DETERMINANTS OF FIRMS' PERFORMANCE IN THE NIGERIAN HYDROCARBON INDUSTRY: DOES INTELLECTUAL CAPITAL MATTER?

By

Isola[1], W. A. (Ph.D)

Email: isolawak@yahoo.com

and

Oyeniran, Ishola Wasiu[2]

Email: wasiuishola35@gmail.com

[1,2] University of Lagos, Akoka, Yaba, Nigeria

Abstract

This study adopts the Pulic (2002) VAIC^{TM} approach as a measure of intellectual capital, to examine the role of intellectual capital in the financial performance of the oil and gas industry in Nigeria. With the aid of panel analysis framework, it was found that aggregated composites of intellectual capital (VAIC) perform less satisfactorily in influencing the financial performance of firms in the oil and gas industry. However, when VAIC^{TM} was disaggregated into human, relational, and structural capital efficiency, it was discovered that the positive effect of human capital on the financial performance of these firms was cancelled out by the negative effect of structural capital. However, the relational capital efficiency that could have improved the financial performance of these firms has no significant impact on these firms' performance and, as such, is ultimately responsible for the insignificant overall effect of intellectual capital (VAIC) on the financial performance of firms in Nigeria's oil and gas industry. One of the implications of these findings is that these firms place much emphasis on human assets and neglect intangible assets such as processes, patents, copyright, research and development, customer care, etc. Also, the current structural capital of the firms in this industry constitutes a drag on their financial performance. Thus, serious attention should be placed on the effective management of firms' relational and structural capital efficiency in order to ensure a better financial return.

Keywords: firms; intellectual capital; Nigeria; oil and gas; Pulic; relational capital

JEL Codes: L25, L71, L90

1.0 Introduction

Determinants of firms' performance have received scholarly attention in the literature. Starting from the pioneering work of Bain (1959), structure-conduct-performance paradigms have been employed to analyse firms' performance, where "structure" (that is, number of players, nature of product, and mobility of factors, among others) is the major determinant of performance. The efficiency hypothesis has been equally popularised in recent times as the most important driver of performance, which posits that it is not the structure that matters but the efficiency of operation by either small or large firms that influences performance (Seelanatha, 2011). Corporate governance has assumed a prominent position as a driver of performance owing largely to the high incidence of business failures across the globe, notably at Cadbury Schweppes Confectionary (in India), Parmalat (in Italy), and Polly Peck and Maxwell Communications (in the United Kingdom), among others.

Furthermore, in the modern economy characterised by intense competition and conflict, intellectual capital, as well as its various components, such as human capital, relational capital, and structure capital, is an emerging concept that is seen as one of the key value drivers of performance. Thus, availing of the competitive advantages offered by intellectual capital has remained a potent instrument for driving both financial and nonfinancial businesses, including the hydrocarbon industry, particularly in the downstream segment in Nigeria. For instance, firms that invest in intangible assets such as intellectual capital, which consists of human, structural, and relational capital, have been empirically confirmed to have higher sustainable performance compared to firms that do not (Yao et al., 2019; Ionita & Dinu, 2021; Sohel & Hossain, 2023).

The literature concerning the extent to which intellectual capital influences performance in the oil and gas industry in Nigeria is sparse. The need for such academic engagement is imperative in the petroleum subsector owing to a number of factors. Oil and gas is one of the vibrant sectors of the Nigerian stock market noted for higher performance. Besides, the sector is mature, and investors prefer to invest in the stock of the companies in this sector, as these companies are considered among the blue-chip companies of the Nigerian Stock Market. In addition, given the crucial role of the sector in the economy, it is important to study how firms in the sector utilise intellectual capital and its various components to create value and even improve their financial controls.

Furthermore, it has been observed that the relative importance of the upstream and downstream sectors depends on the availability of resources in a country. According to Bhattachayya (2011), in a resource-rich country, the upstream is evidently well developed, at least in terms of research and development, trademarks, intellectual property, etc., at the expense of the downstream subsector, while in a resource-poor country, the downstream segment tends to be less developed. Can this study provide empirical support for the structural development in the oil and gas downstream subsector in Nigeria? It is against this backdrop that the study examines the extent to which intellectual capital and its various components influence performance in the oil and gas sector in Nigeria.

The rest of this paper is structured as follows: Section 2 focuses on the literature review. Section 3 provides research methodologies. Data analysis and findings are reported in Section 4. Section 5 concludes the study and offers possible implications.

