

## EFFECT OF INTELLECTUAL CAPITAL ON ECONOMIC VALUE ADDED OF QUOTED NON-FINANCIAL COMPANIES IN NIGERIA

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### Abstract

*This study established the effect of intellectual capital on economic value added of quoted non-financial companies in Nigeria. Specifically this study sought to: determine the effect of Capital Employed Efficiency (CEE) on Economic Value Added of quoted non-financial companies in Nigeria, and ascertain the effect of Human Capital Efficiency (HCE) on Economic Value Added of quoted non-financial companies in Nigeria. Ex-Post Facto research design was adopted for the study and Data were extracted from audited accounts of non-financial companies in Nigeria from 2008 to 2020 (13 years). A sample size of thirty-two (32) non-financial companies was selected from a population of 124 companies. Regression analysis was used to analyze the data using E-view10.0. The result revealed that CEE and HCE have a significant positive effect on EVA of quoted non-financial companies in Nigeria at 5% level of significance. Based on the results, the study recommended among others that enlightenment campaigns in the areas of available cheap long term credit sources at concessionary interest rate and less stringent conditions should be carried out by financial stakeholders. This would assist firms acquire more tangible assets with which to improve upon their performances and enjoy economy of scale.*

**Keywords:** Capital Employed Efficiency, Human Capital Efficiency and Economic Value Added

### INTRODUCTION

Over the years, the issue of intellectual capital (IC) has attracted considerable attention among accounting researchers and practitioners because of the crucial roles they play in achieving firm financial performance (Edvinsson & Malone, 1997). Intellectual capital (IC) is a collective knowledge of the individuals in an organization or society. Intellectual capital includes customer capital, human capital, intellectual property and structural capital. Historically, intellectual capital represents the domain of knowledge of practical experience, organizational technology, customer relation, professional skills that provide the company with relevant advantage in its

market. It includes intangible assets, intangible resources, and intellectual property. IC is multi-dimensional concept which determines the company's stock of knowledge base assets and how they change over the time (Tsai, Chou & Chen, 2018). IC is recognized as group of knowledge base assets which trait value to organization by providing competitive positioning to organization. Intellectual capital covers knowledge and experience of skilled employees which can be used to gain competitive advantage by applying creative strategies. IC has different components like Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE). One of important component is human capital. It is a knowledge and experience of employee. Amahalu, Okoye and Obi (2018) defined human capital as stock of knowledge and experience which is helpful for the organization. Chen and Min (2004) argue that human capital is considered such factors as employees' attitude, skill, knowledge, information and experience fostering organization performance. Human capital is employees' know-how, information and general capabilities which are use to create value for organization. Whereas structural capital is organization's innovative processes, copy rights, patents, procedures and generate value creation for organization. However, relational capital is relation of employees with internal and external stake holders.

However, it has been observed that the issue of financial performance has been dealt with using conventional profitability measures on return on capital employed, return on equity and return on assets management employed. There is a problem with these measures because the index or indices generated are from historical value which is the content of financial statement. It now becomes extremely difficult to be able to judge if the result of the relationship between intellectual capital and financial performance really captures what it purport to capture, if it truly represent the actual relationship. It is against this background, that the current study is advancing a more appropriate measure of financial performance in form of economic value added. Thus, we ask this fundamental question; what is the effect of intellectual capital on economic value added?, which account for the main objective of this study, to investigate the relationship between intellectual capital and economic value added among quoted firms in Nigeria.

The main objective of this study is to establish the effect of intellectual capital on economic value added of quoted non-financial companies in Nigeria.

Specifically this study sought to:

- i. Determine the effect of Capital Employed Efficiency (CEE) on Economic Value Added of quoted non-financial companies in Nigeria.
- ii. Ascertain the effect of Human Capital Efficiency (HCE) on Economic Value Added of quoted non-financial companies in Nigeria.

## **Literature Review**

### **Intellectual Capital (IC)**

Intellectual Capital (IC) is a knowledge and information which create the value added efficiency to create wealth of corporations (Stewart, 1997). Pulic (2004) define IC as employees and their abilities to create value added efficiency. The value creation efficiency of organization can be measured both tangible (Capital Employed) and intangible (Human and Structural Capital). Pulic (2000a, b) and Sullivan (2000) define IC as knowledge that can be converted into profits. IC is defined as knowledge which can be converted into value. The intellectual assets are intangible in nature which does not contain any financial value argued by (Edvinsson & Malone 1997). Intellectual capital is the intangible value of a business, covering its people (human capital), the value relating to its relationships (relational capital), and everything that is left when the employees go home (structural capital), of which intellectual property (IP) is but one component (Chen, 2019). Intellectual property is the value of a company or organization's employee knowledge, skills, business training or any proprietary information that may provide the company with a competitive advantage (Khavandkar, Theodorakopoulos, Hart & Preston, 2016). Intellectual

### **Capital Employed Efficiency (CEE)**

Capital employed, also known as funds employed, is the total amount of capital used for the acquisition of profits by a firm or project. It is the value of all the assets employed in a business or business unit, and can be calculated by adding non-current assets and working capital; or by subtracting current liabilities from total assets. By employing capital, investment has been made. Capital employed can give a snapshot of how a company is investing its money (Hayes, 2019).

$$\begin{aligned} \text{Capital employed} &= \text{Total assets} - \text{Current liabilities} \\ &= \text{Equity} + \text{Noncurrent liabilities} \end{aligned}$$

Capital employed can also be defined as total capital harnessed in a firm's fixed and current assets (Ulum, 2015). Viewed from the funding side, it equals to stockholders' funds (equity capital) plus non-current liabilities (loan capital) (Nimtrakoon, 2015). However, if it is viewed from the asset side, it equals to fixed assets plus working capital (Sufian, Kamarudin & Nassir, 2016). Capital employed efficiency (CEE) is an indicator of value-added efficiency of the capital employed. Capital Employed Efficiency (CEE) Coefficient is the new value that has been created by investing a unit of money in each of the resources (Singh, Sidhu & Joshi, 2016).

