



INTELLECTUAL CAPITAL AND SHAREHOLDERS' WEALTH THE ECONOMIC VALUE ADDED APPROACH

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Abstract: The role of intangible assets such as intellectual capital promoting corporate competitiveness and further shareholders' value has attracted attention in the finance literature. This study investigated intellectual capital efficiency as a source of creating shareholders' wealth in Nigeria. To achieve the study's aim, correlational research design was adopted. The study's data were collected from content analysis of financial statements of listed service companies in Nigeria. The sample used in this study includes 17 service firms listed on the Nigeria Exchange Group from 2011 to 2022. The VAIC model was utilized to estimate intellectual capital. Descriptive statistics were conducted while some diagnostic tests were piloted before the regression analysis. The random effect regression model was used to verify whether the studied variables impact shareholders wealth of listed service companies in Nigeria.

Findings indicated that value added intellectual coefficient as a measure of intellectual capital has a significant positive association with shareholders' wealth. Results further revealed that human capital efficiency, relational capital efficiency and capital employed efficiency (as components of intellectual capital) are significantly and positively associated with shareholders' wealth while structural capital efficiency has a positive but not significant relationship with shareholders' wealth creation. The study concludes that efficient management of intellectual capital can enhance shareholders' wealth in listed service companies in Nigeria and recommends amongst others that firms should make strategic plans regarding intellectual capital and intangible assets as it can increase corporate competitive advantage.

Keywords: Intellectual Capital, Human Capital, Structural Capital, Relational Capital, Capital Employed, Economic Value Added, Shareholders Wealth.

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1. INTRODUCTION

The revolution in information and communication technology (ICT) and globalization has ushered in a new economy often referred to as knowledge-driven economy. The relevance of ICT and globalization has become so strong that knowledge is now considered as the most valuable assets of an organization. Artificial intelligence (AI), Internet of Things (IoT), and computerization have necessitated for a change in how corporate organisations classify and identify intangibles and intellectual capital (IC) in their financial reports (Byrnes & Derhovanesian, 2002; Dogan & Kevser, 2020; Otuya, Akpoyibo & Egbare, 2022; Otuya, Ofeimun & Akpotor, 2022). However, financial statements as presently prepared and presented by firms gives little or no information about intangibles or intellectual capital of firms. As argued by McNamee (2001), non-recognition of intellectual capital has implications in valuation of the market prices of companies. Further, Amir and lev (1996) and Holland (2003) contend that the issue of not recognizing intangibles in the asset structure of a firm has brought about an increase in the gap between the book value and market value of firms. The International Accounting Standards (IAS) 38 is the accounting regulation used for the treatment of intangible assets and other intangibles including research and development expenses. Nonetheless, the constraints inherent in IAS 38 in reporting of intellectual capital in financial reports has added to calls by academics and professionals to develop models suitable for assessing and disclosing intellectual capital (Byrnes & Derhovanesian, 2002; Ulum, Kharismawati & Syam, 2017; Gupta et al., 2020).

As economy evolves from industry-based to knowledge-based, corporate organisations are beginning to place emphasis on developing human assets and intellectual capital to be able to have competitive edge and create value in the long term (Gupta et al., 2020). The Organization for Economic Cooperation and Development (OECD) defines a knowledge-based economy as an economy in which the fundamental drivers of development and expansion are the generation, production, and utilization of knowledge (OECD, 2020). In the opinion of Gupta et al. (2020), intellectual capital has three components: the human capital which represents employees' commitments, competencies, motivation, and loyalty; the structural capital which denotes infrastructures, procedures, and configurations; and relational capital which is used to describe firms' relationships. Sardo et al. (2018) highlight the difficulty in achieving organization goals through IT infrastructures, innovations, and financial assets if the right quality workers is absent. According to Tran, Dinh, Hoang, and Vo (2022), the innovativeness of the business comes from the relationships

between workers, groups, and organizations. Shahwan and Habib (2020) maintain that intellectual capital is the sum of all employee competencies and skills that generate wealth for the firm. Firms with better intellectual capital provide opportunities for their employees to use their skills and knowledge to gain a competitive advantage (Gupta et al., 2020). Also, intellectual capital helps to strengthen the firm's external links through investments in advertising and promotions. In view of this, firms with high intellectual capital form more relationships with partners, boosting their interdependence (Hedvicakova, Jiang & Naeem, 2022)