2.0 Literature Review

2.1 Concept of Intellectual Capital

Conceptually, intellectual capital has been explained in various ways. However, an attempt to develop a widely accepted definition of intellectual capital has remained unsettled. Intellectual capital has been comprehended as intangible materials that increase the value of a firm (Ekwe, 2012; Isola et al., 2016). Klein and Prusak (1994) see intellectual capital as intellectual material that can be formalised, captured, and exploited to produce higher economic value. Similarly, Sullivan (2000) identifies intellectual capital as knowledge that could be converted into value. Intellectual capital has also been perceived as the new wealth of organisations (Stewart, 1997). To him, intellectual capital represents resources such as knowledge, information, and experience that are used in wealth creation. He explains further that this resource includes an organisation's processes, patents, technologies, employee skills, and information about suppliers, customers, and stakeholders.

In the same spirit, Edvinsson (1997) and Papula and Volna (2011) state that "intellectual capital is the value creation that can be understood as a complex of intangible property, knowledge, skills, processes, applied experience, and technologies used in organisations to ensure a competitive advantage on the market". In this way, intellectual capital could be summarised as the broad knowledge within an organisation that creates value and a competitive edge. This knowledge is not limited to those held by individuals working for the organisation but includes

those embedded in organisational databases, systems, business processes, and relationships (Youndt et al. 2004; Zharinova 2011).

Previous studies have identified three components of intellectual capital: human capital, organizational or structural capital, and relational capital (Chen 2008; Hsu & Fang 2009; Namvar et al. 2010; Sharabati et al. 2010). The classification of intellectual capital into various components was based on Saint-Onge's model of 1996. The model identified human capital as the largest and most important intangible asset an organization possesses. The model further identified structural capital as the complement to human capital (Saint-Onge, 1996).

According to Cabello-Medina et al. (2011), human capital is the totality of employees' competence, knowledge, experience, skills, innovativeness, commitment, attitude, and wisdom. It is the manpower base of an organisation. In other words, human capital consists of the talents and skills of all employees and managers of the company. Human capital produces the goods or services that customers require and also provides solutions to their problems; therefore, it represents the organisation's creative capacity as well as its ability to be innovative (Ahangar, 2011).

Structural capital represents those valuable intangible resources that employees cannot take away when off work or leaving the organisation (Edvinsson & Malone, 1997). This could be seen to include company information systems, hardware, software, databases, company images, patents, copyrights, trademarks, organisational capabilities, culture, routines, procedures, and so on (Karagiannis et al., 2008; Aramburu & Saenz, 2011). Relational capital is the goodwill and relationships that the company has with its customers, suppliers, and other stakeholders. It consists of the interaction and exchange of internal knowledge and external intellectual resources (Carmeli & Azeroual, 2009; Kong & Farrell, 2010).

Thus, intellectual capital is an intangible resource consisting of human capital, structural capital, and relational capital that individually and collectively create economic and financial value for an organisation.

2.2 Empirical Review

The relationship between intellectual capital and organisational performance has been widely examined. Most of the literature uses the model VAIC (Value Added Intellectual Coefficient) to assess the relationship between intellectual capital and corporate performance. In Malaysia,

Muhammad and Ismail (2009) investigated the effectiveness of intellectual capital and its impact on the performance of 18 companies in the financial sector. They found that intellectual capital (IC) has a positive relationship with firm performance (measured by profitability and Return on assets (ROA)). A similar study was done by Ting and Lean (2009) on Malaysian firms, in which they revealed that the components of IC and some indicators of profitability have a positive association with the performance of the Malaysian financial sector. However, the Young et al. (2009) study revealed some findings different from those of Ting and Lean (2009). The authors conducted a survey of Asian banks in eight countries and found that physical capital and human capital are the main components of intellectual capital that create and promote value for the banks. Chan (2009), in a study of the relationship between the efficiency of intellectual capital and its components with four measures of firm performance: market valuation, return on assets, return on equity, and productivity of all companies on the Hang Seng stock exchange between 2001 and 2005, found that only structural capital has a significant and positive relationship with firms performance.

Ahangar (2011) examined the effect of intellectual capital on three different firm performance indices (profitability, employee productivity, and sales growth) using a regression approach and found that intellectual capital significantly influenced profitability and productivity. Alipour (2012) evaluated the effect of intellectual capital on the financial performance of 39 insurance companies in Iran during the period 2005–2007. With the use of ordinary least squares, the author finds that value-added intellectual capital and its components have a significant positive effect on companies' profitability (return on assets).