Capital Employed Efficiency (CEE) =  $CEE = VA/CE$

CAit = Capital Employed = Physical Assets + Financial Assets = Total Assets - Intangible Assets at end of 't' period (Thakur, 2017).

Value added (VA): newly created value, calculated as follows  $VA = \text{Operating profit} + \text{Employee costs} + \text{Depreciation} + \text{Amortization}$  or  $VA = \text{OUTPUT (Total income)} - \text{INPUT (All costs of purchasing goods and services from the market)}$  (Poh, Kilicman & Siti, 2018).

Intellectual Capital (IC) is one of important strategic asset in knowledge base economy. The human intellectual ability is a key intellectual and strategic asset which increases the efficiency of firms. Intellectual Capital (IC) is a knowledge and information which create the value added efficiency to create wealth of corporations argued by Stewart (1997). Pulic (2001) concludes IC as employees and their abilities to create value added efficiency. The value creation efficiency of organization can be measured both tangible (Capital Employed) and intangible (Human and Structural Capital) argued by (Pulic 2000a, b). Sullivan (2000) defined IC as "knowledge that can be converted into profits. IC defined as knowledge which can be converted into value argued by (Edvinsson & Malone, 1997). The intellectual assets are intangible in nature which does not contain any financial value. Calculating the efficiency of physical (employed) capital (CEE), which is the ratio of value added and the value of physical capital, which is defined as the book value of equity (net assets). CEE indicator informs about the tangible resource efficiency in the enterprise. In other words it provides information about value added generated by the involvement of one unit of physical capital (Beyer, 2013). The importance of intellectual capital (IC) is one of the most hotly debated issues in contemporary socio-economic development (Krsti & Boni, 2016).

With the emergence of knowledge-based economy, IC is generally acknowledged as a driver of competitiveness and sustainability. Moreover, IC investment is increasingly crucial to companies that seek to achieve productivity and efficiency gains [Dzenopoljac, Yaacoub, Elkanj & Bontis, 2017). According to the resource-based view (RBV), valuable and scarce resources (for Example, knowledge, information technology, and intellectual skills) can enable companies to gain sustainable competitive advantage and accelerate superior performance (Huang, Zhao, Geng, Tian & Jiang, 2017; Smriti & Das, 2018).

Various studies have depicted the effect of IC on the performance and value of the organization. IC is the core need of an organization. Yue, (2018) in a study elaborated that IC has a strong and significant impact on firm's performance. IC along with the combination physical assets can justify the firm's performance. Asiaei and Jusoh (2015) also described that firm's market price is influenced by IC and its components and that greater performance of VAIC (intellectual capital) leads an organization towards more prosperity and success. Iazzolino and Laise (2015) in a study took on 75 listed companies in South Africa to check the significance of IC. The study suggested that IC has a strong impact on profitability of the firm. They illustrated CEE (Physical capital efficiency) have a reliable impact on the performance of Modaraba firms, while CEE (Capital employed efficiency) has a significant impact on conventional banks' performance. Shah (2019) also found a positive impact of IC's efficiency on the performance of banking sector.

### **Human Capital Efficiency (HCE)**

Human capital is the most important asset of a firm. It represents the human factor in an organization as its combines intelligence, skills, knowledge, aptitudes and expertise that gives the organization its distinctive character. These traits immensely contribute to the efficiency in production and profitability, thus improve organizational performance (Bontis, William, Richardson, 2000; Yusuf (2013); Parham & Heling, 2015). Additionally, Micah, Ofurum, Ihendinihu (2012) argued that the ability of a corporate organization to successfully implement business strategies solely depends on efficient use of intangibles asset, particularly human capital. Efficiency in using resources plays an important role in determining the strength of the organization. Measuring human capital performance has become an essential issue for companies in today's business world since it may help them to get the right perspective on human capital. A proper performance measurement tool could provide the firms with the necessary information for

creating an action plan in order to improve human capital contribution to the organizational success (Ranjith, 2017).

Value Added Intellectual Coefficient (VAIC<sup>TM</sup>) developed by Ante Pulic is an analytical tool for measuring the efficiency of intellectual capital within a company. It was designed to enable management, shareholders and other relevant stakeholders to efficiently monitor and evaluate the efficiency of firm's total resources and each major resource component. The model gives a new insight into how value creation efficiency in the company is measured and monitored using accounting based figures. One of the VAIC<sup>TM</sup> components is human capital efficiency (HCE). HCE measures the value added by the human resources of an organization (Kwarbai and Akinpelu, 2016). Human Capital Efficiency measures the value added by the Human Resources of an organization. Value Added Intellectual Coefficient (VAIC) is a method used to measure the value creation Efficiency of a company by using its accounting based figures.

