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International Journal of Innovative Research in Accounting and Sustainability

ISSN 2736-1381 (Print) ISSN 2736-1500 (Online)
Vol. 9, No. 2, 2024

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Adekunle Ajasin University,
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(IJIRAS)

Volume 9, Number 2, June, 2024

**A quarterly publication of the Department of Accounting,
Faculty of Administration and Management Sciences,
Adekunle Ajasin University, Akungba- Akoko, Ondo State,
Nigeria.**

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Intellectual Capital and Financial Performance of Non-financial Firms in Nigeria

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Abstract

Intellectual Capital (IC) is one of the intangible assets which are frequently associated with performance. The aim of the study is to empirically evaluate the effect of intellectual capital and its components on financial performance of non-financial firms listed on the NGX. The financial performance was measured by return on asset (ROA), while Value Added Intellectual Coefficient (VAIC) was used as a quantifiable measure to assess the IC and its components. Data were sourced from 20 selected audited annual reports of listed firms on the Nigerian Exchange Group (NGX) over the period 2016-2021. Data gathered were analyzed with descriptive statistics, correlation analysis, and regression analysis. The result of the analysis shows that all the three components of IC did not have a significant effect on ROA. This could be as a result of the global economic crisis (COVID 19 pandemic) which had a negative financial impact between 2019 and 2021 on all sectors of the economy, listed non-financial firms inclusive. The study concludes that intellectual capital of the selected companies did not drive their performance. Therefore, the study recommends that selected companies should strive to invest more on their physical capital in order to enhance their performance.

Keywords: Intellectual Capital, capital employed, human capital, intellectual capital, structural capital

JEL Classification: O34, L1

1. Introduction

Firm performance is very fundamental for every type of business and its relevance in the corporate world cannot be overemphasized. Proper measurement of an organization's performance depends upon its goals/objectives (Mihaela, 2017; Fijalkowska, 2014). There is no gainsaying the fact that even the not-for-profit making organizations are established to achieve specific objectives. In pursuit of these goals and objectives, firms always deploy strategic plans and effective/efficient use of resources to survive and ensure its perpetual operations. Though, Calisir and Gumussoy, (2010) were of the opinion that the traditional accounting system do not give companies to showcase all the resources used to achieve their performance/success.

There has been a growing increase of the agreement in the relationship between intellectual capital and the future performance of firms (Salman & Abogun, 2023; Lu, Tian, Buitrago, Gao, Zhao, & Zhan, 2021; Salman, Olaniyi, Kasum & Fagbemi, 2014). Salman and Abogun (2023) opined that in a knowledge-based economy and the increasing competitiveness among actors in the corporate world, intellectual capital is a fundamental ingredient to every company's success. This growing increase in the relevance of intellectual capital on firm's value as reflected in some of the most innovative technological and informational developments and major discoveries which have continued to maintain the

gap between developed and developing nations in the world has attracted attention from the competing world market.

The importance of intellectual capital on firms' performance cannot be overemphasized in today's economic activities saturated by high level of technological and human resource to develop the most superior ideas that would make them outstanding and the products produced by firms but also include their intellectual or intangible assets. Today, sources of firm's economic value go beyond non-financial firms in Nigeria have witnessed a continuous change in the production activities due to constant change in the level of innovative ideas and concepts to meet up to customers changing demand. Today, perhaps no company in Nigeria is left out of the race to continuously engage the most strategic decisions about what to produce and how to produce efficiently and effectively using the available resources and keep customers' satisfaction while ameliorating the evidential hostile competition. The level of creativity and innovativeness of firms have proven to have substantial impact on the level of firm performance (Marimuthu, Arokiasamy & Ismail, 2009).

The traditional accounting systems where production facilities, physical location and properties and efficient manufacturing processes were dominant failed to reflect intangible assets with little exception of goodwill, which create value in enterprises and therefore, has also neglected intellectual capital in business performance (Lev, Canibano & Marr, 2005; Bontis, 1996). In the most modern nations such as China and Japan, innovation and entrepreneurship are considered the new driving forces for economic growth; based on their importance. These countries have poor agricultural lands for farming activities and yet innovation and entrepreneurship activities have succeeding elevated them. Capital is a basic foundation for companies' development; technology and knowledge are basic sources of innovative ideas (Lu, et al., 2021). The participants in today's market economies consistently continue to engage in search of intellectual assets that could earn them a competitive advantage over their competitors.