Sharabati et al. (2010) investigate the role of intellectual capital in the performance of firms in the Jordanian pharmaceutical sector and find that the effect of intellectual capital was positive for these firms. In a related but different study of the same field, Zeghal and Maaloul (2010) examine the impact of intellectual capital on the financial, stock market, and economic performance of 300 companies in the UK during 2005. However, the results are inconclusive. Pongpearchan (2016) investigated the effect of intellectual capital on the performance of firms in the computer business in Thailand. Using regression on the components of IC and performance indicators of 925 computer businesses, it was found that organisational capital and innovative capability have a positive effect on firm performance.

Empirical studies on the effect of intellectual capital on firm performance in the oil and gas industry are scanty and nonexistent in Nigeria. Few studies conducted in this area are found in

Asia. For instance, Makki and Lohdi (2008), in their study of the impact of intellectual capital across sectors in Pakistan, revealed that the oil, gas, chemical, and cement sectors enjoy high intellectual capital performance; the financial sector has average performance; and the public sectors have low intellectual capital performance.

Kharal et al. (2014) empirically evaluated the impact of intellectual capital on firm performance for oil and gas firms in Pakistan. The authors capture intellectual capital using Pulic's VAIC model by considering dimensions of human capital, structural capital, and capital employed. Internal and external performance of firms was measured using return on assets (ROA), return on equity (ROE), earnings per share (EPS), sales growth, and market-to-book ratio (M/B) ratio. The results indicate that intellectual capital has a significant and positive impact on firm performance in the oil and gas sector of Pakistan.

Arslan and Zaman (2014) also investigated the impact of intellectual capital on the performance of firms in the Pakistani oil sector between 2007 and 2011. The study proxied firm performance with measures such as return on investment (ROI), return on equity (ROE), and earnings per share (EPS). Using a three-dimensional conceptualization of intellectual capital (human capital, structural capital, and customer capital), the authors found a positive relationship between intellectual capital components and all three measures of firm financial performance.

Saremi et al. (2016) evaluated the effect of intellectual capital and its components (structural, physical, and human capital) on the profitability ratios of the petroleum products industry (return on assets, returns on shareholders' equity, profit margins, and net profit growth rate) in Iran. Using the Pulic model, it was found that a significant relationship exists between the intellectual capital components and ROA, ROE, profit margin, and net profit growth rate. However, when the authors performed regression analysis without exerting the controlled variables, the following findings were made: the intellectual capital and human capital components have no effect on the net profit growth rate; the physical capital does not significantly impact ROA; and the structural capital does not have a significant relationship with ROE, the profit margin, or the net profit growth rate.

Narwal and Yadav (2017) used the value-added intellectual coefficient (VAIC) to empirically examine the impact of intellectual capital efficiency on the financial performance of the Indian electricity, mining, and asset financing service sectors from 2006 to 2015. Through correlation

analysis, it was found that intellectual capital and profitability are positively related, while an inverse relationship between intellectual capital and productivity was observed.

The only study known to us that examined the effect of the human capital component of intellectual capital on firm performance in the Nigerian oil and gas industry is Monday (2015). This study evaluated the extent to which human capital development affects firm performance via the local content policy. With the aid of a survey involving the administration of a structured questionnaire to some purposefully selected indigenous oil servicing companies in the Niger Delta, it was found that human capital has positively influenced the business performance of indigenous companies in this industry.

3.0 Methodology

3.1 Research Design

This study adopted a quantitative research design to examine the impact of intellectual capital on firms' performance. Under this design, causal and descriptive research designs were utilised. First, descriptive statistical analysis was used to examine the nature of the data used, and then a regression approach was used to obtain estimates of the impact of components of intellectual capital on firms' performance.

3.2 Model Specification

Following Hudgins (2014) and Saremi et al., (2016), this study adopts the model stated below as;

$ROE = f(VAIC_{it}, REE, BI_{it}, SIZE_{it},) + \xi_{it}$ 1

Where the subscript i = the number of the number of oil and gas firm i.e. i = 1,..,7 and t = the time period i.e. t = 2012,…2018. ROE represents return on equity, a proxy for financial performance. VAIC stands for valued added intellectual coefficient which comprises human capital efficiency (HEE), structural capital efficiency (SEE) and capital employed efficiency (CEE). REE is relational capital, a component of intellectual capital not captured through VAIC. BI and SIZE are level of competition among firm and firm size. ξ represents the stochastic disturbance term. Disaggregating intellectual capital into its components yields equation 2