Human Capital (HC) = Overall employee expenses (salaries, education, training)

Human Capital Efficiency (HCE) = VA/HC

Intellectual capital can be defined as the intangible assets which are not listed explicitly on a firm's statement of financial position, but positively impact the performance of it, thereby revealing the relationship between employees, ideas, and information and measure what is not measured (Yalama, 2013). It is common knowledge that statement of financial position do not attempt to provide information on the actual value of an enterprise; instead, they are prepared for reporting purposes. Moreover, the relationship between the data obtained from financial reports (which are produced in line with the traditional accounting systems such as discounted cash flow valuation, liquidation and accounting valuation,) and the value of an enterprise has weakened. In addition, traditional accounting systems fail to reflect intangible assets creating value in enterprises (Pal & Soriya, 2012; Mondal & Ghosh, 2012). Thus, practicality of the accounting data obtained from financial reports has been diminishing (Mosavi, Nekoueizadeh & Ghaedi, 2012). In today's world, sources of economic value and wealth include not only the products manufactured by enterprises but also their intangible assets, i.e. their intellectual capital (Wang, 2013). It is widely believed that intellectual capital will play a greater role in creating value (Tanideh, 2013).

The relationship between IC and performance is not consistent. A study in Malaysia by Hussain, Edgeman, Eskildsen, Shoukry and Gani (2018) showed that companies with greater IC are more likely to have a more efficient productivity, and HC is a more significant factor in relation to productivity. However, Firer and Stainbank (2003) studied the 65 South African publicly traded companies and found that IC performance has significant but negative explanatory power for company productivity. Similarly, based on 80 Taiwan listed technological firms, Anghel, Siminica, Cristea, Sichigea and Noja (2018) used the VAIC<sup>TM</sup> model and revealed that there is a negative relationship between IC and productivity (measured by asset turnover). In addition, Tseng, Lim and Wu, (2018) observed that IC does not play any significant role in the productivity of Indian pharmaceutical and textile companies.

### **Economic Value Added**

Economic value added (EVA) is a financial measurement of the return earned by a firm that is in excess of the amount that the company needs to earn to appease shareholders. In other words, it is a measure of an organization's economic profit that takes into account the opportunity cost of invested capital and ultimately measures whether organizational value was created or lost. EVA compares the rate of return on invested capital with the opportunity cost of investing elsewhere. This is important for businesses to keep track of, particularly those businesses that are capital intensive (Chen, 2019). When calculating economic value added, a positive outcome means that the company is creating value with its capital investments. Conversely, a negative outcome would mean that the company is destroying value with its capital investments and the capital would be better spent elsewhere. Businesses can use economic value added to assess managerial performance as it serves as a measure of value creation for shareholders (Mocciaro, Picone & Minà, 2012). Economic value added (EVA) is a measure of a company's financial performance based on the residual wealth calculated by deducting its cost of capital from its operating profit, adjusted for taxes on a cash basis. EVA can also be referred to as economic profit, as it attempts to capture the true economic profit of a company. This measure was devised by management consulting firm Stern Value Management, originally incorporated as Stern Stewart & Co (Timo & Virtanen, 2011).

### **Empirical Studies**

Mehdi, Mohammad and Noghlebari (2013) examined the impact of intellectual capital (human capital, structural capital and relational capital (customer) on financial performance of Guilan Melli bank branches, Iran with profit factors, resource absorption, allocating resources and debt collection. A valid Psychometric questionnaire was used for doing this research after localizing and performing suitable changes about the effect of intellectual performance on bank's financial performance. For analysis of validity of questionnaire, confirmatory factor analysis and to examine reliability of questionnaire, Cronbach's alpha method was used. The research findings showed that there is a positive and meaningful relation between intellectual capital and bank financial performance and from among intellectual capital dimensions, human capital and then relational capital and at last structural capital have the most effect on bank financial performance respectively. Nkenganyi (2014) investigated the efficiency of intellectual capital and financial performance (profitability and productivity) of financial institutions Yaoundé, Cameroon. 60 companies were taken into consideration with data collected from the National Institute of Statistics for 2007-2008. Regression analyses were done between intellectual capital efficiency and financial performance and it was discovered that financial institutions still depend very much on capital employed since it is positively significant to profitability, while human capital and structural capital are not. Nimtrakoon (2014) explored the extent of Intellectual Capital (IC) and its three components among Asian countries, and examined the relationship between firms' IC, market value, and financial performance. The study used the data of 220 technology firms listed on five Asian stock exchanges of year 2011. Pulic's Value Added Intellectual Coefficient (VAICTM) model was adopted as a measure of efficiency from capital employed (VACA), human (VAHU) and structural capital (STVA). The Kruskal-Wallis one-way ANOVA and multiple regression analysis were utilized to test the hypotheses. The results revealed that there is no significant difference in VAICTM across five Asian countries; however, firms in each country tend to place a different degree of emphasis on VAICTM components to generate total value of IC. The results further indicated a positive relationship between IC and stock market value, confirming that firms with greater IC tend to have better market performance. Afshin, Saeed, Ebrahim & Saeed (2015) investigated the relationship between intellectual capital and