This study is motivated by three factors. First, the importance of intellectual capital in the Nigeria's service sector cannot be overlooked, because employment and efficient utilization of intellectual capital is now regarded as the most critical and pivotal factor in the success of the service sector. It is believed that the service sector has more investment in human capital than in fixed and current assets due to the nature of the industry. A service sector equipped with the right blend of intellectual capital is expected to provide high-quality services through continuous training, brand development, system upgrades, improved processes, and strengthening of stakeholders' relationships. Therefore, effective and efficient management of a company's intellectual capital becomes of utmost significance for the service sector to operate optimally. From this perspective, the service industry is taking maximum advantage of intellectual capital and innovations in information and communication technology to maximize shareholders' wealth.

Second, the knowledge on intellectual capital management is relevant for managers and policy makers especially in context-specific findings that reflect the developing economies' business cases. The finding of this study may provide evidence on whether an improved investment in intellectual capital would lead to happier employees and better organisation in a humanity-conscious world and by extension add value to shareholders wealth maximization objective. Third, results on the effect of intellectual capital on corporate performance have produced divergent results due to different measurement of performance. Previous studies that examined the relationship between intellectual capital and performance have adopted measures such as return on assets, return on equity, Tobin Q, and market value of shares as proxies for corporate performance. This paper makes a methodological advancement by applying the novel economic valued added approach which is considered an advancement in knowledge on the relationship between intellectual capital and shareholders' wealth.

The remainder of the paper is divided into the following sections: The review of pertinent literature and the development of hypotheses are presented in section two. The study's empirical methodology is described in full in Section 3 along with the study's design and data, theoretical underpinnings and model specifications, and variable measurement. The data analysis and discussion of the results are presented in section 4 while the study is concluded in section 5.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Shareholders' Wealth

Shareholders' wealth is the value that shareholders have in the company. Maximization of shareholders' wealth is considered the most widely accepted and sustainable objective of a business concern. Prior studies have extensively used metrics including earnings per share (EPS), return on assets (ROA), return on equity (ROE), and Tobin's Q to assess the financial performance of firms (Erin, Eriki, Arumona & Ame, 2017; Gordon, Loeb & Tseng, 2009). However, these accounting measures do not take cognizance of shareholders' value creation by adjusting for risk in the cost of capital. The economic value added is used to represent the wealth of its shareholders because it gives the maximum returns accruable to shareholders for their risk taking. The Economic Value Added (EVA) approach which is a value-based performance appraisal method is gaining momentum in the literature because the measure is able to show a true value of the firm. Studies (Lai, 2014; Mamun, Entebang & Mansor, 2012; Otuya & Osiegbu, 2020; Sharma & Kumar, 2012) have all supported the economic value added approach as more superior to the traditional accounting measurement techniques.

By including the cost of capital in its performance valuation, EVA analysis provides the main benefit of revealing the company's actual profit. EVA is a financial management technology that emphasizes value creation and growth by underlining the use of financial capital. According to Worthington and West (2001), the EVA model is a performance evaluation method that places an emphasis on "net operating profit after taxes less a charge for the capital employed to produce those profits".