The non-financial firms acknowledged the importance of intellectual capital because they make used of more human capital (employees) than those in other sector of the economy (Ekwe, 2013). Although the old accounting system have neglected intellectual capital in the measurement of firm value, but modern accounting system has come to the realization of the importance of the subject, therefore, managers should be in the position to allocate the resources needed to actualize this objective. The exclusion of intellectual capital components from companies' financial statements has far-reaching implications. Firstly, the firm's financial position is undervalued, and such undervaluation may result to deprivation of the company of certain benefits such as loan obtainment, firm's worth in the face of its competitor etc. Secondly, the undervaluation of the worth of the company consequently reduces the share price of the company in the stock market.

This study focuses on the non-financial companies in Nigeria, a developing economy, for the period of 2016 to 2021 in a bid to determine the coherence among early studies such as Salman, (2022), Chukwuebuka, Ndu and Nwokeji (2019), Salman, Ibrahim and Abdulkadri (2015), Ekwe (2013) and also contributes to the existing literature. Section two of this study covers the related literatures; section three discusses methodology while sections four and five cover presentation of data and conclusion respectively.

The main objective of this study is to evaluate the intellectual capital and performance of non-financial firms in Nigeria. The specific objectives are to: assess the effect of capital employed efficiency on return on asset of non-financial firms in Nigeria; evaluate the effect of human capital efficiency on return on asset of non-financial firms in

Nigeria; and investigate the effect of structural capital efficiency on return on asset of non-financial firms in Nigeria.

2. Literature Review and Hypotheses Development

2.1 Intellectual Capital and Its Components

Till date, several research studies have associated the term "intellectual capital" with different descriptions and conceptual meanings but there is no yet known generally accepted definition of the term in literature (Salman, 2022; Chukwuemeka et al., 2019; Ozkan., Cakan & Kayacan 2017). Intellectual capital definition according to Chen and Brock, (2021), is the value of a company's employees' knowledge, skills, business training, or any proprietary information that may provide the company with the competitive advantage over its competitors. Oyewole and Adegoke (2018) describe these values, knowledge, skills and competencies as God-given but can be improved upon through training, self-development and observations. Stewart (1997) made further definition of the term as intellectual material – knowledge, information, intellectual property, experiences possessed by company's employees that can be used to create additional wealth. Companies are differentiated by the level of knowledge and innovative ideas possessed by their employees and their competencies which are unique to the firm and continue to use such advantage over its competitors.

Intellectual capital development is evident in the efforts firms deploy to ensure that employees have the technical skills, knowledge and competencies to shield against the continuous changing business environment. Despite the numerous definitions of intellectual capital above, the general agreement by researchers is that intellectual capital consists of three major categories: human capital (HC), structural capital (SC) and Relational capital (RC) (Salman & Abogun, 2023; Shiu, 2006, Bontis, 1998).

Human capital is the technical know-how, skills acquired and possessed by an employee in the cause of technical or vocational education and on-the-job training in the work place (Yahaya, Salman, Abdulsalam & Adegbayibi, 2022; Oyewole & Adegoke, 2018; Salman, et al. 2015; Enyokit, Amaehule & Teerah, 2011). The term can equally be seen as the workforce of an organization. That is, the knowledge and skills which the individuals' commands and it is uncommon and can only be traced to a particular employee or group of employees and use such uncommon skills to put the particular company ahead of all other companies in the industry. Bontis (1998) defined structural capital as the knowledge that is unique to the company. This unique knowledge that stays with the company is developed over time through the company's operational routines, values, norms, employees' welfare, procedures, systems, goodwill and good database management (Salman et al., 2015; Radjenovic & Krstic, 2007). Relational capital is also called customer's capital. It is the interaction between company and its external stakeholders. It is referred to as customer relation, marketing strategies and other key arrangements the company makes to seek a competitive advantage outside its internal environment (Richard, Devinney & Yip, 2009).

2.2 Intellectual Capital and Performance

The primary goal of corporate managers is to enhance the firm's value without taking excessive risk that could endanger the shareholders' wealth maximization objective (Yahaya et al. 2022; Peterson, Gijbers & Wilks, 2003). Researchers in the field of accounting and finance have used various performance measures to ascertain how well or poorly a firm's activities have been directed and managed. For instance, return on assets, market value, return on investment, profitability, have been used as proxies to measure firm's performance (Yahaya et., al., 2022; Taouab & Issor, 2019). Profitability is a

dimension of firm's performance (Desai & Raval, 2022). It is a means by which a firm makes profit from all of its resources (intellectual capital/ resources and physical resources (Odiong, Were & Omolo, 2014). Harward and Upton (2012) opined that it is can be measured by company's management efficiency.