value-based performance measurement variables of automotive companies operating in Iran in the period 2008-2014 and it was found that efficient use of material and intellectual resources is effective on value-based performance measurement indicators. Also, the efficiency of human capital impacts on economic value added, market value added and value-added cash and the efficiency of capital employed impacts only on the economic value added and has a negative impact on cash value and market value added. Finally, the efficiency of the capital structure had a negative impact on all three indicators of financial performance. The amount to which Human Resource Management affects the performance of a corporate organization was determined by Ezejiolor, Nwakoby, and Okoye (2015). For the study, a survey research design was used, and the data was analyzed using a five-point Likert's scale. Simple regression analysis was used to examine the hypotheses. Human Resource Management has an impact on the performance of a corporate organization, according to the findings of this study. This entailed competent management as a motivator, as well as training and growth. Ulum, Rizqiyah and Ahmad (2016) analyzed the intellectual capital performance (ICP) of financial and non-financial industry of Indonesian biggest companies. ICP was measured with modified value added intellectual coefficient (MVAIC). Data were taken from 50 biggest market capitalizations listed on the Indonesia Stock Exchange for the period of 2007-2014. The result indicated that the ICP of companies in the non-financial industry is higher than the ICP of companies in financial industry. Ikapel (2016) investigated the impact of value added intellectual capital (VAICTM) on financial performance of listed commercial banks at the Nairobi securities exchange for the period 2010 to 2014. The study focused on capital employed efficiency, human capital efficiency and structural capital efficiency as predictor variables while the Net interest Margin was the response variable. Regression analysis was used. The findings showed that Capital employed efficiency had a significant effect on firm performance measured by net interest margin. Except for cooperative bank with HCE coefficient of 0.96, all other banks returned zero coefficients for HCE. Bader, Abdallah, Aqqad, Oqlah, Akhoershiedah and Maqableh (2017) examined the effect of intellectual capital on organizational performance in Jordan from 2010-2016. Data were gathered from 356 employees working in manufacturing companies in Jordan. In order to test the hypotheses of the study, OLS regression analysis was employed. The results of the analysis revealed that intellectual capital had a positive effect on organizational performance and

knowledge sharing. The results also showed that knowledge sharing had a positive effect on organizational performance. Finally, it was found that knowledge sharing had a positive mediating effect on the relationship between intellectual capital and organizational performance. Amin and Aslam (2017) examined the links between intellectual capital (IC), innovation and firm's financial performance, furthermore, the impact of IC and innovation on firm's financial performance was also measured. The research was carried for the three year period of 2012–2014 and the sample consists of 207 firm-year observations. Structural Equation Modeling (SEM) technique was used to address cause effect relationships among endogenous and exogenous constructs. Empirical results of SEM analysis support that IC and its components have positive and significant impact on innovation and firms' financial performance. Moreover, innovation also has significant impact on firms' financial performance. Filipe and Serrasqueiro (2017) analyzed the impact of the intellectual capital (IC) on the financial performance measured by Return on Assets in the European context for the period 2004-2015. This study used data of non-financial listed firms of 8 European countries for the period between 2004 and 2015. Considering that financial crisis had different impact on European countries, the study divided the eight countries in two groups: (1) group 1 – Greece, Portugal, Spain and Italy; and (2) group 2 – Germany, France, Finland and United Kingdom (UK). The estimation method used is the GMM system (1998) estimator, as a dynamic panel estimator, which allows to do longitudinal studies and to analyze the effect of lagged explanatory variables on firms' financial performance. The results indicated that IC efficiency in the current period has a positive impact on financial performance. The three components of VAIC<sup>TM</sup> Model - capital employed efficiency, human capital efficiency and structural capital efficiency in the current period have a positive impact on financial performance, with the exception for structural capital efficiency which for the first group of countries has a negative impact on financial performance. Finally, results suggest that the financial crisis negatively affects financial performance on both groups of countries. The current study contributes to the current literature, analyzing the impact of IC on firms' financial performance in two groups of European countries which suffered the consequences of the 2008 crisis differently. Hapsah, Bujang and Hakim (2018) examined the impact of intellectual capital on financial performance of Malaysian construction firms using value-added intellectual coefficient (VAIC) model. The empirical data were drawn from a panel consisting of 41

construction firms listed in Bursa Malaysia and observed over a five-year period of 2011 to 2015. Two regression models were examined in order to test the hypotheses included in the research framework of the study. Intellectual capital is the independent variable in the study and measured by VAIC, HCE, SCE, CEE and the dependent variable, financial performance, is proxy by ROA. The results showed that VAIC is positive and significantly associated with ROA. However, on the components of intellectual capital, only CEE is positive and significantly associated with ROA. Sharma (2018) examined the intellectual capital coefficient of the firms under study and to study the relationship, if any between intellectual capital constituents and financial performance. Pulic's VAIC (modified) was used to estimate the intellectual capital of BSE S&P 500 listed firms in India from 2007-2016. The data were analyzed using Pearson correlation and linear multiple regression analysis. Findings showed that almost all firms under study have a good VAIC score means above 4 and the top VAIC scorer firms were mainly from refinery, metal, cement, steel, tobacco. Correlation analysis and Linear multiple regression analysis showed that M/B ratio has a significant relationship with VACA, VAHU, Research and Development (Innovation capital) and Advertisement expenses (customer capital). Year-wise results depicts that value of adjusted  $R^2$  is increasing, in 2007 it was just .164 and in the year 2016 it was 607 which infers that VAIC's role is improving in measuring the market value of firms under study. Year wise analysis shows that adjusted  $R^2$  is improving, so findings may serve as significant input for the firms to use intellectual capital as the main factor for improving the market value of firms. Thiagarajan, Baul and Sekkizhar (2018) measured the relationship between the intellectual capital (IC) components with the traditional measures of organizational performance - financial, economic, and stock market. Using data from a sample of 42 listed companies from the Indian auto-component industry for the period from 2008 - 2013, the study applied the modified Value Added Intellectual Coefficient (M-VAIC). This is an optimized framework that improvises the popular and widely - used Value Added Intellectual Coefficient (VAICTM ) model of Pulic (2000, 2004, 2008) as addition of new variables to the VAICTM model improves its explanatory power. The Indian auto component manufacturing companies seemed to be performing effectively by utilizing their IC as seen by the empirical results during the period from 2008 - 2013 in spite of the economic recession of 2008 and its aftermath suggested that stakeholders still perceive the performance of firms in terms of tangible assets as

