

## **Intellectual Capital and Corporate Performance of Listed Non-Finance Firms in Nigeria**

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### **Abstract**

*The study investigated the effect of intellectual capital on corporate performance by drawing samples from listed non-finance firms in Nigeria between the periods of 2012-2021. In this study, human capital, structural capital, and relational capital were the intellectual capital proxies employed to examine their effects on firms' performance. The firm's performance was measured in terms of return on total assets (RETA). Ex post facto research design was adopted; secondary data were employed and a purposive sampling technique was adopted to select the sample size of 85 companies. Furthermore, in line with related extant literature, the researcher adopted a net profit margin to control the model's goodness of fits. The data were analysed using the Ordinary Least Square regression technique. The results showed that human capital has a positive insignificant effect on return on total assets while structural and relational capital have significant positive effect on the return on total assets of the selected non-finance firms. From the findings of the study, it was concluded that relational capital and structural capital significantly improve the performance of selected listed non-finance firms in Nigeria. On the bases of these findings, the paper recommended that managers should invest more in their structural capital as well as their relational capital since they tend to improve the financial performance of the studied firms. It was also recommended that though human capital appears to have insignificant effect on the studied firms, more emphasis should be placed on them since the other resources of the firm cannot function maximally without their creativity, capabilities and innovative capacities.*

**Keywords:** Intellectual capital, human capital, structural capital, relational capital, return on assets.

### **1.1 Background to the Study**

The financial reports of companies are supposed to reflect the true, fair and real value of the firms during the reporting period. These financial statements are prepared according to International Financial Reporting Standards (IFRS), which prescribe the measurement, recognition and disclosure criteria for all items in the financial statements. However, there have been various calls from some accounting scholars expressing worry over the treatment of some intangible assets which do not meet the recognised criteria of the accounting standards. For example, for an item to be recognized as an asset, it must first meet the definition criteria even before being classified as an intangible asset. The control criteria and the cost measurement criteria are difficult thresholds for

some intangible assets to cross especially human capital and this has made them to be expensed even when it is probable that they bring in future economic benefits to the entity. An intangible value driver, which does not meet the criteria for recognition in the financial statement is excluded irrespective of its relevance and significance in influencing the decision of the user (Danish et al., 2021).

The overarching call of the accounting regulations embodied in International Accounting Standards (IAS) 38: Intangible Assets hinges on the accounting treatment of some intangible assets including research and development expenses. Intellectual capital (IC) in its similitude nature to intangible assets is referred to as the knowledge base of an organization. In a knowledge-based economy, knowledge plays a central role in driving performance and generating sustainable competitive advantage (Sushua, & Karam, 2012; Lev, & Gu, 2016). The wealth-growing capacity of nations is now mainly intellectual asset-driven (Cabrita & Vaz, 2018) and the knowledge base (of firms) has become paramount for profitability, stability and sustainability (Puntilo, 2019). When a firm acquires knowledge and that knowledge is capable of being used to generate business value, then it is intellectual capital. IC is comprised of three components: human capital (human resource), structural capital (organizational capital/value) and relational capital (Customer capital/relationship).

Human capital (HC) refers to the knowledge acquired by the members of an organization, their productivity and the value of their contributions to the company. Human capital is the entirety of the workers' skills, capabilities, tacit knowledge, and experience. Structural capital (SC) on the other hand, refers to all the knowledge owned by an organization that is independent of the people (Rawashdeh, 2022). In this sense, it is the set of intangibles that structure and develop the activities of the organization. According to Sveiby (2010), SC includes patents, concepts, models, computers, and administrative systems. Relational capital (RC) is the part of intellectual capital that allows the creation of value as regards the external relations of the company. It refers to the firm's relations with its suppliers and customers (Sveiby, 2010). In this respect, Welbourne (2018) argued that relational capital depends on maintaining and developing quality relationships with other firms, individuals, or groups that influence a company.