$ROE = \gamma_0 + \gamma_1 REE_{it} + \gamma_2 SCE_{it} + \gamma_3 HCE_{it} + \gamma_4 CEE_{it} + \gamma_5 BI_{it} + \gamma_6 SIZE_{it} + \xi_{it}$.....2

On a priori, relational capital is expected to be positively related to ROE. Increase expenditure on relational capital creates more awareness hence increase profit. Thus, $\frac{dROE}{dREE}>0$. Similarly, expenditure on human capital is expected to have a direct impact on ROE. A possible explanation for this is the increase human capital expenditure result to increase productivity and efficient utilisation of machines. Therefore, $\frac{dROE}{dHEE}>0$, the relationship between structural capital and oil and gas firm performance is positive. That is $\frac{dROE}{dSEE}>0$.

3.3 Sources of Data and Measurement of Variables

This study used a panel data set consisting of publicly quoted firms listed on the Nigerian Stock Exchange (NSE). The selection of the listed firms is guided by the availability of information on them, as they are required by law to make public and available their annual financial reports and accounts, which contain all the data required for this study. A total of seven (7) firms were purposefully selected based on the availability of data for the period between 2005 and 2018. The selected companies are: CONOIL (National Oil) PLC, Eternal Oil & Gas CO. plc, Forte Oil (African Petroleum) PLC, Mobil Oil Nigeria PLC, MRS Oil Nigeria PLC (Chevron Oil Nigeria PLC, Texaco Nigeria), OANDO (UNIPETROL NIGERIA) PLC, and Total Nigeria PLC.

The choice of variables and their proxies is guided by the existing literature. The measure of performance used in this study is the return on equity (ROE). ROE is measured as the ratio of operating profit to total equity. Based on its construction, ROE is a good approximation of the extent to which owners' equity is put to efficient use. Although ROE, being an accounting measure of performance, has been criticised on the grounds that it suffers from the effects of differing accounting standards, it is capable of mitigating size bias in the results.

Two components of intellectual capital were measured following Pulic's (2002) value-added intellectual coefficient (VAIC^{TM}). VAIC^{TM} monitors and measures the value-creation efficiency of the company based on accounting figures. VAIC^{TM} is thus a relational index in which value added is compared to capital employed and human capital. It incorporates three components: (1) Human capital efficiency (HEE) is calculated as the ratio of value added and human capital (that is, VA/HC), and it captures the knowledge, professional skill, experience, and innovativeness of employees within a firm. (2) Structural capital efficiency (SEE) is

measured as the ratio of structural capital (the difference between value added and human capital) and value added (that is, SC/VA), and (3) capital employed efficiency (CEE), which is the ratio of value added and capital employed. VAIC^{TM} is the sum of HEE, SEE, and CEE, and it is the proxy for intellectual capital in this study. The level of competition and size of the firm are measured as the growth rate of sales and the number of employed staff, respectively.

3.4 Estimation technique

The longitudinal nature of this study in terms of the number of firms and period considered required a panel data method. Panel data methods have become more common than ever as an econometric tool for modelling individual behaviours (among firms, consumers, households, etc.), partly as a result of the development of powerful software for panel data estimation and partly through the availability of high-quality longitudinal data. All equations are estimated using static panel regression models. The Hausman (1978) specification test is performed in order to assess the suitability of fixed effect models against random effect models. In order to achieve a robust result, each of the components of VAICTM is regressed on ROE so as to determine the individual impact of the components of intellectual capital on the performance of the firms. Four different versions of equation 2 were estimated. In the first and second models, ROE was regressed on VAIC without and with the control variables (BI, CEE, and SIZE), respectively, whereas in the third and fourth models, ROE was regressed on a composite of intellectual capital (SEE, HCE, and REE) without and with the control variables.

4.0 Empirical Results

The descriptive statistics of the variables used in this study are presented in Table 1. The table clearly portrays the behaviour of each of these variables. For instance, the ROE, which measures the performance of the firms, shows that the average return on equity of these firms is 0.103, with the lowest return on equity having a negative value of -12.152 and the maximum at 0.908.

