Intellectual capital investment and value creation of listed financial firms in Nigeria

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Abstract---This study investigated the effect of investments in intellectual capital on the value creation of financial firms listed on the Nigeria Exchange Group over an 18-year period (2006-2023). The study investigates specifically, the influence of human capital efficiency and relational capital efficiency on return on assets and earnings per share, while taking into account the size and age of the banks under review. The study utilized an ex post facto research design, drawing on secondary data obtained from the annual reports of the sampled companies. Purposive sampling technique was employed to select 12 banks from a total of 22. The investigator conducted assessments of data reliability and validity to ascertain the causal relationship among the variables. The findings of the study indicated that Relational Capital Efficiency (RCE) exhibits a positive yet statistically insignificant correlation with earnings per share, alongside a negative and also statistically insignificant correlation with return on assets for listed banks in Nigeria, with p-values of 0.4111 and 0.4907, respectively, at the p< and >0.05 level of significance. The efficiency of human capital demonstrated a noteworthy and

statistically significant effect on both earnings per share and return on assets for the banks examined, with p-values of 0.0001 and 0.0391, respectively, at p<0.05 level of significance. The research findings indicated that the elements of intellectual capital significantly influence the value creation of publicly listed banks in Nigeria. It is recommended that these banks incorporate their investments in intellectual capital within their annual reports, as this could enhance their financial robustness.

1. Introduction

1.1 Background to the Study

The purpose of preparing a financial statement is to provide insights into a company's financial performance, encompassing its cash flows and overall financial condition according to Adegbie, Akintoye & Olusanjo, (2019). To effectively achieve the objectives of financial statement preparation, it is essential that the financial statements encompass adequate information regarding the diverse components of the final accounts. In the formulation of these financial statements, solely assets and liabilities, recorded at their net book values, are employed to ascertain the firm's net worth alongside its financial condition and performance. It has been observed that the reporting of intangible assets, particularly investments in intellectual capital, is often overlooked in the evaluation of a company's financial position (Tarigan, Listijabudhi, Hatane & Widjaja, 2019). In 2013, the International Integrated Reporting Council (IIRC, 2013 & 2021) introduced a reporting framework that emphasizes the significance of intellectual investment. This framework integrates both financial and non-financial measures into a cohesive document, illustrating the interconnections among the six content elements: financial capital, intellectual capital, human capital, social capital, relationship capital, manufactured capital, and natural capital. Together, these represent the reservoirs of wealth that underpin an organization's capacity to generate value. Integrated reporting aims to enhance transparency and accountability concerning an entity's external environment by providing clear communication regarding its strategy, governance, performance, risk, and prospects, amongst other factors, which ultimately contribute to value creation (Adhariani, & Villiers, 2018).

The incorporation of non-financial elements into financial disclosures serves as a mechanism for organizations to communicate their activities to stakeholders regarding sustainability, as noted by Hendri & Puteri (2015), referenced in Ofoegbu, Odoemelam, and Okafor (2018). Research findings suggest that non-financial elements play a significant role in shaping the extent of environmental disclosure. Organizations have the capacity to present a comprehensive analysis of economic performance and sustainability in a single document, thereby bridging the gap between non-financial and financial information through the application of multiple capitals in integrated reporting. (Hussain, Mendes, &