Intellectual Capital

Intellectual Capital has been conceptualised as the combination of all the knowledge and competences that can manifest as a company's sustained

competitive advantage (Sullivan, 1998). Ali et al. (2022) view intellectual capital consisting of information, intellectual property, intellectual material, knowledge, core techniques, customer relationships and experience that can be utilised to make a company competitive in the marketplace. According to Roos and Roos (1997), intellectual capital is not just used to describe a static intangible asset; rather, it can also be seen as the sum of the combined “hidden” assets of an organisation’s members and what is left when they depart the office at the end of the working day. Dzikowski (2000) further explains that intellectual capital consists of the inventory of the knowledge-based resources owned by a company. Intellectual capital is also a term that refers to the collective knowledge and capacity for knowledge within an organisation.

Nahapiet and Ghoshal (1998) classify intellectual capital in three-dimensions – human, organization, and relationship centred. Human capital dimension regards the firm’s employees and their knowledge, education, skills, capabilities and characteristics. In addition, the organization centred dimension capital includes the knowledge embedded in information technology (IT) systems and the outcomes and products of knowledge conversion, such as documents, databases, process descriptions, plans, the intellectual properties of the firm and all the non-human storehouses of knowledge within a firm. The value and knowledge embedded in the firm’s external relationships, such as its ties with its clients, vendors, distributors, partners, local community, and all related parties, make up the relationship-centered dimension (Ali et al., 2022; Dzikowski, 2000; Edvinsson & Malone, 1997; Roos & Roos, 1997; Shahwan & Habib, 2020).

VAIC and Shareholders' Wealth

The total value of all an organization’s intangible assets is its intellectual capital. Though it goes beyond human capital, it does incorporate it. It takes a holistic view of all the aspects of a business that give it a competitive advantage. Pulic (1998) introduced the “Value Added Intellectual Coefficient” (VAIC) as a methodology to measure the efficiency correlated to each component of intellectual capital and the capital employed based on the concept of added value. The VAIC approach is used to gauge how well intellectual capital is being used (Pulic, 2000). The value added (VA) and the three forms of capital—human capital efficiency, structural capital efficiency, and capital employed efficiency—are combined to provide the outcome of the sum of the three efficiency ratios, which is used in the VAIC model (Ali et al., 2022; Shahwan & Habib, 2020). According to Pulic (2000), an increase in the VAIC

indicates an improvement in a firm's ability to generate new economic value by improving the efficiency of its resources in general and the expertise of its personnel in particular.

The influence of intellectual capital on financial performance, market value and corporate efficiency has stimulated a broad debate with unclear results. For instance, Tran, Dinh, Hoang, and Vo (2022) in a study examine the effect of IC efficiency on the financial performance of listed Pakistani and Indian companies between and found that the VAIC has a significant positive effect on the financial performance of Pakistani and Indian firms. Similarly, Gupta and Bhasin (2014) in a study sought to ascertain the association between intellectual capital and brand equity using VAIC as a measure of intellectual capital with questionnaire as instrument that assessed brand awareness, brand image, brand satisfaction and brand loyalty. The study findings indicate a significant positive association between intellectual capital and brand equity. Berzkalne and Zelgalve (2014) used Tobin's Q as a proxy for company value in a 24-year longitudinal study comprising 500 companies. Corporate performance was estimated using five indicators namely: return on assets, assets turnover, sales efficiency, return on sales and net income efficiency. The study's findings indicate a strong positive effect of intellectual capital on corporate performance. Zeglat and Zigan (2014) in another study on four and five star Jordanian hotels found that intellectual capital has a strong positive and important effect on the performances of Jordanian hotels. Muhammad, et al., (2020), and Kalkan, Bozkurt and Arman (2014), in separate studies in Pakistan and Turkey/Estonia respectively discovered that VAIC is positively correlated with company value and financial performance using return on asset and return on equity.

However, studies by Puntillo (2009) and Poh, Kilicman and Ibrahim (2018) suggest that combination of human capital, structural capital and capital employed as variables to make up for intellectual capital have no significant relationship with firm market value and financial performance. Following from foregoing, we hypothesize that VAIC will positively influence shareholders' value.