Table I: Descriptive Statistics

	ROE	HEE	REE	SEE	CEE	BI	SIZE	VAIC
Mean	0.103	7.698	0.377	0.816	2.391	-0.001	18.477	11.283
Median	0.151	5.362	0.345	0.824	1.548	-0.003	18.493	9.362
Maximum	0.908	46.563	7.971	3.740	30.623	15.079	20.378	49.223
Minimum	-12.152	-7.004	-7.652	-1.270	-21.629	-10.283	14.528	-22.119
Std. Dev.	1.329	9.293	1.410	0.425	5.169	2.517	1.011	11.323
Skewness	-8.748	2.552	-1.164	2.251	1.358	2.031	-1.330	1.004

From Table 1, it is observed that there is a high level of consistency displayed by the series, as the mean and median of these variables fall within the minimum and maximum values of the series. For instance, the mean value of human capital efficiency (HEE) is 7.698. The series on SEE is the most consistent variable with the lowest standard deviation, followed by size of firm (SIZE) and return on equity. It is also observed that the index of size of firm (SIZE) has the highest maximum value of 18.493, followed by the composite index of intellectual capital (VAIC), while the proxy for competition among firms (BI) has the least value of -0.003, followed by relational capital efficiency (REE).

Table 2: Pair wise Correlation Result

Correlation	ROE	HEE	REE	SEE	CEE	BI	SIZE	VAIC
ROE	1							
HEE	0.101	1						
REE	0.586	0.110	1					
SEE	-0.706	0.106	-0.856	1				
CEE	0.005	0.040	0.617	-0.574	1			
BI	0.005	-0.008	-0.002	-0.003	0.009	1		
SIZE	0.138	0.047	0.132	-0.194	0.276	0.079	1	
VAIC	0.132	0.856	0.464	-0.244	0.544	-0.003	0.174	1

Table 2 shows the pair-wise correlation coefficients among the variables stated in equation 2. The correlation between most of the variables is below 50%, showing that our variables are jointly free from possible multi-collinearity, except in the case of the relationship between structural capital efficiency (SEE) and relational capital efficiency (REE), for which the correlation coefficient is higher than 50% and thus indicates a close relationship between the two variables.

The pairwise correlation coefficient between all the variables can also be analysed from the table. The relationship between return on equity and the composite intellectual capital of the firms, as measured by the VAIC^{TM}, reveals a positive but weak coefficient. Similarly, a positive correlation coefficient is obtained between ROE and all the explanatory variables except in the case of ROE and structural capital efficiency, whose relationship is negative.

Table 3: Hausman Specification Test Result

	Explanatory Variable(s)	Hausman Statistic	P. Value	Remark
Model I	VAIC	0.008	0.926	Random Effect
Model II	VAIC, CEE, BI, SIZE	7.332	0.119	Random Effect
Model III	HEE, SEE, REE	7.022	0.071	Random Effect
Model IV	HEE, SEE, REE, CEE, BI, SIZE	9.186	0.102	Random Effect

The results of the Hausman specification test are presented in Table III. The Hausman specification test helps in choosing between fixed and random effects models. The Hausman test justifies the choice of the random effect model over its fixed effect counterpart and compares the two models under the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. The result shows that the estimated Hausman statistic supports the random effects models for all four estimated models. Thus, the results of the random effects models are summarised in Table 4.

Table 4: Panel Regression Results
Dependent Variable: ROE

	Model I	Model II	Model III	Model IV
Constant	-0.075 (-0.327)	-3.529 (-1.343)	2.323 (5.637)	0.305 (0.249)
HEE			0.0324** (2.922)	0.031 ** (4.426)
REE			0.224 (1.600)	0.092 (0.974)
SEE			-2.921** (-6.276)	-3.164 ** (-10.471)
CEE		-0.034 (-1.035)		0.173** (11.309)
BI		-0.002 (-0.039)		0.001 (0.058)
SIZE		0.188 (1.316)		0.136 ** (2.163)
VAIC	0.016 (1.241)	0.021 (1.440)		
R-squared	0.017	0.132	0.54	0.805
F-Statistics	1.557 (0.0215)	1.218 (0.292)	34.467 (0.000)	57.759 (0.000)

** indicates statistical significance at 5%.
t statistic is enclosed in bracket

The panel regression (random effects) results for the effect of intellectual capital on the financial performance of oil and gas firms are presented in Table 4. In the presented results, models III and IV were found to be robust based on statistical and econometric evaluation criteria such as robustness of coefficients (significance), high R^2, and F-statistic. Between models III and IV, the latter is more robust.