the sole driver of organization success and less in terms of IC. This opens up avenues for further discovery/ findings to prove/disprove the same in other industries. Amin, William, Matonti and Nicolo (2019) employed Valued Added Intellectual Coefficient (VAIC) as a measure of IC to investigate the relationship between IC, firms' financial performance and market value in Italy. The empirical investigation was developed by using data drawn from a sample of 135 Italian listed companies for the period from 2008 to 2017 and performing different Ordinary Least Squares (OLS) regression models. The findings suggested that, when taken in its aggregated form, IC exerted a positive impact on firms' financial performance measured as firms' profitability and growth in revenues as well as on market value. Filippo, Nicola and Michele (2019) examined the impact of intellectual capital disclosure quality in the integrated reports on firm performance. The empirical research was based on a sample of 45 integrated reports in Croatia from 2015-2017 using multiple regression analysis. The results confirmed the existence of a significant and positive association between the intellectual disclosure quality and the firm performance. Xu and Wang (2019) analyzed the relationship between intellectual capital (IC) and performance of the textile industry in China and South Korea during 2012–2017, and measured the contribution of IC sub-components to companies' performance. The fixed effect regression results showed that the aggregate IC positively affects earnings, profitability, and productivity of textile companies in China and South Korea. At the sub-components level, the contribution of capital employed efficiency (CEE) is the largest, followed by structural capital efficiency (SCE), and relational capital efficiency (RCE) in China's textile industry. In addition, Korea's textile industry relies heavily on CEE and human capital efficiency (HCE), while the contribution of RCE is relatively small. Ovechkin, Romashkina and Davydenko (2021) investigated the relationship between IC, its components and the level of financial profitability. The study used the system generalized method of moments for a broad sample of Russian firms that operate in the agribusiness industry. The results showed that the efficiency of structural capital usage and the stock of human capital have the biggest impact on the profitability level of the agricultural businesses among employed measures of IC. Nejjari and Aamoum (2021) examined the effect of intellectual capital on financial performance. The data in the research comprised 29 Moroccan firms registered on the Casablanca Stock Exchange (CSE). These firms were part of 8 sectors: Food producers and processors, banks, Insurance, building and

construction materials, participation and promotion real estate, distributors, mining, hardware, software and IT services. The chosen information covered a period of six years, from 2013 to 2019. The regression test findings indicated that capital employed efficiency and human capital efficiency affect positively and significantly the financial performance and market value. Anik, Chariri and Isgiyarta (2021) analyzed the impact of the company's financial performance in mediating the relationship between Intellectual Capital and Good Corporate Governance (GCG) on Corporate Value in banking companies listed on the Indonesia Stock Exchange (IDX). Also, the study analyzed the direct effect of intellectual capital and GCG on corporate value and the indirect effect through the company's financial performance. The data used were banking companies listed on the IDX in 2014–2016 with purposive sampling technique and Data Analysis Technique used are path analysis. The results showed that the financial performance of banking companies was proven to mediate the relationship between intellectual capital and GCG. Modupeola and Christian (2021) examined the impact of corporate governance on human resource disclosures in corporate reports of listed firms in the financial industry in Nigeria. The study sample covered all listed money deposit banks and insurance firms covering the period 2009-2018. The study employed secondary data retrieved from annual reports of the listed companies. The panel regression analysis was used as the data analysis method. The findings of the study revealed that the fixed effect coefficients revealed that Board size has a negative impact HRAD which is significant at 5% ( $p=0.000$ ). Board independence is positive and significant at 5% ( $p=0.009$ ). Board gender diversity has a positive but not significant at 5% ( $p=0.2182$ ). Institutional ownership and Audit committee size are significant. Kurniawan and Muharam (2021) examined the effect of intellectual capital on state-owned enterprises (SOE) in Indonesia from 2012-2020. The research used 87 observations as the research sample. The analysis tools used were multiple regression and moderated regression analysis (MRA) to determine the moderating effect of company size in moderating intellectual capital on profitability. The results showed that intellectual capital as measured by the Value Added Intellectual Coefficient (VAIC) variable and its derivatives showed that all VAIC components had a significant positive effect on profitability. In addition, it was shown that company size was also able to moderate the effect of intellectual capital (VAIC) on profitability.

In view of the above submission, it is clear that the effect of intellectual capital on economic value added is yet to be ascertained based on the mixed, inconclusive and contradicting results revealed by the reviewed literature. This study sought to bridge the gap arising from earlier research works on this subject by adopting contemporary performance index; economic value added, in place of the traditional performance indices such as return on assets (ROA), return on equity (ROE), etc which lacked the ability to evaluate the future profit potentials of investors. Based on this review, this study sought to analyze the effect of intellectual capital (proxied by capital employed efficiency, human capital efficiency and structural capital efficiency) on economic value added of quoted non-financial companies in Nigeria from 2008 to 2020.

## **METHODOLOGY**

### **Research Design**

The research design employed in this study is *ex-post facto* research design. *Ex-post facto* research design was employed to establish a meaningful relationship between intellectual capital and economic value added. This study was treated as *ex-post facto* research since it relies on historical data.

### **Population of the Study**

The population of this study centered on the performance indices of 124 quoted non-financial companies in Nigeria from 2008 to 31<sup>st</sup> December 2020 (thirteen years period). These companies were quoted under ten (10) sectors as at the end of the year. (See Appendix A for the ten sectors and their respective companies under them).

### **Sample Size and Sampling Method**

The sample size of this study comprised of thirty-two (32) non-financial companies (see Appendix B) which was selected using purposive sampling technique (that is selecting all the companies that consistently filed their annual financial statements with the Nigerian Stock Exchange from 2008-2020).

