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CAPITAL EMPLOYED EFFICIENCY AND ECONOMIC VALUED ADDED OF QUOTED COMPANIES

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Abstract
This study examine the relationship between Capital Employed Efficiency and Economic Value Added of quoted service firms in Nigeria from 2010-2019. Ex-Post Facto research design was adopted for the study. Data were sourced from annual report and accounts of the sampled quoted service firms, 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. The analyses applied the data collected from publications of the Nigerian stock exchange (NSE) and the annual report and accounts of the sample quoted companies. Panel Least Square (PLS) Regression Analysis was employed to test the hypothesis. The study revealed that which states that there is a significant positive relationship between Capital Employed Efficiency and Economic Value Added of quoted service firms in Nigeria at 5% level of significance. On the premise of this study recommended that firms should enhance their capital employed efficiency by ensuring that capital is allocated to the most deserving activities of the corporation as this will have bigger impact on overall firm performance.
Keywords: Human Capital Efficiency, Economic Value Added and Leverage

Introduction

The rise of the knowledge society can, however, be considered a quantum jump in a long history of development of human skills and know-how. Adam Smith, in The Wealth of Nations, underlined that improvement of workers' skills was a fundamental source of economic progress. He also stressed that investment in human capital and skills affects personal incomes and the structure of wages. Attempts to quantify the actuarial value of a person's knowledge and skills were made by Lotka (1880-1949) and Walsh (1885-1962) was probably one of the first to argue that improvements in the stock of intellectual capital might allow an economy to overcome the (classical) law of diminishing returns. Conceptual analysis of the impact of intellectual capital accelerated considerably since the Second World War. The current generation of digital information and communications technology allows the mobilization of complex information structures in a way not hitherto possible, enabling the coding, stocking, transmission, processing, buying and selling of digital artifacts independent of distance.

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The impact of information and communications technology (ICT) is felt not only in the computer and media sectors but also throughout all branches of the economy. Around the nucleus of applied information technology, major technological breakthroughs have taken place in fields as diverse as advanced materials, energy production and conservation, nuclear and medical science, biotechnology and environmental control. This process is also underpinning new modes of production in manufacturing and the agro-food industry and new methods of distribution, transportation, communication, hospitality, trade and public services. Accordingly, intellectual capital has also become a prominent subject to delve into with respect to the service sector as one of the knowledge intensive sectors because it relies upon a massive amount of human capital and customer relations for its survival. Hence the service sector has to stay innovative and aggressive in developing new products and services especially in the current rapidly changing global environment. Incessant innovation and knowledge creation have become the key sources for sustainable competitive advantage since at its heart, the whole operations of service sector build upon ingenuity, accommodating unique services and offering great products.

In knowledge-based economy, the growing distance between the market and book value is attributed to intangible assets that cannot be properly measured and reported within the traditional accounting framework, thereby, causing each company to use a different accounting method, therefore, posing a challenge towards the measurement of IC in firms. However, the measurement of IC is difficult since it is intangible and non-physical in nature. The traditional accounting model, which is conceived for companies operating in an industrial economy, remains focused on physical and financial assets and ignores most IC assets. Interestingly, even the International Accounting Standards/International Financial Reporting Standards (IAS/IFRS), including the ones recently modified by the International Accounting Standards Board, did not contribute to redefining many of the concepts, principles and valuation methods of IC assets (Mohammed & Irbo, 2018; Adesina, 2019).

Intellectual capital is of substantial and growing importance in innovation and productivity growth, enterprise competitiveness and economic performance. Intellectual capital comprises a number of components, including R&D, technology and intellectual property rights; human resources; organizational and workplace structure; marketing, customer and supplier networks;

and software. However, these components are often poorly identified and measured, information is collected in widely different ways, and financial accounting and reporting practices in general fail to recognize them as assets. Where non-financial information is available, it is ad hoc, difficult to verify, and not comparable across companies or countries. The resulting gap in transparent, reliable and accurate information interferes with the effective management of intellectual capital, distorting the allocation of resources among different forms of intellectual capital, and between intellectual and other forms of capital.