Corporate performance consists of those indicators that allow the management to find out if the expected results are being obtained from a quantitative and qualitative standpoint. In this sense, organizations can decide on the actions that should be implemented to improve their performance; this way, their measurement is essential for every organization and the success or failure of a firm can depend on it. Likewise, it is also analysed when considering the contributions of assets in generating values for the firms. Therefore, improving organizational performance is not solely dependent on the successful development of tangible resources but also on intangible resources such as the effective management of knowledge and intellectual capital systems. IC has become critical to sustaining competitive advantage, organisational success, innovation, superior organisational performance, new product development, enhanced shareholders value and framework for achieving the organisational goal (Onyewelu & Ubesie, 2016; Akpan & Otung, 2020).

This study is supported by the resource-based theory of the firm. According to this theory, the performance of a firm is tied directly to the resources it possesses. The direction of an organisation is dependent on the tangible and intangible resources available to the firm. Barney (1991) in a popular article outlined four characteristics that resources must have to have the potential for sustained competitive advantage. The resource must have the ability to exploit the opportunity and stabilize threats. The scarcity of resource is paramount in the industry and thus the managements need to manage both the intangible and tangible assets of the firm to improve its performance of the firm. Non-finance firms constitute a major sector in the Nigerian economy and

their information disclosure especially, on intellectual capital and other intangible assets are regarded as a milestone in financial reporting, as this is a major determinant of firms' value and of course, the overall performance.

Even when it has been a known fact that organizations with good intellectual capital outperform their counterparts, there are only a few empirical studies on the effect of intellectual capital especially on developing economies like Nigeria. Furthermore, the increasing gap observed between the market value and book value of non-finance firms in Nigeria has drawn the researcher's attention towards investigating the value missing from financial statements. The non-finance firms in Nigeria are one of the sectors that demand a very high intellectual capital to function. In addition to this, some of the research on intellectual capital and corporate performance carried out in Nigeria focused on other sectors of the economy like ICT firms, Breweries companies, banks etc (Muttakin, et.al 2015; Appah & Onowu, 2021; Oziegbe & Inua, 2020; Akpan & Akinniny, 2019), while a few studies did just literature without empirical analysis. In addition, examining intellectual capital on organisational performance is still one of the interesting topics for companies and regulators. More so, there is no consensus from prior studies concerning the effect of intellectual capital on corporate performance. For instance, the studies conducted by Danish et al (2021) Al-Musali, & Ismail (2016), Onyewelu & Ubesie (2016), and Xu & Liu (2020) suggested a positive association; while Abdelmohsen & Gehan (2020), Rawashdeh (2022), Eka, Mirna & Mulia (2019) suggested negative results. Based on this gap, this study is undertaken to ascertain the effect of intellectual capital on the performance of listed non-finance firms in Nigeria.

## **2.0 Literature Review**

### **2.1.1 Intellectual Capital**

Intellectual capital can be defined as all those intangibles an organization has and which can be acquired or generated, assimilated, processed and implemented harmoniously to attain higher levels of innovation, productivity and competitiveness, despite not being reflected in the financial statements. Moreover, they produce future value, upon which competitive advantage supports (Zhang et al., 2018) The concept of IC expands on and elaborates the strategic and operative understanding of firms' key capabilities. In the last decade, this emerging concept has established itself among the most widely accepted management constructs. Its holistic approach emphasizes the dimensions of knowledge employed and activated in organizations, as well as the impact of knowledge-based resources on their performance. Its main objective is to provide firms with guidelines on how to develop their key capabilities represented in intellectual capital, measure their contribution and manage their growth, and most importantly, find the best and most productive way to create value considering the specificity of their key capabilities and effects which arise from their interactions. The defining of intellectual capital and its taxonomy, the strategic and operative management of intellectual capital and the measurement of its key components constitute a homogeneous theoretical framework, which reflects the holistic approach of this concept in creating firms' value. In the theoretical sense, the concept of IC mostly relies on the resource-based theory of the firm and its variation – the concept of dynamic and core capabilities. The notion that the resource-based theory uses as a key concept - the concept of strategic resources, resembles the traditional concept of strategic factors of production.

