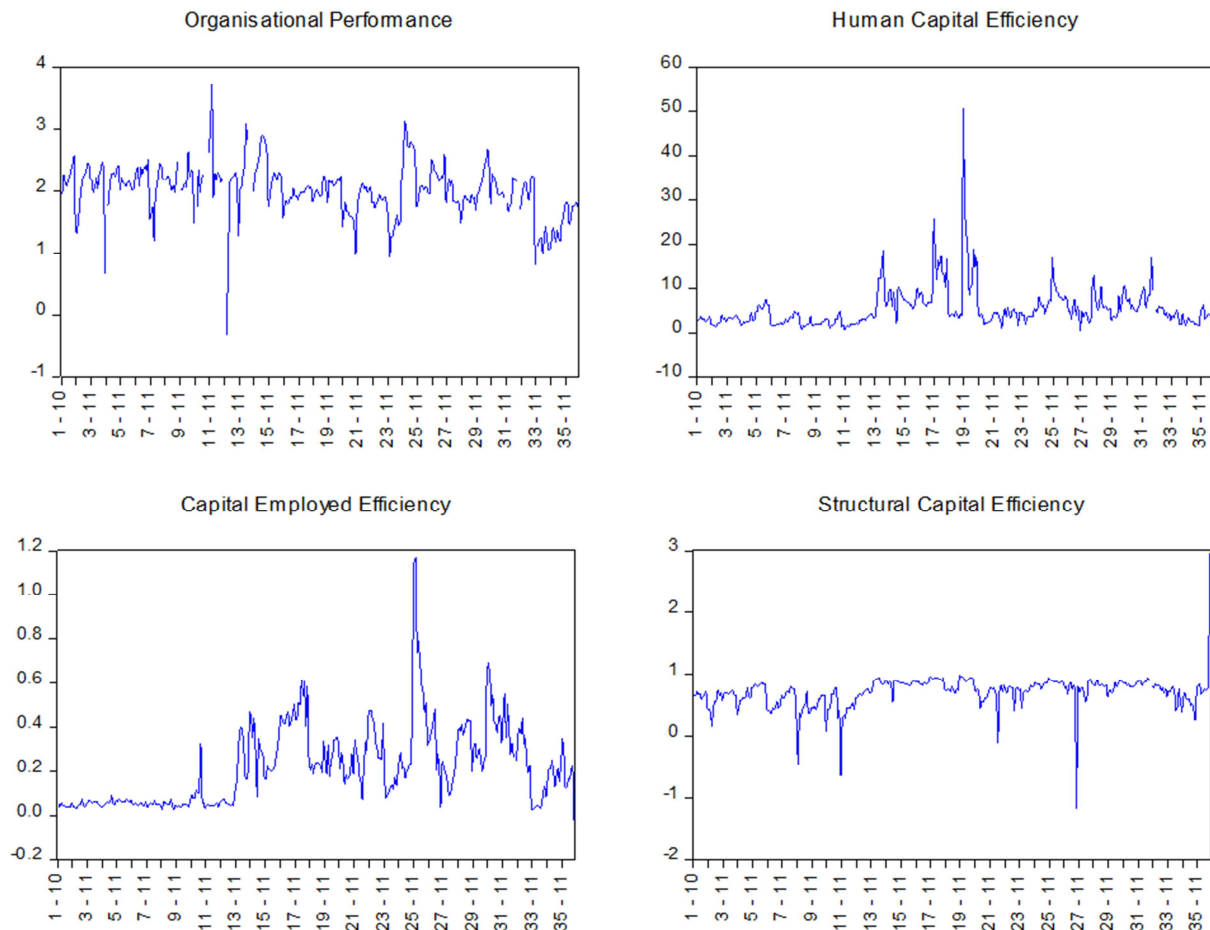


Figure 3. Graphical Illustration of Trends.

This shows the trend analyses of each of the variables under study across all the cross-sections. The performance of all the companies under investigation and their measures of intellectual capital has been volatile (not stable) over the years under review.

Table 2. Correlation Matrix.