The IASB through IAS 38 on Intangible Assets and the subsequent IFRS 3 on Business combinations and IAS 36 on Impairment of Assets applied by IFRS adopting countries and the treatment of goodwill, research and development and other identifiable intangible assets all give credence to the need for incorporating Intellectual Capital in financial reporting. The relative lack of IC accounting recognition and its growing role in the value creation process, imply that financial statements have lost some of their value for shareholders and many other users. EVA proponents assert that an important benefit of EVA is that, it adjusts reported accounting results to eliminate distortions encountered in measuring true economic performance. Conventional performance measures are criticized such as return on investment (ROI), return on assets (ROA), return on equity (ROE), return on sales (ROS), or earnings per share are deficient because they are uni-dimensional and thus unsuited to fully assessing firms' strategic accounting, firms' strategic outcomes and performance (Tiwari & Vidyarthi, 2018). Conventional accounting measures reflect only past performance and not future performance. Moreover, Nawaz (2017) argue that EVA is better goal congruence than ROI. EVA helps overcome the goal incongruence that exists between the manager and the firm which cannot be resolved using ROI. This study examine the relationship between Capital Employed Efficiency and Economic Value Added of quoted service firms in Nigeria

Review of Related Literature

Capital Employed Efficiency

Capital employed refers to the amount of capital investment a business uses to operate and provides an indication of how a company is investing its money. It generally refers to the capital

utilized by the company to generate profits (Daniel, 2020). Capital employed is the total amount of capital used for the acquisition of profits by a firm or project. Capital employed can also refer to as the value of all the assets used by a company to generate earnings (Sherry, 2016). Capital efficiency is the ratio between dollar expenses incurred by a company and dollars that are spent to make a product or service (Hayes, 2020). This is the metric to look at because the more efficiently capital is used to produce a product or service, the better chance a company has for approaching profitability (Adam, 2020). If the amount of capital employed is high and is not sourced from Equity shareholders, then it shows a higher level of risk. It shows an aggressive business expansion and growth plans. If the plan goes successfully then it may provide a higher return to the investors on their investment (Adam, 2020). By employing capital, companies invest in the long-term future of the company. Capital employed is helpful since it's used with other financial metrics to determine the return on a company's assets as well as how effective management is at employing capital. Capital employed efficiency is one of the intellectual capital components based on value added intellectual capital model. It is calculated by dividing value added on capital employed (Pulic, 2000).

Capital employed indicates the investment in the business, the total amount of funds used for expansion or acquisition by a firm as well as the total value of assets dedicated towards the business (Peng, Zhang, Wang, Zeng, Peng & Yu, 2015). Capital Employed is the total funds deployed for running the business with the intent to earn profits (Lee & Sohn, 2016). A higher value of Capital Employed, especially when a major chunk of it is not sourced from shareholders' equity, indicates a proportionately higher level of risk. Though the higher level of risk might make investors wary of investing in the company, it also hints at aggressive business expansion plans, which if successful, could result in much higher returns as well on investments (Zheng & Zheng, 2014). Resources encompass financial resources, tangible resources, and human resources. Optimal resource employment includes the effective use of human resources. Pooled assets offer the prospects of more efficient use of human resources as well as financial and tangible assets. Wise use of resources favorably influences the employment of human talents with attendant effects on social sustainability (Sivalogathasan & Wu, 2015). The effective use of human resources is more important than the use of other resources, since a human resource is an

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expiring resource. In contrast, unused financial or tangible assets have potential future uses, and returns. The efficient use of resources to fulfill human needs with the resultant earning of economic returns supports employment opportunities. In contrast, the inefficient use of resources has economic costs that fall on society and rob its members of need fulfillment and the beneficial use of human resources. Such losses are counter to social responsibility and sustainability (Malinowska-Olszowy, 2012; Hussain, Edgeman, Eskildsen, Shoukry & Gani, 2018). A high need-fulfillment-to-resource ratio implies efficiency in the use of resources (Tseng, Lim & Wu, 2018). Hussain, Rigoni and Cavezzali (2018) found a negative relationship between capital employed efficiency and performance. Huang, Zhao, Geng, Tian and Jiang (2017); Zhang, Liu and Cheng (2018) showed a non-significant relationship between capital employed and financial performance, while Ujwary-Gil (2017); Ahi, Searcy and Jaber (2018); Cantele and Zardini (2018) documented a significant positive relationship between capital employed efficiency and performance.