The concept of IC stresses that organizations create value through several linkages and interactions between all relevant resources, within and outside them. Accordingly, external resources, in different forms of strong and intensive linkages with organizations' stakeholders, are equally important as internal resources. Stakeholders include shareholders, employees, customers, suppliers, lenders, the government and society, and they are treated as organizations' partners in the process of value creation. Therefore, within the context of IC, a firm's performance should be explained from the stakeholders' perspective, implying that a firm's performance is seen

as the total wealth generated by the firm, before its distribution to various stakeholders, rather than the accounting profit allocated only to shareholders. Since the accounting profit measures return to shareholders only, value added (VA) represents a more accurate measure of wealth created by stakeholders and then distributed to them (Meek & Gray, 2018; Riahi-Belkaoui, 2003). Intellectual capital consists of human capital, structural capital and relational capital

### **2.1.2 Organisational Performance**

Organizational performance consists of those indicators that allow the management to find out if the expected results are being obtained from a quantitative and qualitative standpoint. In this sense, organizations can decide on the actions that should be implemented to improve performance. This way, their measurement is essential for every organization and the success or failure of a firm can depend on it. Likewise, it should also be considered that in addition to analyzing the effect that tangible assets have on the organization, it is also necessary to consider intangible assets, in this case, intellectual capital. Organizational performance is a product or result of executive processes and the fulfilment of organizational goals. In another definition, organizational performance is accomplishing the duties assigned to human forces by the organization (Masedeh, Gharaibeh, Magableh & Karajeh, 2013). Organizational performance includes almost all the purposes associated with competitiveness and production excellence and is related to the concepts of costs, flexibility, velocity, reliability, and quality. Moreover, organizational performance can be described as an umbrella for all the concepts that encompass every organization's success and practices. It is a function of the organisation's ability to obtain and use resources to achieve a competitive advantage. As a result, organizations must adopt a performance-evaluating system that looks beyond measuring only financial performance (Chang, & Lee, 2012). In this study, performance is proxied by return on total assets (RETA). RETA measures a company's profitability by revealing how much profit a company generates from the shareholders' investment and how much value has been added to shareholders' investments.

### **2.1.3 Human Capital (HC) and Organisational Performance**

Human capital can be defined as the knowledge acquired by the members of an organization, their productivity and the value of their contributions to the company (Lee & Lee, 2018). It is also defined as “the capacity to act in a wide variety of situations to create both tangible and intangible assets” (Sveiby, 2010). The main component of HC is employees who can create knowledge through instinctive skills, educational skills, competence, and attitudes (Roos & Ross, 2017). It is argued that HC is the entirety of the workers' skills, capabilities, tacit knowledge, and experience. Further, Chen et al. (2005) stated that employees' competence, loyalty commitment, and motivation are the main components of HC. Employees use tacit knowledge and the traits that accumulate from these forms to create value in their firm. Cabrera et al (2018) added that HC is a strategic renewal and a source of innovation which has a positive effect on organizational performance. It gives the firm its unique nature and reflects its human factor, combined intelligence, expertise, and skills (Oziegbe & Inua, 2020). Abdelmohsen & Gehan (2020) investigated the impact of IC on the firm's financial performance of two main sectors in the Bahrain Bourse, the financial and service sectors, for five years, from 2013–2017. Findings related to the financial sector revealed that all IC components (human capital, customer capital, and structural capital) have positive correlations with firms' performance except for the labour costs variable (the sub-variable of human capital). Based on the above, it was hypothesized that;

HO1: Human capital has no significant effect on the performance of selected listed non-finance firms in Nigeria.

#### **2.1.4 Structural Capital and Organisational Performance**

According to Sveiby (2010), structural capital SC includes patents, concepts, models, computers, and administrative systems. Structural capital refers to all the knowledge owned by an organization that is independent of the people. In this sense, it is the set of intangibles that structure and develop the activities of the organization. Roos et al. (2017) stated that “SC is what remains in the company when employees go home for the night. Bontis (2004) suggested organizational learning capacity, documentation service, the general use of information technologies, and organizational flexibility as SC examples. Besides, Duho & Onuma (2019) stated that “all non-human storehouses of knowledge, including databases, organizational charts, process manuals, strategies, and routines are examples of components of SC”. Sedeaq (2018) surveyed 84 managers at Jordanian telecommunication firms to explore the effect of IC on a firm's performance. They found that CC has the greatest significant and positive influence on Jordanian firms' performance, followed by HC and SC as second and third in significance.