Human Capital Efficiency and Shareholders' Wealth

Human capital is considered the central and vital element of intellectual capital because it reflects the value of company employees' knowledge, intelligence of staff members, data, and resources (Duho & Onumah, 2019). Chien and Chao (2011), human capital comprises features such as the employees'

sheer intelligence, values, attitudes, aptitudes, know-how, skills, capabilities, individual relationships, creativity, education, experience, qualifications, motivation, commitment, loyalty, resolve, interactions, expertise, proactivity, leadership abilities, flexibility, learning capacity, behaviour, intellectual agility and risk-taking propensity. All of the attributes regarding human capital originate from the knowledge and skills embedded in and available through the employees. The inherent characteristics are applied to an organization to address business issues and optimize wealth for the shareholders (Alamanda & Springer, 2019; Hamdan, 2018).

The influence on human capital on corporate performance and productivity has not been fully explored in the literature. A few studies on the subject matter has produced divergent results. In order to assess the technical human capital of US firms in information technology (IT), software engineering, mobile networks, data analysis, and web development, Fedyk and Hodson (2022) used a specially detailed employer-employee matched dataset. They discovered that all five technical skill sets are linked to higher firm valuations. The study however forecast a negative financial and operational performance in the future. Similarly, Xu and Liu (2020) in a study show that human capital was the most influential factor and performance enhancing measure to firm profitability and value. A study by Adesanmi (2021) revealed that human capital efficiency has a significant positive effect on return on equity and return on assets on Nigeria's listed non-financial firms. The study also conforms to Komnencic and Pokrajcic (2012) who examined whether human capital has influence on company performance. The findings revealed that human capital is significantly and positively correlated to all three corporate performance dimensions.

However, Duho and Agomor (2021) found that human capital efficiency did not significantly affect non-financial firms' profitability when the VAIC model applied. Based on the preceding discussion, we hypothesize a significant positive relationship between human capital efficiency and shareholders wealth.

Structural Capital Efficiency and Shareholders' Wealth

Nawaz (2017) views structural capital as organizational capital and describe it as the solid foundation that enables the company to work systematically. Gupta et al. (2020) state further that even when employees leave an organisation, the structural capital remains with the firm. Structural capital, according to Appuhami (2007), includes ideas, frameworks, procedures, information designs, databases, structures, composition, and regulations that offer businesses

a competitive edge. Structural capital includes all physical assets, intellectual property rights, databases, R&D endeavours, software, hardware, corporate cultures, functions, and everything else that aids in the productivity of the workforce (Gupta et al., 2020). The relationship between structural capital and organization performance has also generated research interests. The performance of intellectual capital was measured by Duho and Agomor (2021) using a list of non-financial companies in West Africa. It was discovered that the performance of listed non-financial enterprises in West Africa is correlated with structural capital in an inverted U pattern. Also, Tran et al. (2022) used a sample of 60 publicly traded companies from the Ho Chi Minh Stock Exchange between 2011 and 2020 to assess the separate and combined effects of intellectual capital and corporate social responsibility on business performance in Vietnam. The study's findings indicate that a key factor in intellectual capital that affects company performance is structural capital efficiency. In contrast, Abdelmohsen and Gehan (2020) structural costs variable (the sub-variable of intellectual capital) has a negative correlation with firm's performance. As a result of the foregoing, we frame a hypothesis of a significant positive association between structural capital and shareholders' wealth.

Relational Capital Efficiency and Shareholders' Wealth

Relational capital is defined by Kalkan, Bozkurt, and Arman (2014) as the value created by a firm as a result of the public relationship or public liaison it has with the outside world. It is also called customer and external capital (Kalkan, Bozkurt, & Arman, 2014). It is the value of the relationship a firm has with external stakeholders. There are a number of stakeholders external to the firm including host communities, customers, suppliers, government, institutions, employees, and others. The relational capital can create some form of reputation, goodwill, brand and other form of benevolence that the firm enjoys and uses as a competitive advantage.