In the random effect results for model IV, the coefficients of human (HEE), structural (SEE), and capital employed efficiency (CEE) and size of firm are statistically significant at the 5% critical level. The coefficient of structural capital is, however, negative. This is in contrast with the economic expectation of a positive relationship between structural capital and the performance of firms. Also, as expected, the size of a firm has a positive and significant impact on the financial performance of firms in the oil and gas industry.

Based on the random effect estimates, human capital has a positive effect on the financial performance (ROE) of oil firms in Nigeria. Its coefficient indicates that a percent increase in this composite will, on average, lead to about a 0.031 percent increase in the financial performance of oil firms in Nigeria. This result corroborates the findings of Young et al.'s (2009) study, which revealed that human capital is one of the main components of intellectual capital that creates and promotes the value of firms.

On the other hand, the results also show that structural capital has a significant negative impact on the financial performance of oil and gas in Nigeria, contrary to a priori expectations. The coefficient of SCE is negative and significant at the 5% level. A 1 percent increase in capital employed efficiency leads to a 3.16 percent decrease in the financial performance of oil and gas firms (ROE). This finding is not consistent with prior literature (Chen et al., 2005; Ahangar, 2011; Rehman et al., 2011), while it is consistent with Mumtaz, Rauf, Ahmed, and Noreen (2013), Nassar (2016), Anindya, Martin, and Vini (2018), and Smriti and Das (2018), who in their various studies found a negative relationship between SEE and ROE. This finding may be explained by the fact that in these firms, the investment in structural capital (e.g., processes, patents, copyright) is not emphasized. It also points to the fact that the majority of firms in the Nigerian oil and gas industry do not consider structural capital such as patents, research and development, trademarks, intellectual property rights, and databases as sources that contribute to financial performance. This finding further confirms Bhattachayya's (2011) hypothesis that the downstream sector is undeveloped in a resource-rich country such as Nigeria. This result is, however, in contrast to the findings of Chan (2009), who, in a study of the relationship

between the efficiency of intellectual capital and its components for all companies on the Hang Seng stock exchange between 2001 and 2005, found that structural capital has a significant and positive relationship with firms performance.

The result also indicates that relational capital is positive but statistically insignificant at the 5 percent level. Perhaps this is not unconnected with the poor structural capital in the oil and gas sector. Since the structural capital on which relationships are built is deficient, one cannot expect relational capital to be effective. A firm can have individuals with a high level of intellectuality; however, if the organization has bad systems and procedures (structural capital), relational and intellectual capital cannot achieve optimal performance (Anindya, Martin, & Vini, 2018).

The results in Model II are not robust. The coefficient of VAIC^{TM}, a proxy for intellectual capital, remains statistically insignificant. It shows that the proxy is not an appropriate measure of intellectual capital. Although it has a positive effect on firms' performance, its effect on firm performance is negligible. This finding finds support from the study of Dimitrios et al. (2011), whose empirical result failed to support the importance of intellectual capital, using the VAIC^{TM} methodology, on firms' performance. Firer and Williams (2003) also reported an insignificant relationship between VAIC^{TM} and the performance of South African firms. Hence, this finding questions the use of the VAIC^{TM} as a measure of intellectual capital.

5.0 Conclusion and Recommendations

This study has examined the role of intellectual capital in the financial performance of the oil and gas industry in Nigeria. Data were sourced from a panel data set consisting of 7 publicly quoted oil and gas firms listed on the Nigerian Stock Exchange (NSE), and panel regression analysis was used to obtain estimates of the links between components of intellectual capital and measures of firm performance. The results of the empirical analysis reveal that aggregated composites of intellectual capital (VAIC) perform less satisfactorily in influencing the financial performance of firms in the oil and gas industry. However, when VAIC^{TM} is disaggregated into human, relational, and structural capital efficiency, some interesting findings are revealed. First, the positive effect of human capital on the financial performance of these firms was cancelled out by the negative effect of structural capital. However, the relational capital efficiency that could have improved the financial performance of these firms remains statistically insignificant and, as such, is ultimately responsible for the insignificant overall

effect of intellectual capital (VAIC) on the financial performance of firms in Nigeria's oil and gas industry. One of the implications of these findings is that these firms place much emphasis on human capital development but neglect relational and structural capital. In other words, firms in this industry place more weight on human assets and neglect intangible assets (processes, patents, copyright, research and development, customer care, etc.). Also, the current structural capital of the firms in this industry constitutes a drag on their financial performance. Thus, serious attention should be placed on the effective management of firms' relational and structural capital efficiency in order to ensure a better financial return.

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