Previous studies presented different proxies for SC. For instance, Xu & Liu (2020) used research and development expenditures, while Masadeh (2013) used total intangible assets and capital expenditures. OECD (2008) indicated that SC is a non-physical asset that has the ability of economic profits, short in physical materials, and could be traded and retained by a firm. In light of the above, the firm's total of non-physical assets was selected as a proxy for SC in the current study. Moreover, Godfrey and Hill (1995) claimed that the firms' capability to possess all the characteristics of strategic assets derives from the inclusion of intangible assets and thus can significantly affect firms' performance. Thus based on the above, it was hypothesized that:

HO2: Structural capital has no significant effect on the performance of selected listed non-finance firms in Nigeria.

#### **2.1.5 Relational Capital (RC) and Organizational Performance**

Relational capital is the part of intellectual capital that allows the creation of value as regards the external relations of the company. It refers to the firm's relations with its suppliers and customers (Sveiby, 2010). In this respect, Welbourne (2018) argued that relational capital depends on maintaining and developing quality relationships with other firms, individuals, or groups that influence a company. Amrizah and Rashidah (2013) pointed out that “RC is an organization's ability to create relational value with its external stakeholders. Organizations gain manifolds when they build relational capital, e.g., customer and brand loyalty, customer satisfaction, market image and goodwill, power to negotiate, strategic alliances and coalitions”. Tsui et al. (2014) indicated that the interaction between firms and their external environment, including marketing channels, governmental and industrial networking, supplier relationships, customer relationships, customer loyalty, intermediaries or partners, customers, and competitors, leads to improved value creation. Based on the above, it was hypothesized that:

HO3: Customer capital has no significant effect on the performance of selected listed non-finance firms in Nigeria.

### **2.2 Theoretical Background**

#### **2.2 Resource-Based Theory by Barney (1991)**

According to the Resource-Based Theory (RBT), the performance of a firm is tied directly to the resources it possesses. The direction of an organisation is dependent on the tangible and intangible resources available to the firm. Barney (1991) in a popular article outlined four characteristics that resources must have to have the potential for sustained competitive advantage. The resource must have the ability to exploit the opportunity and stabilize threats. The scarcity of resources is paramount in the industry. There must be no room for the replication of resources. For a resource to have sustained competitive advantage potential, there should be no equivalent resource. IC is

also seen as a strategic resource from the perspective of Al-Musali & Ismail (2016), using the resource-based theory, hence management of firms can capitalize on it to create sustained competitive advantage. Firms may have IC in the form of patents, structures, information, customer relations, brand and other intangible variables which possess these characteristics, and should translate into firms' financial and market performance. If that is the case, IC can be classified as an asset contrary to the stance of the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB). When managers can control and manage their assets efficiently, it should lead to value creation for their shareholders.

### **2.3 Empirical Review**

Some empirical studies have been undertaken in this area and some of them are reviewed below.

Rawashdeh (2022) examined the relationship between intellectual capital components (human capital, structural capital, and relational capital) and organizational performance. Data were collected from 294 employees working in Jordanian airline companies. Data were analyzed through descriptive statistical methods with mean, standard deviation, percentage, Pearson correlation coefficient, T-test and regression performed by SPSS. The results of the analysis showed that intellectual capital components (human capital, structural capital, and relational capital) had a positive effect on organizational performance.

Danish, et al., (2021) empirically analyzed the influence of innovative culture and trust on intellectual capital and examined the impact of intellectual capital on organizational performance through the mediation effect of the performance measurement system in the aviation sector of Pakistan. The target population of the study comprised ground-level and aircraft staff from the aviation sector of Pakistan. The convenience sampling technique was used to collect the data. The pre-structured questionnaire was used to gather data. Using SEM in AMOS v22, the outcomes of the study showed that organizations can efficiently improve their non-financial performance by measuring the main drivers of IC (i.e., trust and innovative culture).