Firm performance is a major area of concern for all types of business organization be it investors, business owners and other stakeholders because performance is the primary goal for most modern corporations (Peterson, Gijsbers & Wilks, 2003). This performance can be financial or non-financial (operational). This study utilizes ROA as financial performance indicator which measures the firm's profitability in relation to its total assets. Sequel to the importance of a company's assets which are used to generate income, a proper use of such asset cannot be overemphasized. For this reason, the study adopts the performance indicator (ROA) as dependent variable in the measurement of firm performance.

Several methods have been used to measure intellectual capital efficiency/performance. These include market capitalization approach, balance scorecard, economic value added and VAICTM (Chan, 2009). This study utilizes VAICTM to calculate the IC performance/efficiency (independent variables) of the sampled companies. There are quite a number of studies which have used VAICTM model to measure IC efficiency (Salman & Abogun, 2023; Lu et. al. 2021; Soewarno et al. 2020; Momani & Nour, 2019; Calisir, et al., 2010; Chan, 2009; Kamath, 2007; Ghosh and Mondal, 2009; Shiu, 2006. The following are few previous studies with empirical evidence of intellectual capital and firm performance. Renaldo, et al. (2023) assessed the impact of business intellectual capital and financial performance on firm of 420 manufacturing industry companies between 2013 and 2021. The findings revealed that the business intellectual capital and company performance have a significant relationship.

Salman and Abogun (2023) examined intellectual capital and market performance of 117 Nigerian companies. Correlation and regression analysis were used to analyze the data. The study result showed positive and significant relationship between structural capital efficiency and financial performance. Lu, Tian, Buitrago, Gao, Zhao and Zhan (2021) carried an investigation on Intellectual Capital and Firm Performance of Venture-Capital Syndication in China between 2014 and 2018. The study utilized modified VAIC model to measure IC efficiency and applied the pooled OLS model for hypotheses testing. The findings revealed that intellectual capital components improved performances of sampled firms in China.

However, the study of Tran and Vo (2018) found only capital employed efficiency influence firm performance. This study was carried out investigating intellectual capital efficiency on Thai quoted banks. Data analysed revealed that capital employed efficiency (CEE) was the most significant component that influenced bank performance out of the three components of VAIC. Likewise, the study of Bayraktaroglu et al. (2019) found different result. Bayraktaroglu et al., (2019) focused on the evaluation of intellectual capital and firms' performance in Turkey with the aim of proposing an extended value-added (VA) intellectual coefficient (VAIC) model. Data collected were analysed with multiple regression after evaluating IC efficiency with VAIC expanded model. Findings show that only the companies' structural capital efficiency has a moderate effect on and profitability. In additional there are studies that found no relationship between intellectual capital and firm performance (Firer & Williams, 2003; Buallay, 2017; Chowdhury et al. 2019). Hence, there is a mixed result from the previous studies, this study hypothesized that:

H₀₁: Capital employed efficiency does not significantly affect return on asset.

Ho2: Human capital efficiency does not have any significant effect on return on asset.
 Ho3: Structural capital efficiency does not significantly affect return on asset.

2.3 Theoretical Review

2.3.1 Resource-Based View Theory

This study was underpinned by Resource Based View (RBV). The RBV was propounded by Wernerfelt (1984) which is one of the most strategic management theories that underpins the performance of firms as a result of powerful resources under their possession which help to sustain competitive advantage. Becker (1964) pointed out that education and training (human capital drivers), innovation (structural capital driver) were investments that can add to firm's productivity. Organizations continue to invest in intellectual capital hoping for better creativity (Salman, 2022). The Resource Based View is of particular significant to this study because it takes an inside-out view of firms unique attributes on why organizations succeed or fail in the market place. Those firms that possess resources that are uncommon, valuable, inimitable and non-substitutable such as intellectual capital would stand out and perform excellently well than those otherwise (Barney, 1991). It then makes sense for organizations to add the intellectual capital assets that creates value with their physical assets in the financial statements to showcase the total worth of the company.