Relations capital helps to link a firm to the external world and amasses knowledge about the company's customers' needs and desires (Grasenick & Low, 2004). According to Cabrita and Bontis (2008), corporate entities can develop relations capital through the application of employee expertise and knowledge to provide better services (exploitation processes) and/or establishing new external communities of practice (exploration process).

The influence of relational capital as a component of intellectual capital on corporate performance has produced diverse results. In a study, Obeidat

et al. (2017) found that information sharing has a positive mediating impact on the link between IC and firm performance. Additionally, results of the study by Abdelmohsen and Gehan (2020) show that customer capital, a part of intellectual capital, has the most substantial beneficial impact on the performance of businesses in the financial industry. Following from the foregoing, we frame our next hypothesis that relational capital has a significant positive influence on shareholders value.

Capital Employed Efficiency and Shareholders' Wealth

A company requires capital to provide goods and/or services to generate profits. Capital employed is defined as fund invested in non-current (fixed) and current assets (Otuya & Eginwiw, 2017). Gupta et al. (2020) defines capital employed as the amount of capital investment a company uses to its operations. It generally refers to the capital utilized by the company to generate profits. In accounting, the Return on Capital Employed (ROCE) ratio is frequently used to calculate a company's profitability and capital utilisation efficiency. According to Pulic (2000), effective use of physical capital enhances corporate organisation performance. Capital used efficiency was found to significantly improve business financial performance in studies by Akpan and Utung (2020), Nnubia, Okolo, and Emeka-Nwokeji (2019), Yaser and Obaid (2022), and Haris et al. (2019). Ze'ghal and Maaloul (2010) use data from 300 UK companies to examine the role of value added (VA) as an indication of intellectual capital (IC) and its effects on the firm's financial, economic, and stock market performance. The findings also suggest that, although having a detrimental effect on economic performance, capital employed remains a significant factor in determining financial and stock market performance. In light of the information above, we surmise that capital employed efficiency has a positive relationship with shareholders' wealth.

3. METHODOLOGY

Design and Data

The study seeks to find relationship between and among variables hence adopts a correlational research design. The population of the study comprises of all 25 service firms listed on the Nigeria Exchange Group. The filtering sampling technique was employed in this study since firms were included in the sample on certain selection criteria. First, firms that have not been active on the Nigerian Exchange Group market over the 12 years starting from year 2011 to

year 2022 (3); second, firms that their annual financial reports cannot provided the required data(1); and third firms that joined the Nigerian Exchange Group after the year 2011(4) were excluded from the study. The exclusion of such firms allowed for homogeneity of period scope and help the research obtain balanced panel data. However, due to the small size of the population, the annual reports for 17 service firms were selected for the period 2011 to 2022 making a total of 204 year-end observations. Panel data collected were subjected to analysis through descriptive, correlation and linear regression analyses.

Theoretical Framework and Model Specification

Resource based theory and Knowledge-based theory are the theories supporting this study. First, the resource-based view put forward by Wernerfelt (1984) contends that the corporation has resources, including both tangible and intangible assets, at its disposal that are used to further organisational objectives. According to Barney and Arikan (2001), these resources are the many assets that the company employs to create and carry out its policies. Because intellectual capital is a component of the firm's resources (also known as its intangible assets), the resource based theory is considered suitable for this study. According to Pulic and Kolakovic (2003), every firm has specific knowledge, skills, values, and solutions—intangible assets— which could be converted into market value. Efficient management of the resources of the firm, (intangible assets inclusive) helps organisations to achieve objectives, increase productivity, and improve shareholders' wealth and market value (Pulic & Kolakovic, 2003; Barney & Arikan, 2001).

Second, the Knowledge-Based theory as propounded by Stalk (1992) is used to support this study. The knowledge based theory assumes that the competitive capacities of a company is hinged on capabilities and competencies of its human resources which are driven by knowledge. According to Marr and Schiuma (2004), knowledge is the foundation of corporate capabilities, and since knowledge is a resource, an organization's possession of certain knowledge gives it access to those capabilities. They pointed out that having information enables particular capabilities, hence only managing knowledge will aid an organisation in identifying, maintaining, and upgrading its competencies over the long and short terms.