Akpan and Otung (2020) investigated the effect of intellectual capital on the economic value added of listed banks in Nigeria. The data for the study were secondarily derived from the annual reports of the studied banks and the Nigeria Stock Exchange fact book. The research design adopted was expo facto design and the study covered a period of 4 years from 2015-2018. The sample size of 12 banks was selected using the Cochran model. Intellectual capital was measured using Value Added Intellectual Coefficient (VAIC) developed by the Public. Data were analyzed using descriptive statistics and ordinary least square regression technique. The results obtained showed that human capital efficiency, structural capital efficiency and capital employed efficiency, significantly influenced the economic value added of listed banks in Nigeria. It was concluded that IC efficiency is positively associated with the economic value added of banks in Nigeria. The study recommended that the apex bank and other regulatory agencies should strengthen the enforcement of policies and measures that promote intellectual capital development, as this will enhance the value added of these banks.

Ibara, et.al. (2019) carried out a study to ascertain if human capital, structural capital and relational capital have a positive influence on the organizational performance of medium-sized firms in the Mexican manufacturing sector. Moreover, it is analyzed if competitive advantage mediates the relation between intellectual and organizational performance. Data were obtained from a survey of 309 CEOs of Mexican manufacturing firms. To test the research hypotheses, the construct validity was tried using face, content, convergent, nomological and discriminant validity, for which techniques such as exploratory and confirmatory factor analysis using SPSS and AMOS, respectively, were resorted to. Later on, Partial Least Squares Structural Equation Modeling (PLS SEM) was applied using the software SmartPLS. Results showed that the three dimensions of

intellectual capital have a positive and significant influence on organizational performance. Furthermore, competitive advantage mediates the relationship between intellectual capital and organizational performance.

Akpan and Akininnyi (2019) investigated the effect of intellectual capital on value creation and bank performance in Nigeria. The study adopted ex-post facto as its research design and data for the study were obtained from banks quoted on the Nigeria stock exchange and the study period was 2013-2015. Three hypotheses were tested and the statistical technique employed was descriptive statistics and OLS regression analysis. The result of the analysis showed that human capital, structural and relational capital do not significantly affect the performance of banks in Nigeria. It was concluded that though the intellectual capital components do not significantly affect banks' performance, this should not underscore the relevance of intellectual capital as a major driver for corporate performance and value creation. Based on these findings, it was recommended that banks as well as other corporate organisations should invest tremendously and report their intellectual capital components in their financial statements, as this can enhance their reputation, and competitiveness as well as add more value to their bottom lines.

Abdelmohsen & Gehan (2020) investigated the impact of IC on the firm's financial performance of two main sectors in the Bahrain Bourse, the financial and service sectors, for five years, from 2013–2017. The study employed canonical correlation analysis as a unique statistical method to analyze data gathered from 29 sampled companies, representing 145 firm-year observations over five years. Two groups of variables are employed. The first represented the firm's financial performance with two variables (return on equity – ROE and return on assets – ROA), while the second included three intellectual capital components, namely human, customer, and structural capital. Findings related to the financial sector revealed that all IC components (human capital, customer capital, and structural capital) had positive correlations with firms' performance except for the labour costs variable (the sub-variable of human capital), which had a negative correlation with firm's performance. Human capital was also found to be the most significant component of the IC, while structural capital is reported as the lowest effect on the firm's performance, consistent with some previous research findings. Furthermore, the services sector results revealed that IC was significantly associated with the firm's performance.

Narwal & Yadav (2017) carried out a study to determine the level of IC disclosure among Malaysian listed companies and also investigated the effect of IC information on market capitalization. A sample of 185 companies listed in Bursa Malaysia was selected. Descriptive statistics and content analysis were performed to analyse the data. The result of the analysis showed that about 69% of the companies selected disclosed IC in their annual reports. The study also found a positive effect of IC information on market capitalization. They concluded that disclosure of human capital (HC) and relational capital (RC) information in the annual report gave a positive significant effect on market capitalization. In a similar study, Eka, Mirna and Mulia (2019) studied the effect of IC on the financial performance of listed companies in Indonesia. The data used were obtained from these companies' financial statements for the period 2010 to 2015. The panel data used were analysed using E-views 9. The result of the analysis showed that IC had a significant and positive influence on almost all the sub-variables of financial performance proxied by net profit margin (NPM), return on equity (ROE) and average asset turnover (AAT). It was also found that IC had a significant influence on market value and was concluded that one of the reasons for the rising share price of some companies was due to the good valuation of the company by the investors.