Economic Value Added (EVA)

Economic Value Added (EVA) or Economic Profit is a measure based on the Residual Income technique that serves as an indicator of the profitability of projects undertaken. Its underlying premise consists of the idea that real profitability occurs when additional wealth is created for shareholders and that projects should create returns above their cost of capital (Stewart, 2013). EVA is the incremental difference in the rate of return over a company's cost of capital. Essentially, it is used to measure the value a company generates from funds invested into it. If a company's EVA is negative, it means the company is not generating value from the funds invested into the business. Conversely, a positive EVA shows a company is producing value from the funds invested in it (Mocciaro, Picone & Minà, 2012). The goal of EVA is to quantify the charge, or cost, of investing capital into a certain project or firm and to then assess whether it generates enough cash to be considered a good investment. The charge represents the minimum return that investors require to make their investment worthwhile. A positive EVA shows a project is generating returns in excess of the required minimum return EVA as a performance indicator is very useful. The calculation shows how and where a company created wealth,

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through the inclusion of statement of financial position items. This forces managers to be aware of assets and expenses when making managerial decisions (Dheeraj, 2019).

Empirical Review

Rehman, Rehman Rehman and Zahid (2011) examined the Intellectual Performance (IC) of 12 Modaraba companies and its impact on corporate performance in Pakistan from 2005-2009. The study examined the performance of three main components of VAIC™ i.e. Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) and its impact on corporate performance by employing the predictive analysis. The empirical results revealed that one of the important components to strengthen the IC performance is Human Capital Efficiency (HCE) which means investing more to boost the employees productive would increase the human efficiency of employees. The results showed that HCE and SCE have significant relation with financial performance (ROE and EPS). Mariya, Molodchik, Anatolievna and Bykova (2012) employed intellectual capital on the intersection of value-based management (VBM) and the resource-based view (RBV) in Italy. The study emphasized that the Intellectual Capital Transformation Evaluating Model (ICTEM) framework could be mostly applied for the analysis of a firm as a typical representative of industry or country. In that sense it is not applicable for specific feature analysis of a company. The study highlighted the ICTEM as a tool of investment decisions, mostly taking into account common trends, the prospects of industries, and economies' development. The ICTEM provides the ostensive framework of intellectual capital transformation analysis using a statistical approach which evidenced the existence of a positive relationship between intellectual capital and return on capital employed. Sumedrea (2013) analyzed the structure of the intellectual capital and its influence on the economic performances based on the VAIC model. The study covered the period 2008-2011 in Brazil. The results were obtained by applying Panel least square regression models and suggest that, in crisis time, the development of companies is influenced by the human and the structural capital, while profitability (profit after tax) is additionally linked to the financial capital through the value added intellectual capital coefficient. Ashrafipour and Mojtahedi (2013) explored the relationship between intellectual capital and market value added in 150 Malaysian firms during

the years 2000-2011. Debt to equity ratio and Administrative expenses per staff were considered as control variable. Multiple regressions were used to predict the impact of intellectual capital on market value added. The finding of the study showed that there was a positive relation between intellectual capital and market value added; it also indicated that the effect of debt to equity ratio on market value added was positive but this relation for Administrative expenses per staff was negative. Razafindrambinina and Santoso (2013) examined the relationship between intellectual capital and firm performance. The study used panel data from publicly listed non-financial institutions on the Jakarta Stock Exchange. The study used 191 publicly listed companies on the Jakarta Stock Exchange from 2009 to 2010. The Value Added Intellectual Coefficient measured intellectual capital and its components namely human capital, structural capital, and capital employed. Using multiple regression technique, the study found no significant relationship between intellectual capital and firm performance. Anuonye (2016) evaluated the effect of IC on value creation of insurance firms in Nigeria using their ROA. Ex post facto research design was adopted in the selection of data. Primary and secondary data were employed. The target population consisted of 150 workers in the 3 strategic departments of human resources, accounts and marketing of 18 insurance companies using the purposive sampling technique. 150 questionnaires were distributed and a response rate of 74% was recorded. Face validity, content validity and pilot test were used to validate the instruments. The Cronbach's Alpha reliability test gave a result of (r=0.806) and (r=0.800) respectively. Regression was used for data analyses at 5% level of significance. Primary data result indicated that human capital and relational capital had statistically non-significant effects on return on assets of the firms whereas structural capital had a significant effect on ROA. Mrázková, Peržeľová and Glova (2016) examined the role of various intellectual capital components on firm profitability. The dataset consisted of data of 289 software companies from member states of European Union during the period of three years. Data were analyzed using 95 companies from 2013 to 2015. VAIC™ and its components were used as a measure of IC and represented the independent variables via OLS regression equation. Additionally, the study added one categorical variable – time. Company's performance was defined by four main indicators representing dependent variables – market to book value ratio, return on assets, return on equity and employees' productivity. Ezejiofor, Nwakoby and Okoye