The Knowledge-based theory buttresses this study because the knowledge acquired by the human capital are the intellectual capital which the firms use to enhance their performance through harnessing the knowledge its Human

Capital Efficiency, Structural Capital Efficiency, and Relational Capital Efficiency.

Against this backdrop, a model that captures shareholders' wealth as a function of intellectual capital efficiency of listed service companies in Nigeria was developed for the study.

The model is expressed as follows:

$$SHWT_{it} = \beta_0 + \beta_1 VAIC_{it} + \beta_2 HCPE_{it} + \beta_3 SCPE_{it} + \beta_4 RCPE_{it} + \beta_5 CPEE_{it} + \varepsilon_{it}$$

Where:

SHWT: Shareholders' Wealth; VAIC: Value Added Intellectual Coefficient; HCPE: Human Capital Efficiency; SCPE: Structural Capital Efficiency; RCPE: Relational Capital Efficient; CPEE: Capital Employed Efficiency. β_1 - β_5 are regression parameters and ε is error term; i represent sampled service firms while t is the time dimension.

Measurement of Variables

Table 1: Operationalisation of Variables

<i>SN</i>	<i>Variable</i>	<i>Acronym</i>	<i>Measurement</i>	<i>Source</i>	<i>A Priori Expectation</i>
1	Shareholders' Wealth	SHWT	It is proxied by Economic Value Added (EVA), measured as (Profit after Tax - Weighted Average Cost of Capital (WACC) x Invested Capital). Where invested capital is total assets less current liabilities.	Otuya and Osiegbu (2020)	+
2	Value Added Intellectual Coefficient	VAIC	HCPE+SCPE+RCPE	Ali et al. (2022)	+
3	Human Capital Efficiency	HCPE	Value added/Human Capital. Value added = Net Sales – total expenses. Human Capital = Total Employee Costs	Tran et. al. (2022)	+
4	Structural Capital Efficiency	SCPE	Expenditure on R&D/Management Expenses/Value Added	Lu et al. (2021)	+
5	Relational Capital Efficiency	RCPE	Selling, Distribution & Advertising Expenses + Donations/Value Added	Lu et al. (2021)	+
6	Capital Employed Efficiency	CPEE	Value Added/Capital Employed. Capital Employed = Total Assets-Intangible Assets	Ali et al. (2022)	+

Source: Researcher's Compilation, 2023.

4. ESTIMATION RESULTS AND DISCUSSION OF FINDINGS

Table 2: Descriptive Statistics of the Variables

	<i>SHWT</i>	<i>VAIC</i>	<i>HCPE</i>	<i>SCPE</i>	<i>RCPE</i>	<i>CPEE</i>
Mean	4.343	1.675	1.205	0.642	0.212	1.310
Maximum	12.853	4.732	2.416	3.327	7.422	9.865
Minimum	0.751	0.915	0.085	0.121	1.664	1.108
Std. Dev.	3.454	0.165	0.305	1.463	4.261	2.451
Observations	204	204	204	204	204	204

Source: Researcher's Compilation, 2023.

KEY: SHWT – Shareholders Wealth; VAIC – Value Added Intellectual coefficient; HCPE – Human Capital Efficiency; SCPE – Structural Capital Efficiency; RCPE – Relational Capital Efficiency; CPEE – Capital Employed Efficiency

Table 2 shows the descriptive statistics of the variables. Shareholders wealth (SHWT) is observed with a mean of 4.343 with maximum and minimum values of 12.853 and 0.751 respectively. The standard deviation of 3.454 indicates that there is considerable dispersion in creation of shareholders wealth among the listed serve firms. The table also shows the descriptive results of VAIC, HCPE, SCPE, RCPE and CPEE with mean values of 1.675, 1.205, 0.642, 0.212 and 1.310 respectively. The corresponding maximum and (minimum) values are 4.732(0.915), 2.416(0.085), 3.327(0.121), 7.422(1.664) and 9.865(1.108) respectively. RCPE has the highest standard deviation for the period with 4.261 while HCPE has the lowest standard deviation with 0.165.