Xu & Liu (2020) investigated the impact of IC and its components on the performance of Korean manufacturing firms over the period 2013–2018. The modified and extended Value Added Intellectual Coefficient (VAIC) model was adopted to more accurately measure IC, and the firm's

performance was systematically and comprehensively measured in three distinct parameters: profitability, productivity and market value. The regression results showed that physical capital was the most influential factor in the firm's performance; human capital was viewed as a performance-enhancing measure; structural capital had no significant impact on the firm's performance; and innovation capital and relational capital hurt a firm's profitability.

In a similar research by Sedeaq (2018), the impact of intellectual capital on the performance of the real estate sector of companies listed in the Istanbul stock exchange for the period of 2004-2015 was studied. VAID method was utilized as a measure of IC. Ordinary least square (OLS) regression was used as an analytical technique. The analysis showed that SCE had a key role to play in value creation as it had a positive significant relationship with market-to-book value, ROE, and EPS before the crises. HCE showed a negative significant relationship with ROA and ROE before the crises and a negative significant association with market-to-book value and asset turnover. It was concluded that although intellectual capital had a significant impact on value creation, it revealed also that real estate Turkish companies weakly depended on its IC.

In Nigeria, Onyewelu & Ubesie (2016) studied the effect of IC on quoted pharmaceutical firms. The study adopted the panel research design as they used time series and cross-sectional data. The result of the study revealed that HCE had a positive and significant effect on market-to-book value. It also revealed that customer capital had a negative and significant effect on market-to-book value. Narwal & Yadav (2017) examined the impact of IC on the Indian real estate sector's profitability and productivity. Their findings indicated that IC had a significant positive impact only on the profitability of this sector.

Based on the empirical review above, it was found that most of the work on intellectual capital and firms' performance is done outside of Nigeria (Sedeaq 2018; Xu & Liu 2020; Suhendra, 2015; Narwal & Yadav 2018; Xu & Liu, 2020)). In addition, some of the outcomes are positive (Sushua & Karam 2012; Xu & Liu 2020), others have negative results (Onyewelu & Ubesie, 2016; Pontilo, 2019), and others found no relationship at all. It is therefore based on this gap that this study was undertaken

### **3.0 Methodology**

According to Uford (2017), research design entails selecting a suitable approach to guide your work. For this study, the *ex post facto* research design was considered suitable. This design was suitable for this study because the data employed were historical data and also the researcher had no intention to influence the data. The population of this study is made up of non-finance firms that are listed on the floor of the Nigerian Exchange Group for 10 years i.e. between 2011 and 2021. At the end of 2021, there were one hundred and nine (109) non-finance companies listed on the floor of the Nigerian Exchange Group and the distribution is shown as Healthcare Sector -10; Agriculture - 4; Conglomerate - 5; Natural Resources - 5; Consumer Goods Sector; - 22; Industrial Goods Sector - 13; Services - 23; Oil and Gas - 12; ICT -8; Construction and Real Estate - 7. The sample of 85 companies was purposively selected based on certain criteria. The secondary data-gathering technique was used in this study. This is because secondary data can easily be verified and authenticated. The study employed analytical software of Stata version 16 and Microsoft Excel for the analysis. The secondary data collected were analysed using descriptive statistics, correlation, and regression analysis. Descriptive statistics were used to evaluate the characteristics of the data: mean maximum, minimum, and standard deviation and also check for normality of the data. Correlation analysis was employed to evaluate the association between the variables and to check for multicollinearity. Ordinary Least Square (OLS) regression analysis technique was employed to find the cause-effect relationship between the independent variables and the dependent variables.