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(2015) ascertained the effect of Human Resource Management on performance of business organization. Survey research design was employed and data were collected and analyzed with five point Liker's scale. Simple regression analysis was used to test the hypothesis. The study found that Human Resource Management has effect on the performance of business organization. This has to do with training and development, good planning system and proper management as a motivator. Onyekwelu and Ubesie (2016) examined the effect of Intellectual Capital(IC) on corporate valuation of firms quoted in Nigeria. The study adopted the Panel Research Design and used Time Series and Cross-Sectional Data. Data covered a ten- year period (2004-2013). Multiple Regression and Correlation Analysis were used on the data at 5% level of significance. E-View Statistical Tool version 8.0 was used in the analysis. The results reveal that Human Capital Efficiency has a positive and significant effect on Market/Book Value. SCE has a negative and insignificant effect on M/BV; CEE has negative and significant effect on M/BV; positive and insignificant effect on EPS. Muhammad, Mohammad, Jian-Zhou, Muhammad and Arshad (2017) investigated the determinants of financial performance of listed financial sectors in Karachi Stock Exchange from 2008 to 2012. The objective of the study was to investigate the factors of financial performance of financial sectors in Pakistan. Descriptive statistics, Correlation matrix, Chow test, Hausman Test for Fixed Effect Model and Random Effect Model and Breusch-Pagan Lagrange multiplier for Random Effect were used in the study. Estimated results revealed that determinants of financial sectors such as leverage, liquidity, size, risk and tangibility have significant effect on financial performance of financial sectors. It was recommended that financial sectors should consider EVA as an important factor for financial performance. Ezejiofor, John-Akamelu and Iyidiobi (2017) examined the adoption of Human Resource Accounting on the Profitability of Corporate Organizations. Exploratory research design and time series data were adopted for this study. Data for the study were collected from selected ten (10) commercial banks in Nigeria. Data collected were analyzed and tested with t-test statistical tool with aid of SPSS version 20.0 version. The study revealed that the study revealed that increase in staff salary has positive effect on organizational profitability, also that the level of increment in staff has influence on organizational profitability. Onyekwelu, Okoh and Iyidiobi (2017) appraised the effect of intellectual capital on financial performance of firms

in Nigeria using the banking industry for the period of 10 years (2004-2013). The study used the Value Added Intellectual Coefficient (VAIC) to ascertain the extent that intellectual capital indices affect financial performance of three banks. The study indicated that IC has a positive and significant effect on banks' financial performance but some were not significant. The results further showed that the banks were statistically different in both the intellectual capital and its financial performance indicators. It also showed that the banks with high IC also show high financial performance. Mačerinskienė & Aleknavičiūtė (2017) examined various scientific approaches of the national intellectual capital and its impact on the economic growth; also to offer a measurement model of the national intellectual capital influence on economic growth; and lastly to evaluate the specific European Union countries' intellectual capital's effect on their economic growth. The analysis of intellectual capital components' influence on economic growth rate of 25 European Union countries showed that only human capital and the level of economic development have statistically significant influence. A more comprehensive human capital's influence on economic growth analysis revealed that 63.1 percent of the long-term economic growth rate in 25 European Union countries can be explained by differences in their economic development level and differences in educational achievement factor values. Moreover, analysis of national intellectual capital effect on economic growth in separate clusters allowed identifying influence differences in each group of countries. The study concluded that intellectual capital has not fully related to the financial performance of quoted commercial banks in Nigeria. Ezenyilimba, Ezejiofor and Afodigbueokwu (2019) investigated whether the use of Total Quality Management practices contributed to higher quality output and lower costs. The data was collected using questionnaires and presented in a tabular format, with the t-test performed using the Statistical Package for Social Science (SPSS) version 20.0. the outcome of the result shows that the application of Total Quality Management practices has assisted in achieving improved quality output and reduced cost. Purwaningsih (2018) determined the influence of value added intellectual capital on financial performance with ownership structure as moderating variable in Indonesia. Return On Assets used as a proxy for financial performance. Data for the study was obtained from secondary data by purposive sampling method. There are 65 manufacturing companies listed in IDX on 2013-2017 that used as sample. The study used