Alucha, 2019). The integrated reporting framework, transcending mere terminology, encompasses the domains of intellectual capital and advocates for their incorporation in reports when they are crucial to the organization's capacity to generate value (IIRC, 2013 as referenced in Seo, 2019). Although the aim of integrated reporting was to encourage the disclosure of both intellectual and non-intellectual capital, it appears that the emphasis is predominantly on intellectual capital. According to Akintoye (2019), the term "intellectual capital" was introduced by Jon Kenneth Galbraith in 1969, where he characterized it as the effectiveness with which enterprises utilize their human and material resources, alongside their ability to generate value from knowledge. Zhang, Duc, Mutruc, and Tsai (2021) assert that intellectual capital represents a type of resource that remains unaccounted for in financial statements yet can be utilized to confer a competitive edge upon a business and enhance its prospective value. As it becomes increasingly evident in contemporary society that knowledge assets significantly impact economic value, the emphasis often lies on how enterprises effectively leverage intangible resources to enhance their market standing amid competition from other entrepreneurs (Salman & Abogun, 2024). The perception of a company as composed of individuals possessing specialized expertise fosters creativity within the organization. Additionally, selecting the right structural mechanism is essential for transforming human capital, intellectual property, and knowledge into concrete assets and financial success. In the aftermath of the global financial crisis of 2007, stakeholders have persistently pursued greater insights into the non-financial endeavours of firms, recognizing the significant impact these activities exert on both society and the environment (Velte & Stawinoga, 2017). This has prompted numerous organizations to willingly issue distinct publications of their social and environmental reports. Nonetheless, owing to the financial burden associated with publishing two separate reports or the adverse impacts of their activities on society, most organizations tend to overlook these reports. While Nigeria has yet to implement obligatory standards for integrated reporting, Sardo & Serrasqueiro (2019) perceived this reporting approach as a comprehensive document encompassing finance, sustainability, risk management and strategy, human resources, corporate governance, stakeholder engagement, performance and regulatory reporting, as well as information technology and operations management.

1.2 Statement of the Problem

Nadeem, Dumay, and Massaro (2019) noted that a common divergence exists between a business's book value and its market value, a phenomenon that can be elucidated by the omission of intangible assets in the financial reports of companies. In a similar vein, Zhang et al. (2021) supported this assertion by indicating that the variations in market-to-book values illuminate the advantages of intangibles and their significance. The influence of intangibles within these organizations is evidenced by the magnitude of the disparity between their book values and market values (Drehmann and Juselius, 2014). Should the Accounting Regulatory Board release a statement of accounting standards aimed at enhancing the overall reporting of the drivers of intellectual capital within financial statements, this issue could be resolved. The extent of investment in knowledge assets has been associated with the challenges faced by the financial sector of the nation, as evidenced by various literary analyses. Oko, Onodi, and

Tapang (2018) assert that banks in Nigeria face challenges in sustaining the knowledge and expertise required for profitable and efficient operations.

Objectives of the Study

The main objective of the study is to determine the effect of intellectual capital investment on the value creation of financial institutions listed on the Nigeria exchange group while the specific objectives are to;
  i. Examine the effect of relational capital efficiency on the value creation of financial firms in Nigeria
  ii. Ascertain the effect of human capital efficiency on the value creation of financial firms in Nigeria

1.3 Research Hypotheses

$H0_1$ Relational capital efficiency does not significantly affect the value creation (ROA) of financial firms in Nigeria

$H0_2$ Human capital efficiency does not significantly affect the value (EPS) creation of financial firms in Nigeria

2. Review Of Related Literature

2.1 Conceptual Review
2.1.1 Intellectual Capital Investment and Disclosure

The phrase "intellectual capital investment" refers to the knowledge, competencies, and talents that individuals have developed through their financial pursuits (Hidayah, 2018). The composition encompasses the knowledge, skills, creativity, commitment, insight, and experience of the workforce. Similar to other assets, investment in human capital is widely recognized as an intangible asset that generates income and various advantageous outcomes over time; however, intellectual property is fundamentally connected to the individuals who hold it, in contrast to physical and financial capital (Gapenski & Brigham, (2017). In the initial stages of its existence, the tangible assets of a company significantly influenced its valuation. The impact of intangible assets was minimal and largely speculative in nature. The value of investments in information and other intangible assets has seen a notable increase recently, whereas tangible assets have diminished in significance. Executives in organizations and government have primarily concentrated on intangible assets to establish a lasting competitive advantage. A significant portion, exceeding 80%, of a company's value is constituted by intangible assets such as inventions (Gupta, Goel & Bhatia, 2020). In contemporary discourse on corporate sustainability, it is imperative to recognize that an exclusive emphasis on economic factors is insufficient; one must also account for social and environmental dimensions. Consequently, business decisions and actions generally consider the social, economic, and environmental dimensions (Asare, Margaret, Joseph & Michael, 2021). The practice of information reporting has transformed from a mere focus on financial data to a more comprehensive approach that encompasses nonfinancial data, taking into account social and environmental considerations. The transition from a manufacturing-oriented economy to knowledge-centered economy has led to a