### 3.2 Model Specification

The study adapted the model specified by Xu & Lui (2020), which was modified for the purpose of establishing a relationship between the dependent variable and the linear combinations of several determining variables captured in the study. The econometric form of our model is expressed as:

$$RETA_{it} = \beta_0 + \beta_1 HC_{it} + \beta_2 SC_{it} + \beta_3 RC_{it} + \beta_4 NPTM_{it} + \mu_{it}$$

Where:

- RETA = Return on Asset
- HC = Human capital
- SC = Structural Capital
- CE = relational capital
- NPTM = Net Profit Margin
- $\beta_0$  = Constant
- $\beta_1- \beta_6$  = Slope Coefficient
- $\mu$  = Stochastic disturbance
- i = i<sup>th</sup> firm
- t = time period

### 3.7 Operationalization of the Variables

S/N	Variables	Notation and Sources	Apriori Sign
<b>Dependent Variable</b>			
1	Performance (RETA)	Profit after tax/ to total asset	
<b>Independent Variables</b>			
2	Human Capital Efficiency	Staff cost / sales revenue +	
3	Structural Capital	Research and development cost/sales revenue +	
4	Customer capital	Natural log of goodwill +	
5	Net Profit Margin	Profit after tax margin in percentage is computed as profit after tax divided by revenue or sales +	

Source: Author’s Compilation (2022)

#### 4.0 Data Analysis and Discussion of Results

##### 4.1 Data Analysis

The following analyses were conducted for the study:

##### Descriptive Analysis

**Table 4.1:** Descriptive Statistics of the effect of intellectual capital on organisational performance

Variable	Obs	Mean	Std. Dev.	Min	Max
reta	753	1.75349	17.19673	-179.9173	176.2669
hc	748	3.984325	5.116617	-16.3314	73.3844
sc	753	.569192	1.543194	-20.5332	18.6774
re	754	.2347301	.2785263	-1.2159	5.8538
nptm	752	-11.7744	434.8416	-5376.709	6946.536

Source: Author (2022)

Table 4.1 shows the summary of the descriptive statistics for this study. From the table, it is observed that dependent variable of return on asset (RETA) on average was 1.75 with a standard deviation of 17.20. It is also observed that on average, human capital (HC) was 3.98 with a standard deviation of 5.12 as well as a minimum and maximum value of -16.33 and 73.38 respectively. Structural capital (SC) on average is 0.57, with a standard deviation of 1.54. Structural capital employed had a minimum of -20.53 and a maximum of 18.68. The table also shows that on average, customer capital (CE) was 0.23 with a standard deviation of 0.28 as well as a minimum and maximum of -1.22 and 5.85 respectively. In the case of the control variable, the table shows that net profit margin (NPTM) had a mean of -11.77 and a standard deviation of 434.84.

**Table 4.2: Correlation analysis of the relationship between intellectual capital and organisational performance**

	RETA	HC	SC	RE	NPTM
RETA	1.00				
HC	0.38	1.00			
SC	0.23	0.71	1.00		
RE	0.48	0.46	0.17	1.00	
NPTM	0.92	0.34	0.16	0.38	1.00

Author's computation (2022)

The analysis from the spearman rank correlation in table 4.2 shows that human capital (0.38), structural capital (0.23), relational capital (0.48), as well as the control variable of net profit after tax margin (0.92) are positively related to the dependent variable of return on asset. All associations are seen to be weak, hence there is no room to suspect the presence of multicollinearity in the estimated model. More so, to confirm the absence of multicollinearity among the variables, the researcher employed a more robust check of the Variance inflation factor test (VIF).

**Table 4:3 Regression result of the effect of intellectual capital and organisational performance**

	<b>RETA Model (Pooled OLS)</b>	<b>RETA Model (Robust Regression)</b>
C	-2.16 {0.006} **	-0.73 {0.000} ***
HC	0.20 {0.153}	0.00 {0.878}
SC	0.67 {0.071}	0.17 {0.029} **
RE	11.38 {0.000} ***	10.89 {0.000} ***
NPTM	0.01 {0.000} ***	0.40 {0.000} ***
F-statistics Wald Statistics	36.54 (0.00) ***	127.06 (0.00) ***
R- Squared	0.17	0.17
VIF Test	1.29	
Heteroscedasticity Test	88.32 (0.000) ***	

Note: (1) bracket { } are p-values

(2) \*\*, \*\*\*, implies statistical significance at 5% and 1% levels respectively

From table 4.3, it is observed from the OLS pooled regression that the R-squared value of 0.17 shows that about 17% of the systematic variations in firms' performance as measured by return on the asset in the pooled non-finance firms over the period of interest was jointly explained by the independent variables and the control variable in the model. This implies that the return on the asset in Nigeria cannot be 100 per cent explained by humans and the control variables. The unexplained part of the return on the asset can be attributed to exclusion of other independent variables that can impact firms' performance but were excluded because they are outside the scope of this study. However, they have been captured in the error term. The F-statistic value of 36.54 and its associated P-value of 0.00 shows that the OLS regression model on overall is statistically significant at a 1% level, this means that the regression model is valid and can be used for statistical inference.