	HCEE	CEEE	SCEE
HCEE	1	0.523	0.464
CEEE	0.523	1	0.433
SCEE	0.464	0.433	1

Source: Authors computation (2021)

The table above shows no evidence of multi-linearity among our exogenous variables; hence the variables are good

for the estimation.

4.1. Regression Analysis

4.1.1. Hypothesis One

Interpretation

Post-Estimation Results: The Hausman test with *p-value* of 0.434, is more than the 5% level of significance revealing that random effect is the appropriate estimator according to its null hypothesis which states that there is presence of unsystematic difference in the model coefficients; thus, the study did not reject the null hypotheses. The Breusch, and Pagan Lagrange multiplier test for the appropriateness of random effect having *p-value* of 0.000 also showed that random effect is the best appropriate estimator.

Table 3. Regression and Post-Estimation Results for Hypothesis One.

MODEL ONE				
“Random-effects Regression with Driscoll-Kraay standard errors”				
Variable	Coeff	Std. Err	T-Stat	Prob
Constant	0.049	0.010	4.77	0.001
HCE	0.056	0.057	0.98	0.350
SCE	0.00016	0.00026	0.61	0.558
CEE	0.0523	0.017	3.01	0.013
R ²	0.379			
Wald Stat	13.12 (0.010)			
Hausman Test	2.73 (0.434)			
BPL Multiplier Test	26.89 (0.000)			
Heteroskedasticity Test	61.83 (0.000)			
Serial Correlation Test	13.61 (0.004)			
Cross-sectional Index.	4.910 (0.000)			

Source: Author's computation (2021)

Note: all the analysis was tested at 5% significance level

To examine the robustness of the model, it was tested for heteroskedasticity, autocorrelation, and cross-sectional dependence. The result of the heteroskedasticity with *p-value* of 0.000 (that is, 0 percent) is less than the significance level of 5% signifying the presence of heteroskedasticity; that is, the residuals of the model are not constant over time. Thus, the study does reject the null hypothesis. Serial correlation test using Wooldridge test with *p-value* of 0.004 (that is, 0 percent) is less than the significance level of 5% implying serial correlation problem in the model. Therefore, the study rejects the null hypothesis. In addition, the cross-sectional dependence test result with *p-value* of 0.000 (that is, 0 percent) is less than the significance level of 5% suggesting the model has cross sectional dependence problem. “Due to the presence of heteroskedasticity, serial correlation and cross-sectional dependence problems in the model”, Model One was estimated using Random-effects Regression with Driscoll-Kraay standard errors

Regression Equation Results

$$OP_{it} = \alpha_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \mu_{it} \quad (3)$$

$$= 0.049 + 0.056 + 0.00016 + 0.0523 + \mu_{it}$$

Equation (3) in Table 3 examined the effect of the three measures of the independent variables (HCE, SCE and CE) on organisational performance (measured by ROA, ROE, LEV, ATO and MBV). The regression estimates results revealed that: HCE has a positive and insignificant effect on OP ($\beta=0.056$, $p=0.35$). The positive coefficient of 0.056 implies that a percent increase in human capital efficiency will lead to 0.056 percent increase in organizational performance; structural capital efficiency has an insignificant positive effect on organizational performance ($\beta=0.00016$, $p=0.558$); which means that a percent increase in structural capital efficiency will lead to 0.00016 percent increase in organizational performance; capital employed efficiency has a significant positive effect on organizational performance ($\beta=0.052$, $p=0.013$) revealing that a percent change in CEE would yield 0.052 percent increase in organisational performance. In summary, only CEE on individual basis significantly influences organisational performance while

other exogenous variables exerted insignificant impact on organisational performance.

The result of the Wald stat with probability value of 0.010 implies that all the proxies of the independent variables (HCE, SCE, and CEE) jointly and significantly impacted organisational performance. The coefficient of multiple determination of 0.379 suggests that all the independent variables proxies (HCE, SCE, and CEE) are jointly responsible for 37.9% changes in OP while the remaining changes in OP (63.1%) is caused by other factors outside model's scope.

Decision: Based on the probability of Wald-statistics of 0.010 being less than the 5% chosen significance level of the study, this study thus decide that the null hypothesis for Model 1 which states that “Value Added Intellectual Capital has no significant effect on return on asset of deposit money banks in Nigeria.” be rejected.