marked enhancement in the significance of intellectual capital within the value creation mechanisms of enterprises. Given that conventional financial disclosures omit details related to intellectual capital, numerous stakeholders have persistently advocated for corporations to voluntarily reveal their intellectual capital. This inclusion is deemed essential for comprehensive assessments of company performance and evaluations (Abhayawansa & Guthrie, 2016). The advent of integrated reporting has equipped managers with a new mechanism for managing intellectual capital disclosure. In contemporary contexts, information and communication (IC) function as a foundational element for corporations, facilitating the attainment of objectives and the preservation of a competitive advantage. To fulfill the expectations within their network, organizations have disseminated intellectual capital information via intellectual capital statements, annual reports, environmental reports, and corporate social responsibility (CSR) reports (Yousaff, 2022). Scholars examining IC disclosure within the pertinent academic domain frequently utilize these materials as a foundational element for their enquiries. While the incorporation of IC information is present, it is essential to acknowledge that these documents inadequately address the interplay between a firm's tangible and intangible resources.

2.1.2 Value Creation and measurement

The concept of value is commonly employed to articulate the significance, worth, or utility of a good or service (Hameed & Anwar, 2018). The process of value creation involves the utilization of labour to convert resources into entities of significance. This phrase in economics encompasses the generation of tangible goods and services. Investments in capital goods and intangible assets are also encompassed. Value stands as one of the four fundamental components of a business model—alongside product, location, pricing, and promotion—playing an indispensable role in the formation of a company (Eka, et al, 2019). The concept of value plays a crucial role in marketing and promotion, as comprehending value is essential for effectively navigating promotion, pricing, and product development. The act of converting inputs into outputs that possess greater worth than their individual components is referred to as value creation. The concept of value is articulated as the disparity between the asking price of a product or service and the expenditure incurred by the company in its production. Value represents the worth that an entity is perceived to possess. Consumers are more inclined to acquire a product or service when they perceive it to hold significant value. It is essential for any business owner or entrepreneur to comprehend the principles of value creation, as it serves as the cornerstone of a thriving enterprise. Three elements have been delineated by Noor, Nordin, Mohd, Rahim, Sakinah, and Shaikh (2021) as determinants of a product's perceived value: The value of a company's product is significantly enhanced when it fulfils a genuine need or desire of the consumer. Rarity: When a business produces something that is challenging for others to find or acquire, it will inherently be regarded with greater esteem, and Egoism posits that an individual perceives a product or service as valuable when it contributes to their sense of self-worth. Özmen (2018) asserts that a firm is capable of producing diverse types of value, encompassing time savings, enhanced productivity, reduced stress, and the transformation of raw materials such as wood, rocks, and minerals into functional items like clothing or furniture. The process of converting personal interests and skills into

a thriving enterprise exemplifies the essence of value creation. The creation of value involves three fundamental processes: transformation, distribution, and consumption. The distribution process entails converting your product into a marketable entity for customers, while the transformation process focuses on refining raw materials into practical applications. The consumption phase encompasses the utilization of the product by the customer in accordance with your original intentions. The ability of a company to generate value is essential, as it enhances customer satisfaction and drives profitability. Value can be perceived as a strategic investment that, when executed effectively, produces enduring benefits. According to Sedeaq (2018), the generation of value is an essential element within a firm. As it serves as the cornerstone for revenue generation, it holds considerable importance for an organization. The act of bringing forth something into the world that possesses the potential to assist others is referred to as value creation. To derive revenue from its products and services, a corporation must enhance their value. The act of creating value involves offering something that individuals will desire or perceive as beneficial in some manner. The process may range from the straightforward act of brewing coffee to the intricate endeavour of erecting a skyscraper; nonetheless, the contribution of the individual involved is essential in infusing value into the outcome. When a business manufactures superior products and has cultivated a reputation for consistently comprehending and fulfilling client requirements, its offerings are regarded as valuable. The assessment of value creation was once primarily reliant on a company's profit margin; however, in the contemporary digital landscape, numerous methodologies have emerged to evaluate value creation. Revenue, client satisfaction, and the success of a sale serve as metrics for evaluation. According to Amrizah & Rashidah (2013), the subsequent approach serves as a straightforward means to assess the value produced by a revenue-generating organization: Depreciation and amortization in conjunction with net or operating income