#### 4.4 Discussions of Findings

Human Capital and Performance of Selected Listed Non-Finance Firms in Nigeria.

The results obtained from the robust OLS regression in table 4.3 shows that human capital {0.00 (0.878)} has a positive and insignificant effect on the firms' performance as proxied by return on asset. This, therefore, means that the null hypothesis should be accepted (human capital has no significant effect on the financial performance of listed non-finance firms in Nigeria). This implies that an increase in human capital efficiency of non-finance firms in Nigeria insignificantly increases the financial performance of such firms. This result agrees with prior empirical results which show that human capital efficiency is not a significant driver of financial performance (Narwal & Yadav, 2017; Abdelmohsen & Gehan, 2020; Sushua & Karam 2012). Most specifically, the results did not tally with previous findings of various researchers that report that human capital efficiency has a significant negative impact on financial performance (Onyewelu & Ubesie; Lai, 2013; Puntilo, 2019)). The results did not also tally with previous findings of various researchers that human capital efficiency has a significant positive effect on financial performance (Eka et al 2019; Edvinson & Malone, 2007)

#### Structural Capital and Performance of Selected Listed Non-Finance Firms in Nigeria.

The results obtained from the robust OLS regression in table 4.3 shows that structural capital efficiency {0.17 (0.029)} has a positive and significant effect on the firm's performance as proxied by return on asset. This, therefore, means that the null hypothesis should be rejected (structural capital efficiency has no significant effect on the financial performance of listed non-finance firms in Nigeria). This implies that an increase in structural capital efficiency significantly increases the financial performance of listed non-finance firms in Nigeria during the period under consideration. This result agrees with prior empirical results which show that capital-employed efficiency is a major driver of financial performance (Suhendra, 2015; Lev & Gu, 2016; Xu & Li, 2019). Contrary to this, the results did not tally with previous findings of various researchers that customer capital efficiency has a significant negative impact on financial performance (Sedeaq, 2018; Duho & Onuma, 2019).

#### **Relational Capital and Performance of Selected Listed Non-Finance Firms in Nigeria.**

Finally, the results obtained from the robust OLS regression show that relational capital efficiency {10.89 (0.000)} has a positive and significant effect on the firm's performance as proxied by return on asset. This, therefore, means that the researcher should reject the null hypothesis {relational capital has no significant effect on the financial performance of listed non-finance firms in Nigeria}. This implies that an increase in relational capital efficiency significantly increases the financial performance of listed non-finance firms in Nigeria during the period under consideration. This result agrees with prior empirical results which show that relational capital efficiency is a significant driver of financial performance (Chiang et al, 2011; Abdelmohsen Gehan, 2020; Meek & Gray, 2018; Cabrita & Vaz, 2018). More so, the results did not tally with previous findings of various researchers that structural capital efficiency has a significant negative impact on financial performance (Narwal & Yadav, 2017; Eka et al, 2019)

#### **5.0 Conclusion and Recommendations**

From the findings of this study, the study concluded that relational and structural capital efficiency can significantly improve the financial performance of listed non-finance firms in Nigeria. The result indicates that in the Nigerian non-finance sector, most of the companies still have a high dependency on the physical capital resource while the human capital component is treated as an expense because it does not meet the measurement and recognition criteria of international financial reporting standards. From the resource-based view, a firm's heterogeneous resource architectures are the primary sources of income. Their apparent valuable, rare, inimitable, and non-transferable qualities can contribute to the competitive advantage of firms.

On the bases of these findings, the researcher recommended that managers should invest more in their structural capital and relational capital as they seem to improve the financial performance of the studied firms. It was also recommended that though human capital appears to have insignificant effect on the studied firms, more emphasis should be placed on them since the other resources of the firm cannot function maximally without their creativity and innovative capacity.

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