4.1.2. Hypothesis Two

Table 4. Regression and Post-Estimation Results for Hypothesis Two.

MODEL TWO				
Pooled Regression with Cluster				
Variable	Coeff	Std. Err	T-Stat	Prob
Constant	0.391	0.175	2.23	0.028
HCE	0.111	0.571	0.19	0.846
SCE	0.00077	0.00411	0.19	0.851
FS	0.000052	0.00019	0.27	0.784
CEE	0.465	0.182	2.54	0.028
Adjusted R ²	0.25			
F- Stat	1.79 (0.136)			
Hausman Test	10.21 (0.0371)			
Testparm Test/LM Test	7.14 (0.128)			
Heteroskedasticity Test	59.66 (0.000)			
Serial Correlation Test	34.15 (0.0002)			

Source: Authors computation (2021)

Note: all the analysis was tested at 5% significance level

Interpretation

Post-Estimation Results: In Table 4, the result of the Hausman test with the *p-value* of 0.434, being more than the 5% level of significance reveals that random effect is the appropriate estimator according to its null hypothesis which states that there is presence of unsystematic difference in the model coefficients; thus, the study does not reject the null hypothesis. This was supported with the result of the Breusch, and Pagan LaGrange multiplier test for the appropriateness of random effect, having *p-value* of 0.000 showed that random effect is the best appropriate estimator for the study.

To examine the robustness of the model, it was tested for heteroskedasticity, autocorrelation, and cross-sectional dependence. The result of the heteroskedasticity with *p-value* of 0.000 (that is, 0 percent) which is less than the significance level of 5% indicated the presence of heteroskedasticity; that is, the residuals of the model are not constant over time, thus the study do reject the null hypothesis. Also, serial correlation test carried out using Wooldridge test with *p-value* of 0.004 (that is, 0 percent) which is less than the significance level of 5% indicated serial correlation problem. Therefore, the study rejects the

null hypothesis. In addition, the cross-sectional dependence test result with *p-value* of 0.000 (that is, 0 percent) which is less than the significance level of 5 percent evidenced that the model has cross sectional dependence problem. “Due to the presence of heteroskedasticity, serial correlation and cross-sectional dependence problems in the model”, Model Two was estimated using Random-effects Regression with Driscoll-Kraay standard errors

Regression Equation Results

$$OP_{it} = \alpha_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \beta_4 FS_{it} + \mu_{it} \quad (4)$$

$$= 0.391 + 0.111 + 0.00077 + 0.00032 + \mu_{it}$$

Equation (4) in Table 2 examined the controlling effect of firm size (FS) on the effect of value-added intellectual capital efficiency (HCE, SCE and CE) on organisational performance (measured by ROA, ROE, LEV, ATO and MBV).

The regression estimates results revealed that: HCE has a positive and insignificant effect on OP ($\beta=0.11$, $p=0.84$) this was originally with a coefficient of 0.056 ($\beta=0.056$, $p=0.35$). This suggests that the controlling effect of firm size has increase the effect by 0.054, therefore FS has a positive controlling effect on the effect of human capital efficiency on organizational performance. However, this positive controlling effect is statistically insignificant, now a percent increase in human capital efficiency will lead to 0.11 percent increase in organisational performance. Structural capital efficiency originally has an insignificant positive effect on organizational performance ($\beta=0.00016$, $p=0.558$); however, the controlling effect of FS has increased the coefficient to 0.00077. Therefore, FS has positively controlled the effect of structural capital efficiency on organisational performance though statistically insignificant. This means that a percent increase in structural capital efficiency leads to 0.00077 percent increase in organisational performance. Capital employed efficiency originally has a significant positive effect on organizational performance ($\beta=0.052$, $p=0.013$) this coefficient has been improved to 0.465 by controlling for the effect of firm size. Thus, a percent change in CEE would now yield 0.46 percent increase in organizational performance because of controlling each cross-section by firm size, this controlling effect is again statistically significant. In summary, only CEE on individual basis significantly influences organizational performance while other exogenous variables exerted insignificant impact on organizational performance.