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Multiple Regression Analysis (MRA) as method of analysis. The results showed that the value added intellectual capital has a positive influence on financial performance. The results on moderating variable showed that the ownership structure use proxy was managerial ownership did mediation relation negative between the intellectual capital with financial performance, and institutional ownership did not mediate relation between the intellectual capitals with financial performance. Aftab, Muhammad and Muhammad (2019) empirically investigated the relationship between intellectual capital and firm value. The moderating role of managerial ownership has been evaluated with the help of regression analysis. The sample included the panel data taken from non-financial firms listed on Pakistan stock exchange (PSX) covering the period 2010-2015. A sample of 79 firms out of 384 firms has been selected with the help of systematic sampling technique. VAIC (Value Added Intellectual Coefficient) model has been used for the calculation of intellectual capital. Tobin's Q has been taken as a measure of firm value. Managerial ownership has been tested as moderator. Based on data analysis, it is concluded that the relationship between intellectual capital and firm value was positively significant. It was also concluded that managerial ownership moderates the relationship between intellectual capital and firm value negatively. Kibiya, Aminu and Abubakar (2019) examined the moderating effect of institution on the relationship between intellectual capitals on the financial performance of conglomerates in Nigeria. Correlational research design was adopted and historical data were extracted from annual report and accounts of the sample firm on NSE. Firms were chosen based on censor sampling method. Eleven years of financial data were used (2007-2017). Multiple regression analysis was employed to analyze the data extracted. The results from pooled ordinary least square regression (OLS) and fixed effect revealed that intellectual capital indexed by a value-added intellectual coefficient (VAIC) has a positive and significant impact on financial performance indexed by return on asset (ROA) of listed conglomerate firms in Nigeria. Saudah, Mike and Richard (2019) examined the impact of of IC on management accounting practices, specifically, performance measurement and corporate performance in Nigeria. The study explored whether firms investing heavily on IC were more likely to emphasize non-financial measures. The study also examined whether the degree of IC values in these firms influence their performance. The study was both exploratory and descriptive in

nature which was conducted through a survey in over 100 large companies covering both high and low levels of IC. The study explored both the role of management accounting information and that of the management accountant. Results suggested some evolution in performance measurement approaches due to the impact of IC and they also indicated that IC does influence corporate performance. William, Gaetano, and Giuseppe (2019) examined the effect of Intellectual Capital (IC) on financial performance of Italian listed firms. 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. Saiful and Asfarawenti (2019) examined the influence of intellectual capital (IC) on bank performance measured by ROA, ROE and NIM. The study explored purposive sampling methods. 10 Islamic banks and 30 Conventional banks were selected as a sample for the study for the period 2012-2016. The study found that IC had positive effect on bank performance that measured by ROA, ROE and NIM. The study showed that HCE and CEE had positive effect on bank performance that measured by ROA, ROE and NIM. Meanwhile, SCE positively affect the bank performance that was measured by ROA only. Xu and Liu (2019) explored the value creation effect of intellectual capital on corporate performance of energy companies. The listed renewable energy companies were selected from 2010 to 2016. The study conducted an empirical research based on the Ohlson model and used quantile regression to analyze the impact of value-added intellectual coefficient (VAIC) on sustainable performance at different life cycle stages. The results confirmed that increasing the VAIC created value for enterprises. It also examined the effect of life cycle on the impact, and the result showed that it does not change the significant positive correlation with the economic sustainable performance at different life cycle quintiles. The study also concluded that value-added human capital coefficient (VAHU) and value-added capital assets coefficient (VACA) were the most important component of intellectual capitals to economic sustainable performance at the growth stage, maturation stage, and decline stage. Firmansari, Muhammad and Alwan (2019) examined the effect of intellectual capital on financial performance in Indonesia from 2011-2017. The study was an explanatory research and sampling technique used purposive sampling with a total sample of 26 banks. Chukwu, Ugo and Osisioma (2019) examined the effect of human capital on the market value of banks in Nigeria,