3. Data and Methods

This study was based on ex post facto research design because it aimed at analyzing the already available data. Secondary data were used for this study from 2016 to 2021 extracted from the sampled companies audited financial statements. The sample size of this study is made up of 20 non-financial companies listed on the Nigerian Exchange Group (NGX) and the composition of the sample are as follows: Agricultural sector 2, Conglomerate sector 2, Real estate sector 2, Consumer goods 3, Health care 2, ICT 2, Industrial goods 2 Natural resources 1, Oil and gas 1 and Service sector 3. Value Added Intellectual Coefficient (VAICTM) was used to calculate the IC efficiency of non-financial firms selected. The study utilizes Ordinary Least Squares (OLS) for hypotheses testing.

3.1 Model Specification

This study adopted (Calisir, et al. (2010) model in the measurement of the independent variables. VAICTM is calculated by the sum of these components and defined as:

$$VAIC^{TM} = HCE_i + SCE_i + CEE_i \dots \dots \dots (i)$$

Where: VAICTM = the sum of value added for the company;

HCE_i = human capital efficiency of the company _i,

SCE_i = structural capital efficiency of the company _i

CEE_i = capital employed efficiency of the company _i.

To calculate these components, there is need to find out Value Added (VA) created by the company. The calculation of VA_i (the sum of value added for companies_i) is defined as follows):

$$VA_i = I_i + DP_i + D_i + T_i + M_i + R_i + WS_i \dots \dots \dots (ii)$$

Where, I_i = interest expenses for company _i, DP_i = depreciation expenses for company _i, D_i = dividends for company _i, T_i = corporate taxes for company _i, M_i = equity of minority shareholders in net income of subsidiaries for company _i, R_i = profits retained for companies_i; WS_i = the sum of wages and salaries for companies _i.

$$HCE_i = VA_i / HC_i \dots \dots \dots (iii)$$

Where, HCE_i = human capital efficiency of the companies i , VA_i = the sum of value added for the company i , HC_i = total salary and wage expenditure of the companies i ;
 $SCE_i = SC_i / VA_i$ (vi)

Where, SC_i = structural capital of the company i , which is $VA - HC$
 SCE_i = structural capital efficiency of the companies i ,
 VA_i = the sum of value added for companies i ,
CEE is defined as:

$CEE_i = VA_i / CE_i$ (v)

Where, CEE_i = capital employed efficiency of the companies i , VA_i = the sum of value added for the companies i , CE_i = book value of net tangible assets for the firms i
 ROA = Financial performance
 ROA is measured as the net income divided by total assets of the company for the year
 $SIZE$ = Measured as numbers of employees (control variable 1)
 AGE = Years in operation (control variable 2)

3.1.2 Regression Model

$ROA = f(CEE, HCE, SCE)$ (i)

$ROA = \beta_0 + \beta_1 CEE_i + \beta_2 HCE_i + \beta_3 SCE_i + FSIZE + FAGE + u$ (ii)

4 Data Analysis and Discussion of Findings

4.1 Descriptive Analysis

The study employed descriptive statistics, correlation and Ordinary Least Square (OLS) regression to analyze data collected. The descriptive statistics result (minimum, maximum, mean and standard deviation) is presented in table 1.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	120	1.495	1.594	.025	14.031
CEE	120	1.01	1.787	0	10.712
HCE	120	18.603	22.527	1.162	111.849
SCE	120	.806	.208	.139	.991

Source: Authors' Computation (2024)

The descriptive statistics table shows the mean, standard deviation, minimum and maximum value of each variable. The estimated average performance of the companies represents by ROA is 1.495 with standard deviation (estimated error) of 1.594, company with the lowest performance (min ROA) has 0.025, while the most performing company among the sampled companies has ROA of 14.031. The estimated average effectiveness of Capital Employed (CEE) by companies is represented by the mean of 1.01, standard deviation of 1.787, while the company with the least CEE is scored 0, the highest value of CEE value of a particular company represented by max is 10.712. For HCE, the estimated average effectiveness of Human Capital (HCE) by companies is represented by the mean of 18.603; standard deviation of 22.527, while the company with the least HCE value has 1.162, the highest value of CEE value of a particular company is represented by max is 111.849. For SCE, the estimated average effectiveness of Structural Capital (SCE) by companies is represented by the mean of .806, standard deviation of 0.208, while the company with the least SCE value has 0.139; the highest value of CEE value of a particular company is represented by max is 0.991. Several tests were carried out on the data before it is fitted in the model. The results of those tests are presented under the following subsections:

4.2 Correlation Matrix

Table 2: Correlation Analysis

Variables	(1)	(2)	(3)	(4)
(1) ROA	1.000			
(2) CEE	0.114	1.000		
(3) HCE	-0.087	-0.019	1.000	
(4) SCE	-0.169	-0.236	0.562	1.000

Source: Authors' Computation, 2024

The results in table 2 provided correlation coefficient of the variables showing the relationship between the variables. From the table it can be seen that none of the correlation coefficient is up to the correlation limit of 0.85 (indicator of relationship). Since, there is no relationship among the variables as predicted by the correlation results in Table 2, none of the independent (predicators) variables used in this study are not expected to impact, affect or predict the dependent variables.