The F-stat with probability value of 0.13 implies that firm size does not have a significant controlling effect on all independent variables' proxies (HCE, SCE, FS and CEE) jointly. The value of the coefficient of multiple determinations of 0.25 means that all the proxies of the independent variables (HCE, SCE, FS and CEE) are jointly responsible for 25% changes in OP while the remaining changes in OP (75%) is attributable to other factors outside the model's scope.

4.2. Discussion of Findings

The descriptive statistics confirmed that HC (Human Capital) contributes the highest (most) efficiency to total intellectual capital. The first hypothesis was that intellectual capital has no significant effect on the organizational performance of financial companies quoted in Nigeria. The decision was the null hypothesis was rejected and the alternative hypothesis that intellectual capital has a positive effect on organizational performance in the financial sector in Nigeria and that HCE is the highest contributor.

The decision is consistent with the following prior studies which also shows positive association between intellectual capital and organizational performance [21-37].

The second hypothesis was if firm size affects intellectual capital impact on organizational performance of quoted financial companies in Nigeria. The F-stat result implies that firm size does not have a significant controlling effect on all the proxies of the independent variables (HCE, SCE, and CEE) jointly. This is contrary to a priori expectation. Banks with big asset base should have diversified options to earn higher income. Existing literature however provides mixed evidence on the impact of banks size on profitability.

Studies that have provided results of similar negative association are Tari and Floros [41] who posited that “large banks are difficult to monitor, and the economies of scale can only be enjoyed up to a certain level”. Beyond that, the further increase in size leads to a decline in profitability due to inefficiency and bureaucratic reasons [42]. Another study concluded that operating expenses, bank size and loan are negatively related to profitability but only bank size are significant [43].

5. Conclusions

In a knowledge-based economy, the role of physical assets as a strategic lever has shifted into that of intangible assets (intellectual capital) as a strong lever to sustain and improve performance. With globalization, investors are also shifting concerns from just using financial statements or tangible assets to non-financial intangible assets for their investment decisions. This study examined the impact of intellectual capital on the organisational performance of the financial sector in an emerging market using Nigeria as an example. To accomplish this objective, the study examined 12 quoted banks and 23 quoted insurance companies over a ten-year period from 2010 to 2019. Two hypotheses were formulated, and regression analysis was done on the data.

5.1. Policy Implications of the Research

As IC is an important element for an organisation's success along with other factors, financial Institutions should increase their investment in intellectual capital for improved performance as the study concluded a positive impact of overall IC on their performance. This study should also help Nigerian financial companies and the regulators to assess the key indicators for a better organisational performance.

5.2. Contributions of the Research

This paper adds to existing literature on Intellectual Capital and Nigerian financial institutions. Secondly, this study is beneficial to the individual banks, regulatory authorities; and professional bodies in the sector when considering new strategies to improve performance in the financial sector. This study also provides an awareness that good intellectual capital in the financial sector will benefit the sector and ultimately the society. The use of leverage as a measure of organisational performance and the adoption of three theories are novel introduction in this study.

6. Recommendations

Companies in Nigeria especially the financial institutions should adopt a proper strategy to manage its intellectual capital. Management should determine the knowledge intensity of the business and take appropriate actions for its acquisition and utilisation. Management should develop competencies by replacing the laggard performers with more qualified and results-oriented talents and upskilling the current workforce to make them learn new technical and management skills to increase the organization's intellectual capital. Regular and targeted training of employees in key areas of the business should be done as targeted training positively impacts on employee's performances and service delivery. Increasing SCE is also required for increasing IC performance. So, the financial institutions are advised to improve their technical acumen, information technology, customer and suppliers' management, bank's image and sustain a positive organizational culture helps internal business operations.

Limitations and Future Research: Although the study was based on a large sample of quoted financial institutions in Nigeria and considered five variables of performance measurements, it has some limitations. The study is limited to quoted financial industry in Nigeria. Future studies could be extended to comparative analysis of manufacturing and other sectors of the stock exchange. It could also be replicated in other emerging economies sharing similar socio-economic structure. The use of primary data outside of VAIC approach could also be considered.

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