Multicollinearity Analysis

The variance inflation factor (VIF), which assesses the correlation and strength of correlation between the predictor variables in a regression model, was used to test for multicollinearity. VIFs greater than 10 are seen by Hair et al. (2022) as being of concern. As can be seen from Table 3, none of the variables have VIF values more than 10, hence no significant evidence of multicollinearity was found.

Regression Results

The regression results of the panel data estimation are reported in Table 4. The study used three estimators of panel data; pooled OLS, random effects and fixed effects in order to take cognizance of the dynamics of change with short time series, and thereby control for the effect of the unobserved heterogeneity in the dataset. The Hausman test was further conducted to validate the appropriate

Table 3: VIF Test

	Collinearity Statistics	
	Tolerance	VIF
VAIC	0.721	2.119
HCPE	0.414	6.216
SCPE	0.221	4.214
RCPE	0.311	7.751
CPEE	0.580	2.013

Source: Researcher's Compilation, 2023

KEY: SHWT – Shareholders Wealth; VAIC – Value Added Intellectual coefficient; HCPE – Human Capital Efficiency; SCPE – Structural Capital Efficiency; RCPE – Relational Capital Efficiency; CPEE – Capital Employed Efficiency

method in estimating the model which gave a chi-square statistics value of 2.017, $p=0.621$ ($p>0.05$). Thus, the random effect was used in estimating the model.

The results of data analyzed are discussed thus:

Intellectual capital (VAIC) is found to have a positive and significant association with shareholders' wealth (SHWT) at 5% significant level ($\beta_1 VAIC_{it} = 35.1197$, $Prob. = 0.0000$). The result meets our *a priori* expectation and is consistent with prior studies such as (Ali et al., 2022; Muhammad et al., 2020; Tran et. al., 2022; Kalkan, Bozkurt and Arman (2014). However, this result is not in tandem with Puntillo (2009) and Poh, Kilicman and Ibrahim (2018) that found that combination of human capital, structural capital and capital employed as measure of intellectual capital has no significant relationship with firm market value. The implication of the result is that increasing the aggregate value intellectual capital positively enhances the economic value added of listed service firms in Nigeria.

Further, the coefficient of the variable human capital efficiency is observed to be positive and significant ($\beta_2 HCPE_{it} = 8.1953$, $Prob. = 0.0000$). This indicates that increase in investment in human capital increases shareholders' wealth of listed service companies. The result meets our *a priori* expectation and is consistent with previous studies such as (Adesanmi (2021; Alamanda & Springer, 2019; Duho & Onumah, 2019; Fedyk and Hodson (2022; Hamdan, 2018) that reported significant positive association between human capital efficiency and corporate financial performance.

The regression result on structural capital efficiency variable shows a positive association but not statistically significant at 5% ($\beta_3 SCPE_{it} = 0.54535$ $Prob.$

Table 4: Linear Least Square Regression Results

<i>Variable</i>	<i>Pooled Ols</i>		<i>Panel Ols (Random Effects)</i>		<i>Panel Ols (Fixed Effects)</i>	
	<i>Coefficient</i>	<i>Prob.</i>	<i>Coefficient</i>	<i>Prob.</i>	<i>Coefficient</i>	<i>Prob.</i>
C	33.32064	0.0000	32.5645	0.0000	28.51212	0.0000
VAIC	31.03204	0.0000	35.1197	0.0000	29.31333	0.0000
HCPE	2.095353	0.0000	8.19531	0.0000	1.569987	0.0000
SCPE	0.118654	0.0556	0.54535	0.4232	0.254107	0.3115
RCPE	0.274532	0.0011	0.21453	0.0011	0.419760	0.0021
CPEE	1.756453	0.0000	1.87665	0.0000	1.787670	0.0000
R ²	0.68435		0.68435			
ADJ R ²	0.43176		0.43176			
F-Stat	2.17857		2.17857			
P(f-stat)	0.00000		0.00000			
D.W	1.74361		1.74361			
<i>Hausman test</i>	2.0175		0.6210			

Source: Researcher's Compilation, 2023.