### **Sources of Data**

This study made use of secondary data precisely. The data were sourced from publications of the Nigerian stock exchange (NSE), fact books and the annual report and accounts of the sampled quoted non-financial companies, particularly the comprehensive income statement and statement of financial positions of these companies as well as their respective notes to the accounts for the period 2008-2020.

## Research Variables

### Independent Variables

This study includes three independent variables: Capital Employed Efficiency (CEE), and Human Capital Efficiency (HCE)

### Value Added Intellectual Coefficient Indices include:

- Capital Employed Efficiency (CEE) measure the efficiency of Capital Employed (CE), where (CE) = book value of firm net assets.

$$CE = \text{physical capital} + \text{financial assets}$$

$$CE = \text{Total assets} - \text{intangible assets}$$

$$CEE = VA/CE$$

CE represents tangible resources while HC represents intangible resource (Mondal & Ghosh, 2012).

$$VA_{it} = \text{OUTPUT}_{it} - \text{INPUT}_{it}$$

Output<sub>it</sub> is the total income generated by the firm from all products and services sold during the period t, and input<sub>it</sub> represents all the expenses incurred by the firm during the period t except cost of labour, tax, interest, dividends and depreciation.

- Human Capital Efficiency (HCE). In VAIC model, HCE is defined as salary and wages in a period (Pulic, 1998). Besides showing the firm size, high HCE reflects higher employee skills that would add more value compared to employees with lower salary and wages. HCE shows the efficiency of HC usage in creating VA. If the human capital cost is low while VA is high then the firm uses its HC efficiently.

$$HCE = VA/HC$$

### Dependent Variable

In this study one (1) dependent variable was calculated:

**Economic Value Added (EVA™):** is one of a number of measures available to determine an organization's performance. EVA™ reflects the residual wealth calculated by deducting cost of capital from the operating profit (adjusted for taxes on a cash basis) (Stewart 1990).

$EVA = NOPAT - (WACC \times \text{Invested Capital})$ .

$NOPAT = \text{Profit \& Loss before Tax} + \text{Interest Expense} - \text{Income Taxes} - \text{Tax Shield on Interest}$   
(Tax Rate X Interest Expense)

$\text{Invested Capital} = \text{Short Term Debt} + \text{Long Term Debt} + \text{Minority Interest} + \text{Shareholders Equity}$

$WACC = \text{Cost of Debt} \times \{ \text{Total Debt} / (\text{Total Debt} + \text{CMVE}) \} \times (1 - \text{Tax}) + [ \text{Cost of Equity} \times \{ (\text{CMVE} / (\text{Total Debt} + \text{CMVE})) \} ]$

$CMVE = \text{Company's Share Price} \times \text{Total Shares Outstanding}$ .

$\text{Market Value of Company} = \text{CMVE} + \text{Total Debt} + \text{Minority Interest}$ .

Cost of Equity is calculated by using Capital Asset Pricing Model (Issham, Fazilah, Hwa, Kamil, Ayub & Ayub, 2008).

A typical WACC for listed companies could be estimated at around 12% to 13% (Evanomics, 2011).

### Control Variables

In conducting the linear multiple regression analysis, the following control variables were included:

- (a) Size of the firm (FSZ): Size of the firm as measured by the natural log of total assets, is used to control the impact of size on wealth creation (Deep & Narwal 2014).
- (b) Leverage (LEV):

Financial leverage as measured by total debt divided by total equity is used to control the impact of debt servicing on corporate performance and wealth creation

$LEV = \frac{\text{Total debt}}{\text{Total equity}}$

### Method of Data Analysis

Descriptive statistics were used to summarize the mean, median, standard deviation, skeweness, kurtosis, maximum and minimum of the study variables.

Inferential statistics of the stated hypotheses were carried out with the aid of E-views10.0 statistical software, using:

- i. Pearson coefficient of correlation: is a good measure of relationship between two variables, tells us about the strength of relationship and the direction of relationship as well.
- ii. Regression analysis: predicts the value of a variable based on the value of the other variable and explains the impact or effect of changes in the values of variable on the values of the other variables. Panel Least Square (PLS) Regression Analysis was used for the study.

### Model Specification

The model for this study was adapted from Pulic (2000):

$$ROE = \beta_0 + \beta_1 CEE + \beta_2 SCE + \beta_3 HCE + \varepsilon \quad - \quad - \quad 1$$

**Where:**

ROE = Return on Equity

CEE = Capital Employed Efficiency

HCE = Human Capital Efficiency

Upon the model specified, the following constructs were modified for the purpose of hypothesis testing:

$$EVA_{it} = \beta_0 + \beta_1 CEE_{it} + \beta_2 FSZ_{it} + \beta_3 LEV_{it} + \varepsilon_{it} \quad - \quad - \quad i$$

$$EVA_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 FSZ_{it} + \beta_3 LEV_{it} + \varepsilon_{it} \quad - \quad - \quad ii$$

**Where:**

$\beta_0$  = Constant term (intercept)

$\beta_{it}$  = Coefficients to be estimated for firm  $i$  in period  $t$

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

$EVA_{it}$  = Economic Value Added of firm  $i$  in period  $t$

$HCE_{it}$  = Human capital efficiency of firm  $i$  in period  $t$

$CEE_{it}$  = Capital Employed Efficiency of firm  $i$  in period  $t$

$FSZ_{it}$  = Firm Size of firm  $i$  in period  $t$

$LEV_{it}$  = Leverage of firm  $i$  in period  $t$

**Decision Rule:**

Accept  $H_0$ , if the P-value of the test is greater than 0.05, otherwise reject.