using data on three proxies of human capital related to remuneration and staff strength. Relevant financial statement data for the period 2010 to 2014 were extracted from the annual reports and accounts of fourteen banks listed on the Nigerian Stock Exchange. Results of regression of stock price on the human capital indicators showed that only one variable – the proportion of highly paid employees - had a significant effect on the market value of firms. The findings suggested that investors' confidence increased with the strength of valuable stock of human capital in the payroll of banks. Banks that were unable to retain a high proportion of highly paid employees in their staff structure may consider merging with other banks to sustain investors' confidence. Rahman, Sobhan and Islam (2019) examined the determinants of intellectual capital disclosure (ICD) in the pharmaceutical and chemical industry of Bangladesh. The research was conducted on the listed firms of pharmaceutical and chemical industry in Bangladesh during the period of 2016 to 2017. The study developed a self-structured intellectual capital disclosure index; and the proxies of determinants of ICD were used as board characteristics (board size, independent directors and female directors), ownership structures (institutional ownership and director ownership), and firm characteristics (firm size, leverage and performance). The study used a content analysis to analyze the extent of ICD and a pooled cross-sectional method to find the determinants of ICD. The study found that intellectual capital disclosure is positively associated with firm size, leverage, and firm performance and negatively associated with director ownership and institutional ownership. This study also found that there is no significant association of ICD with independent director or female director. The study recommended that the regulatory authority should develop mandatory guidelines on ICD for ensuring proper and consistent disclosure about the intellectual capitals. Besides, the companies should include a separate section in the annual reports to disclose the measurement and management of intellectual capital. Aleša and Vasilije (2020) examined the relationship between intellectual capital and financial performance of listed Slovene companies from 2014-2018. Multiple regression technique was adopted. The dependent variable was measured with Market-to-Book Value and Tobin's q, while intellectual capital was proxied with Human Capital Efficiency Structural capital efficiency, Capital Employed Efficiency. The regression result revealed the existence of a positive relationship between the components of intellectual capital and Tobin's Q.

The justification or otherwise for the place of knowledge also known as intellectual capital in driving the earnings and indeed other corporate value indices of firms has constituted a challenging academic puzzle in recent years . Some scholars have described intellectual capital as being a key driver of corporate value enhancement (Pandey, Chandwani & Navare, 2018). Similarly, other strand of researchers submits that intellectual capital provides a platform through which firms enjoy competitive advantage, well and above their contemporaries (Juliansyah, Mellita-Sari, Andriyani & Sanusi, 2019). Xu and Wang (2019); Filippo, Nicola and Michele (2019); Rahman, Sobhan and Islam (2019); Chukwu, Ugo and Osisioma (2019) and others, found out a statistically significant positive relationship between the components of intellectual capital and performance. In contrast to the above submissions, some other strand of empirical studies could not establish any statistical relationship between intellectual capital and firms' values.

Methodology

Research Design

The research design that was employed in this study is the *ex-post facto* research design. An *Ex-post Facto* research determines the cause-effect relationship among variables. *Ex-post Facto* seeks to find out the factors that are associated with certain occurrence, conditions, events or behaviours by analyzing past events or already existing data for possible casual factors (Kothari & Garg 2014).

The population of this study consists of the eighty two (82) service firms listed on the Nigeria stock exchange as at 31st December, 2019.

This study adopted purposive sampling technique. The sample comprised firms that meet the following conditions: firms that have been listed on the Nigerian Stock Exchange (NSE) as at 2009; firms whose stocks have been trading actively on the floor of NSE during the period of interest (2010-2019); firms that have data available for the period of interest; firms that consistently filed their annual reports and accounts with the Nigeria Stock Exchange without missing any year during the study period.

Method of Data Analysis

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 service firms, 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 2010-2019. Both the dependent and independent variables would be computed from the data extracted from publications of the Nigerian stock exchange (NSE), the annual report and accounts of the selected quoted companies and ratios were computed from the figures as reported in the annual reports. Such data extracted include: Revenues, total assets, shareholders fund, total debt, staff cost for the period as well as other relevant ratios that would be required by a particular variable.

Independent Variables

Intellectual capital which is the independent variable would be proxied into Capital Employed Efficiency (CEE);:

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

CE = physical capital + financial assets

CE = Total assets – intangible assets

CEE = VA/CE

CE represents tangible resources while HC represents intangible resource (Pulic, 2000).