=0.4232). The positive coefficient meets our *a priori* expectation. Nonetheless, we anticipated a significant relationship in view of the fact that investments in R&D is a major determinant of human capital development. Prior studies have also reported positive link between structural capital efficiency and performance and firm value (Gupta et al., 2020; Tran et al., 2022).

With respect to relational capital efficiency, RCPE is observed to have a positive relationship and statistically significant at 5% ($\beta_4 RCPE_{it} = -0.21453$, *Prob.* =0.0011). This, therefore, implies that customer and public relations are a major determinants of economic value added of listed firms in the service sub sector. This result meets our *a priori* expectation and the position is supported by prior studies such as Obeidat et al. (2017) and Abdelmohsen and Gehan (2020).

Finally, the regression result on capital employed efficiency variable shows a positive link and statistically significant at 5% ($\beta_3 CPEE_{it} = 1.87665$ *Prob.* =0.000). The implication is that increase in physical capital also improves shareholders wealth. The results meets our *a priori* expectation and is consistent with findings by Akpan and Utung (2020), Nnubia, Okolo, and EmekaNwokeji (2019), Yaser and Obaid (2022), and Haris et al. (2019).

5. CONCLUSION AND RECOMMENDATIONS

The role of intangible assets such as intellectual capital as a determinant of corporate competitiveness and firm value has attracted attention in the finance literature. This study investigated intellectual capital efficiency as a source of creating shareholders' wealth in Nigeria. To achieve the study's aim, correlational research design was adopted. The study's data were collected from content analysis of financial statements of listed service companies in Nigeria. The sample used in this study includes 17 service firms listed on the Nigeria Exchange Group from 2011 to 2022. The VAIC model was utilized to estimate intellectual capital. Descriptive statistics were conducted while some diagnostic tests were piloted before the regression analysis. The random effect regression model was used to verify whether the studied variables impact shareholders wealth of listed service companies in Nigeria. The analysis indicated that value added intellectual coefficient as a measure of intellectual capital has a significant positive association with shareholders' wealth. Findings of the study further revealed human capital efficiency, relational capital efficiency and capital employed efficiency (as components of intellectual capital) are significantly and positively associated with shareholders' wealth while structural capital

efficiency has a positive but not significant relationship with shareholders' wealth creation. The study concludes that efficient management of intellectual capital can enhance shareholders' wealth in listed service companies in Nigeria.

In line with the findings of this study, the following recommendations are proffered:

1. Intellectual capital can increase competitive advantage hence firms should make strategic plans regarding intellectual capital and intangible assets to reap the long term benefits.
2. Investment in human capital in form of training and development of staff, improved welfare packages and sponsorship of conferences and seminars should be encouraged.
3. Structural capital was also found to positively contribute to corporate efficiency and firm value in this study. In line with this finding, increase in expenditure on research and development and other infrastructural facilities should be intensified.
4. In modern knowledge economy, customer and public relations promotes competitive advantage. The results of this study indicate that relational capital efficiency contributes to growth of the shareholders' value. It is therefore recommended that corporate managers should identify marketing and promotional activities that will enhance corporate social responsibility and good publicity for the firm.
5. Physical assets also contribute to the growth and financial performance of companies as shown in the study. Corporate managers should therefore place emphasis on efficient management of current and non-current assets to achieve optimum productivity and promote shareholders' wealth.

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