**DATA ANALYSIS**

**Table 1 Descriptive Statistics**

	EVA	CEE	HCE	FSZ	LEV
Mean	0.1285	0.0546	3.5654	11.5985	0.6108
Median	0.1100	0.0500	2.9900	11.7400	0.6200
Maximum	0.2300	0.1100	9.6600	12.2400	1.5000
Minimum	0.0600	0.0300	1.6000	11.0800	0.1400
Std. Dev.	0.0571	0.0273	2.2305	0.4229	0.3863
Skewness	0.9455	0.9290	1.6275	-0.0204	0.8343
Kurtosis	2.4660	2.5608	5.2848	1.5833	3.4496
Jarque-Bera	2.0913	1.9743	8.5667	1.0880	1.6175
Probability	0.3515	0.3726	0.0138	0.5804	0.4454
Sum	1.6700	0.7100	46.3500	150.7800	7.9400
Sum Sq. Dev.	0.0392	0.0089	59.7011	2.1460	1.7909
Observations	416	416	416	416	416

Source: Researchers' Computation (2021)

**Interpretation**

The table in 1 shows the descriptive statistics of intellectual capital indices (CEE, and HCE) as well as that of EVA and the control variables; FSZ and LEV. The result shows that observation of the study is 416 which is a reflection of 32 firms x 13 years. The mean of EVA is 0.1285 with a variability of 0.9455, this shows the stability of EVA earned across the firms under consideration. The maximum amount of EVA earned by a firm stood at 0.2300 while the minimum EVA for the sampled firms remained at 0.0600. The observed mean for CEE at 0.0546 with a standard deviation of 0.0273 infers that the efficiency of the studied firms towards capital employed is averagely about 5.46%. Also, the maximum level of capital employed efficiency stood at 0.1100 (11%) while the minimum remained at 3%. In the same vein, the mean score for HCE is 3.5654 an indication that the degree of the sample firms efficiency towards human capital in the period of interest (2008-2020) is averagely 356.54%.

### Correlation Matrix

The correlation matrix explains the nature of relationship between the dependent and independent variables of the study as well as the independent variables among themselves. The summary of the associations among the variables of the study is presented in table 2.

**Table 2 Pearson Correlation Matrix**

	EVA	CEE	HCE	FSZ	LEV
EVA	1.0000				
CEE	0.4176	1.0000			
HCE	0.1735	-0.0903	1.0000		
FSZ	-0.3802	-0.4741	0.2401	1.0000	
LEV	0.0272	0.4584	-0.2217	-0.3435	1.0000

Source: E-Views 10.0 Correlation Output, 2021

### Interpretation of Correlation Matrix

The result of the Pearson Coefficient analysis in table 4.2 indicates that EVA positively correlates with CEE, HCE and LEV at correlation coefficients of 0.4176, 0.1735, and 0.0272 but inversely associates with FSZ as revealed by the coefficient factor of -0.3802 respectively.

### Test of Hypotheses

#### Test of Hypothesis I

**H<sub>0</sub>:** Capital Employed Efficiency (CEE) has no significant effect on Economic Value Added of quoted non-financial companies in Nigeria.

**H<sub>1</sub>:** Capital Employed Efficiency (CEE) has significant effect on Economic Value Added of quoted non-financial companies in Nigeria.

**Table 3 Panel Least Square Regression Analysis testing the effect of Capital Employed Efficiency on Economic Value Added**

Dependent Variable: EVA  
Method: Panel Least Squares  
Date: 07/17/21 Time: 17:04  
Sample: 2008 2020  
Periods included: 13  
Cross-sections included: 32  
Total panel (balanced) observations: 416

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.748836	0.127978	5.851296	0.0000
CEE	0.085956	0.032755	2.624205	0.0090
FSZ	-0.049205	0.012056	-4.081413	0.0001
LEV	-0.001942	0.005549	-0.349977	0.7265
R-squared	0.669533	Mean dependent var		0.273654
Adjusted R-squared	0.662758	S.D. dependent var		0.278410
S.E. of regression	0.269533	Akaike info criterion		0.225315
Sum squared resid	29.93093	Schwarz criterion		0.264071
Log likelihood	-42.86550	Hannan-Quinn criter.		0.240639
F-statistic	10.26283	Durbin-Watson stat		1.593535
Prob(F-statistic)	0.000002			

Source: Researchers' Computation (2021)

### Interpretation of Regression Result

Table 3 reveals an adjusted  $R^2$  value of 0.662758. The adjusted  $R^2$ , which represents the coefficient of multiple determinations imply that 66.3% of the total variation in the dependent variable (EVA) of quoted non-financial companies in Nigeria is jointly explained by the explanatory variables (CEE, FSZ and LEV). The adjusted  $R^2$  of 66.3% did not constitute a problem to the study because the F- statistic value of 10.26283 with an associated  $\text{Prob.} > F = 0.000002$  indicates that the model is fit to explain the relationship expressed in the study model and further suggests that the explanatory variables are properly selected, combined and used. The value of adjusted  $R^2$  of 66.3% also shows that 33.7% of the variation in the dependent variable is explained by other factors not captured in the study model. This suggests that apart from CEE, FSZ and LEV there are other factors that mitigate EVA of quoted non-financial companies in Nigeria. The results in table 4.3 illustrated that CEE has a positive and significant relationship with EVA measured with a beta coefficient ( $\beta_1$ ) = 0.085956 and t- value of 2.624205 respectively and p- value of 0.0090 which is statistically significant at 5%:

$$\text{EVA} = 0.748836 + 0.085956\text{CEE} - 0.049205\text{FSZ} - 0.001942\text{LEV} + \mu$$

This beta coefficient revealed that if CEE increases by one unit, then the sampled firms EVA would increase by 0.085956 units; a unit increase in FSZ will exert 0.049205 units reduction in EVA, similarly, a unit increase in LEV will cause EVA to reduce by 0.001942 units. In addition, Durbin-Watson test is implied to check the auto correlation among the study variables. The

Durbin-Watson value is 1.593535 which is less than 2 provide an evidence of no auto-correlation among the variables.