VA_{it} = $OUTPUT_{it}$ - $INPUT_{it}$

$Output_{it}$ is the total income generated by the firm from all products and services sold during the period t, and $input_{it}$ represents all the expenses incurred by the firm during the period t except cost of labour, tax, interest, dividends and depreciation.

Dependent Variable

Economic Value Added (EVA) served as the dependent variable of this study.

EVA = Net Operating Profit after Tax - (Capital Invested x WACC**)**

As shown in the formula, there are three components necessary to solve EVA: net operating profit after tax (NOPAT), invested capital, and the weighted average cost of capital (WACC)

$WACC = R_D (1- T_c)*(D / V)+ R_E *(E / V)$

Control Variables

i. Leverage: $\frac{\text{Total Debt}}{\text{Total Assets}}$

ii. Firm Size: Natural logarithm of Total Assets

Model Specification

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

$ROA = \beta_o + \beta_1 CEE + \varepsilon$

Where:

ROA = Return on Assets

CEE = Capital Employed Efficiency

To test H_1, this study would estimate the following regression equations:

$EVA = f(CEE) + \varepsilon$

The specific model constructs would be:

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

Where:

ε_{it} is the error term capturing other explanatory variables of the firm not explicitly included in the model.

βo is the intercept of the regression.

β_1 is the coefficients of the regression (Intellectual Capital)

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

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

LEV_{it} = Leverage of firm í in period t

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

í = Individual firms

t = time periods

Method of Data Analysis

The analyses applied the data collected from publications of the Nigerian stock exchange (NSE) and the annual report and accounts of the sample quoted companies. Both the dependent and

independent variables were computed from the data extracted from publication of the Nigeria stock exchange (NSE), the annual report and accounts of the selected quoted companies and ratios were computed from the figures as reported in the annual reports.

Pearson Coefficient of Correlation, Regression Analysis and Granger Causality Test were utilized to ascertain the causation that runs between the study variable

Decision Rule

Accept the alternative (H_1) hypothesis, if the P-value of the test is less than 0.05. Otherwise reject.

Data Analysis

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 below;

Table 1 Pearson Correlation Matrix

	EVA	CEE	LEV	FSZ
EVA	1.0000	0.0303	0.0938	0.3472
CEE	0.0303	1.0000	-0.1276	-0.1854
LEV	0.0938	-0.1276	1.0000	0.0044
FSZ	0.3472	-0.1854	0.0044	1.0000

Source: E-Views Correlation Output, 2020

Table 1, shows no indication of multicollinearity as the highest correlation is 0.6993 (between intellectual capital components and EVA). Multicollinearity is considered to exist if the correlation coefficient is above 0.8 as it may lead to spurious regression. As indicated in table 4.2, the study found that all pairs had a correlation of less than 0.80 which is the threshold to permit retaining of all the variables under study (Bartels, 2016). The table shows that CEE, LEV and FSZ are positively correlated with EVA, with respective correlation coefficients of 0.0303, 0.0938 and 0.3472.

Test of Hypothesis

Ho_1: There is no significant relationship between Capital Employed Efficiency and Economic Value Added of quoted service firms in Nigeria.

H_1: There is significant relationship between Capital Employed Efficiency and Economic Value Added of quoted service firms in Nigeria.

Table 2: Panel Least Square (PLS) Regression Analysis testing the relationship between CEE and EVA

Dependent Variable: EVA
Method: Panel Least Squares
Date: 11/26/20 Time: 15:07
Sample: 2010 2019
Periods included: 10
Cross-sections included: 51
Total panel (balanced) observations: 510

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.348293	0.100776	3.456102	0.0006
CEE	0.052386	0.028112	2.799167	0.0053
LEV	-0.010944	0.003315	-7.284850	0.0000
FSZ	-0.015449	0.010038	-1.538942	0.1244

R-squared	0.519252	Mean dependent var	0.206362
Adjusted R-squared	0.513437	S.D. dependent var	0.228340
S.E. of regression	0.226800	Akaike info criterion	-0.121681
Sum squared resid	26.02782	Schwarz criterion	-0.088470
Log likelihood	35.02874	Hannan-Quinn criter.	-0.108660
F-statistic	10.10897	Durbin-Watson stat	1.577411
Prob(F-statistic)	0.000000		