4.3 Intellectual Capital and Financial Performance

Table 3: Model Summary

Random-effects GLS regression	Number of obs = 120
Group variable: company code	Number of groups = 20
R-sq:	Obs per group:
within = 0.0295	min = 6
between = 0.0904	avg = 6.0
overall = 0.0472	max = 6
corr(u_i, X) = 0 (assumed)	Wald chi2(3) = 1.65
	Prob > chi2 = 0.6470
	(Std. Err.adjusted for 20 clusters in companycode)
sigma_u	.77671089
sigma_e	.85723882
rho	.4508352 (fraction of variance due to u_i)

Source: Authors' Computation (2024)

The number of observations (cases) in this study is 120. The Wald-test coefficient and its p-value test in the model are jointly equal to zero. Which mean that the slope and constant coefficients are equal to zero. The outcome of the test accepts the null hypothesis as the Wald-test coefficient = 1.65 and p-value = 0.6470 > 0.05, it means that the model as a whole explains/predicts nothing about the dependent variable. Because if all the coefficients are equal to zero, then it means that there is no relationship and therefore having no impact. This fact has been verified in the previous table 2 of correlation matrix.

Table 4: Model Parameters (Coefficients) Robust

ROA	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	Sig
CEE	.0908361	.0712741	1.27	0.203	-.0488587 .2305308	
HCE	.000453	.0045426	0.10	0.921	-.0084503 .0093562	
SCE	-.2403975	.5523561	-0.44	0.663	-1.322996 .8422005	
cons	1.505632	.4971148	3.03	0.002	.5313045 2.479959	***

*** p<.01, ** p<.05, * p<.1

Source: Authors' Computation (2024)

Table 4 shows the coefficients of CEE on ROA. It is noted that CEE has a positive coefficient of 0.091 which means that, if there is increase in CEE there will be an increase in ROA. However, looking at the p-value (0.203), which is above 0.05 level of significant, we can retain the null hypothesis which states that capital employed efficiency does not significantly affect return on asset of non-financial firms in Nigeria with 95% level of confidence. Also, the table shows the coefficients of HCE on ROA. It is noted that HCE has a positive meaningless coefficient of 0.000453 which means that, if there is increase in HCE there will be a non-significant increase in ROA. However, looking at the p-value (0.921), which is above 0.05 level of significant, we can retain the null hypothesis which states that human capital efficiency does not have any significant effect on return on asset of non-financial firms in Nigeria with 95% level of confidence.

In additional, it is noted that SCE has a negative coefficient of -.2403975 which means that, if there is decrease in SCE there will be an increase in ROA and vice-versa. However, looking at the p-value (0.663), which is above 0.05 level of significant, we can retain the null hypothesis which states that structural capital efficiency does not significantly affect return on asset of non-financial firms in Nigeria with 95% level of confidence. The finding revealed that Intellectual Capital (IC) components, (Capital Employed Efficiency, Human Capital Efficiency and Structural Capital Efficiency) which are the independent variables, does not have a significant effect on return on asset (ROA, dependent variable) of listed non-financial firms in Nigeria. This is contrary and inconsistent with the submissions of Salman, Ibrahim and Abdulkadri (2015) Chukwuebuka, Ndu and Nwokeji (2019), Lu, Tian, Buitrago, Gao, Zhao and Zhan (2021). This study finding could be as a result of the global economic crisis (COVID 19) which had a negative impact between 2019 and 2021 on all sectors of the economy, listed non-financial firms in Nigeria inclusive. Six (6) years financial performance of selected firms were analyzed, out of which the activities of 18 months, representing about 25% was badly affected by the pandemic.

5. Conclusion

This study concluded that intellectual capital efficiency does not have significant effect on return on asset of listed nonfinancial firms in Nigeria. This conclusion was reached from all the results presented from tables 1 to 4. The study then recommended that physical assets should be given more attention so as to enhance the performance of nonfinancial firms in Nigeria. Future study can make use of other companies (sectors) order than non-financial firms.

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