### Decision

Based on the outcome of the result, we therefore reject the null hypotheses and accept the alternative. This suggested that CEE has a significant positive effect on EVA of quoted non-financial companies in Nigeria at 5% level of significance.

### Hypothesis Two

**H<sub>02</sub>:** Human Capital Efficiency (HCE) has no significant effect on Economic Value Added of quoted non-financial companies in Nigeria.

**H<sub>2</sub>:** Human Capital Efficiency (HCE) has significant effect on Economic Value Added of quoted non-financial companies in Nigeria.

**Table 4: Panel Least Square Regression Analysis testing the effect of Human Capital Efficiency on Economic Value Added**

Dependent Variable: EVA  
Method: Panel Least Squares  
Date: 07/17/21 Time: 17:11  
Sample: 2008 2020  
Periods included: 13  
Cross-sections included: 32  
Total panel (balanced) observations: 416

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.845418	0.123683	6.835350	0.0000
HCE	0.611464	0.003949	6.370596	0.0000
FSZ	-0.056816	0.011802	-4.813956	0.0000
LEV	-0.002208	0.005614	-0.393270	0.6943
R-squared	0.754296	Mean dependent var		0.273654
Adjusted R-squared	0.747410	S.D. dependent var		0.278410
S.E. of regression	0.271731	Akaike info criterion		0.241558
Sum squared resid	30.42107	Schwarz criterion		0.280315
Log likelihood	-46.24409	Hannan-Quinn criter.		0.256882
F-statistic	17.84756	Durbin-Watson stat		1.774550
Prob(F-statistic)	0.000000			

Source: Researchers' Computation (2021)

### Interpretation of Regression Analysis

Table 4 shows that there is a significant positive relationship between HCE and EVA of quoted non-financial companies in Nigeria. This can be observed from the beta coefficient ( $\beta_1$ ) of 0.001464 with p value of 0.0000 which is significant at 5%. This indicates that HCE has a positive relationship with EVA of quoted non-financial companies in Nigeria.

$$EVA = 0.845418 + 0.611464HCE - 0.056816FSZ - 0.002208LEV + \mu$$

The implication of this regression coefficient is that one unit increase in HCE would exert 61.15% increase on EVA. On the other hand, a unit increase in firm size will lead to 5.68% reduction in FSZ, similarly, a unit increase in LEV would cause EVA to reduce by 0.002208LEV. Overall, the combined and the overall effect of the regressors –HCE, FSZ and LEV of quoted non-financial companies in Nigeria, is shown on the model probability summary of the regression results. The F-statistic of 17.84756 with an associated Prob (F-statistic) of 0.000000 is statistically significant at 5%, which reveals that the model is well fitted, while the coefficient of determination; adjusted  $R^2$  of 0.747410, explains the individual variation of the dependent variable (EVA) as a result of the changes in the independent variables (HCE, FSZ and LEV). It can be said that HCE, FSZ and LEV have combined predictive power of 74.74% in affecting EVA of non-financial companies in Nigeria, while the remaining 25.26% is accounted for by other factors which are not captured in the model.

### **Decision**

Considering the P-value of the test = 0.000000 which is less than 0.05 (5%), we therefore reject the null hypotheses and accept the alternative which shows that HCE has a significant positive effect on EVA of quoted non-financial companies in Nigeria at 5% level of significance, thus the  $H_1$  is accepted.

## **CONCLUSION AND RECOMMENDATIONS**

### **Conclusion**

The regression results shows that CEE has a positive and significant relationship with EVA measured with a beta coefficient ( $\beta_1$ ) = 0.085956 and t-value of 2.624205 respectively and p-value of 0.0090 which is statistically significant at 5%. Also the result indicated that one unit increase in HCE would exert 61.15% increase on EVA. On the other hand, a unit increase in firm size will lead to 5.68 reduction in FSZ, similarly, a unit increase in LEV would cause EVA to

reduce by 0.002208LEV. Overall, the combined and the overall effect of the regressors – HCE, FSZ and LEV of quoted non-financial companies in Nigeria, is shown on the model probability summary of the regression results. The F-statistic of 17.84756 with an associated Prob (F-statistic) of 0.000000 is statistically significant at 5%, which reveals that the model is well fitted, while the coefficient of determination; adjusted  $R^2$  of 0.747410, explains the individual variation of the dependent variable (EVA) as a result of the changes in the independent variables (HCE, FSZ and LEV). It can be said that HCE, FSZ and LEV have combined predictive power of 74.74% in affecting EVA of non-financial companies in Nigeria, while the remaining 25.26% is accounted for by other factors which are not captured in the model.

### **Recommendations**

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

- i. Considering the positive relationship between capital employed efficiency and economic value added, enlightenment campaigns in the areas of available cheap long term credit sources at concessionary interest rate and less stringent conditions should be carried out by financial stakeholders. This would assist firms acquire more tangible assets with which to improve upon their performances and enjoy economy of scale.
- ii. Sequel to the positive relationship between human capital efficiency and economic value added, Government and firm managers should develop policies and strategies to emphasize the importance of human capital accumulation on performance of firms. Also, firms should invest more in Human Capital Efficiency to improve performance.

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