Source: E-Views 10.0 Regression Output, 2020

Interpretation of Regression Result

Table 2 proves that the functional relationship between the dependent and independent variables is: EVA = 0.052386 + 0.052386LEV - 0.010944LEV - 0.015449FSZ

The table revealed that CEE is positively and significantly correlated with the EVA of quoted service firms in Nigeria. The beta coefficient of the variable is 0.052386; t-statistic = 2.799167 and a p-value of 0.0053 which is significant at 5% level of significance. The implication of this finding is that one unit increase in CEE will cause EVA to increase by 5.24%. Furthermore, the

result exhibits evidence of significant negative relationship between leverage and EVA. The result shows beta coefficients of -0.010944, t-statistic = -7.284850 with p-value of 0.0000. In the same vein, a non-significant negative relationship exists between FSZ and EVA as demonstrated by the beta coefficient of -0.015449; t-statistic = -1.538942 and p-value = 0.1244. As evident in table 4.17, the adjusted R^2 is approximately 51%. This means that 51% of the variations in the sampled firms' EVA can be explained jointly by CEE, LEV and FSZ. The overall regression result with a P-Value = 0.000000 evidenced that CEE exhibits a significant positive effect on EVA.

Decision

The regression result with P-value = 0.000000 provides a basis for accepting the alternative hypothesis, which states that there is a significant positive relationship between Capital Employed Efficiency and Economic Value Added of quoted service firms in Nigeria at 5% level of significance.

Table 3: Pairwise Granger Causality Test showing the Causality between CEE and EVA

Pairwise Granger Causality Tests
Date: 11/26/20 Time: 15:11
Sample: 2010 2019
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
CEE does not Granger Cause EVA	408	3.91350	0.0239
EVA does not Granger Cause CEE		4.49415	0.0117

Source: E-Views 10.0 Causality Output, 2020

Interpretation of Diagnostic Test

Table 3 shows that a bi-directional causality runs from CEE to EVA and from EVA to CEE respectively at P-values of 0.0239 and 0.0117 which are statistically significant at 5% level. Consequently, the result of the granger causality test upholds that there is a causality link between Capital Employed Efficiency and Economic Value Added of quoted service firms in Nigeria at 5% level of significance.

Discussion, Conclusion and Recommendation

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This study ascertained the nexus between intellectual capital and economic value added of quoted service firms in Nigeria for a ten year period covering from 2010-2019. The independent variable was proxied by capital employed efficiency and value-added intellectual coefficients while economic value added served as the dependent variable of the study.

The findings for Hypothesis showed that the table revealed that CEE is positively and significantly correlated with the EVA of quoted service firms in Nigeria. The beta coefficient of the variable is 0.052386; t-statistic = 2.799167 and a p-value of 0.0053 which is significant at 5% level of significance. The implication of this finding is that one unit increase in CEE will cause EVA to increase by 5.24%. Furthermore, the result exhibits evidence of significant negative relationship between leverage and EVA. The result showed beta coefficients of -0.010944, t-statistic = -7.284850 with p-value of 0.0000. In the same vein, a non-significant negative relationship exists between FSZ and EVA as demonstrated by the beta coefficient of -0.015449; t-statistic = -1.538942 and p-value = 0.1244. The overall regression result with a P-Value = 0.000000 evidenced that CEE exhibits a significant positive effect on EVA. The findings of this study is in line with the findings of Rahman, Sobhan and Islam (2019); Chukwu, Ugo, and Osisioma (2019); Aftab, Muhammad and Muhammad (2019); Smriti and Das (2018) but contradicts the findings of Tarigan, Listijabudhi, Hatane and Widjaja (2019).

This study assessed the nexus between intellectual capital and economic value added of quoted service firms in Nigeria for a ten year period covering from 2010-2019. The study obtained data from annual reports and account and publications of the service firms that operated during 2010-2019 with the aid of E-Views 10.0. This study revealed that capital employed efficiency and value-added intellectual coefficients have a significant positive relationship with economic value added of quoted service firms in Nigeria at 5% level of significance. Conclusively, the theoretical a priori expectation as stated in methodology was confirmed as any positive increase in β_1 will exert a corresponding increase in the dependent variable (Economic Value Added). On the premise of this study recommended that firms should enhance their capital employed efficiency by ensuring that capital is allocated to the most deserving activities of the corporation as this will have bigger impact on overall firm performance.

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