2.1.3 Financial Institution

The financial sector represents a particularly fitting domain for the examination and exploration of intangible assets due to the service-oriented and cognitive characteristics inherent in the industry, which prioritizes knowledge and the competencies of its workforce over mere monetary and physical resources. Furthermore, this sector is distinguished by its access to dependable data, and the application of intellectual capital in generating value within knowledge-driven industries, particularly the financial sector, surpasses that of other economic domains (Adegboyegun, Alade, Ben-Caleb., Ademola, Eluyela, & Oladipo, 2020). The financial sector encompasses a range of firms engaged in the provision of financial services to both commercial and retail clients; it comprises entities such as banks, investment funds, insurance companies, and real estate firms. Financial services thrive in environments characterized by low interest rates, as a significant segment of this sector derives revenue from mortgages and loans, which appreciate in value when interest rates decline. The financial sector comprises a collection of institutions, instruments, markets, and a legal and regulatory framework that facilitates transactions via the provision of credit. At its core, the development of the financial sector revolves around addressing the inherent "costs" associated with the financial system. The endeavour to minimize

the expenses related to information acquisition, contract enforcement, and transaction execution leads to the formation of financial contracts, intermediaries, and markets. The financial sector in Nigeria is regarded as one of the largest components of the economy, playing a vital role in fostering economic development (Hong Kong Monetary Authority, 2015). Acheampong (2019) delineated five fundamental functions of a financial system within a nation, which include: i. generation of information prior to investments and capital allocation; ii. being in-charge of investments and the implementation of corporate governance subsequent to financing; iii. facilitation of trading, diversification, and risk management; iv. mobilization and aggregation of savings; and v. The promotion of the exchange of goods and services.

2.1.4 Dependent, Independent and Control Variables

Return on Asset (ROA): According to Kamath (2017), return on assets serves as a measure that assesses the efficacy of the assets utilized, illustrating the earnings produced by the company from its capital and investment assets to its shareholders. The evaluation of a company's financial resources is more precisely determined by the returns generated from its investments. The return on assets serves as a valuable metric for evaluating how effectively a company's governance framework safeguards and enhances the performance of its management. The Return on Assets ratio, which assesses the efficiency of assets in generating sales, is determined by dividing Net Income by Total Assets.

Earnings per Share (EPS): The calculation of earnings per share (EPS) involves dividing the total number of common shares outstanding by the company's net income, after deducting preferred dividends. EPS serves as a prevalent metric for assessing corporate value, reflecting the monetary amount a company produces for each share of its stock. Earnings per Share serves as an essential metric for assessing the performance of potential companies, aiding in the selection of the most suitable investment opportunity (Utami, 2018). The financial status of a company can be analyzed over time through the examination of EPS.

Bank Size: According to Jasch (2013), larger enterprises possess the ability to yield higher profits owing to their more substantial market share. Furthermore, this notion suggests that a company's profitability is affected by its scale, with numerous experts having identified a positive correlation between the two. Akinyomi and Olagunju (2013) posited that the dimensions of a business are pivotal in assessing organizational success, noting that a plethora of studies have sought to explore the relationship between firm size and profitability. As a result, larger enterprises might engage in more lucrative markets characterized by reduced competition, depending on these conditions.

Financial institution The concept of "firm age" refers to the length of time a business has been in operation. The longevity of the company serves as a crucial determinant of its performance efficacy. Established corporations often struggle to achieve the same levels of profitability and growth as emerging enterprises, as the latter possess the agility to innovate work processes, create job opportunities, expand within local markets, and cultivate talent effectively. Conversely, well-established enterprises endowed with extensive expertise, a proven history,

consolidated resources, and a commendable standing within the industry possess the capacity to navigate challenges and function efficiently. According to Pollet's (2009) research, a company acquires proficiency in its operations, navigates challenges, and meets its social responsibilities within the first year of its inception.

Human capital encompasses the competencies, capabilities, knowledge, skills, experiences, and motivations of individuals to innovate, as well as their alignment with and support for an organization's governance framework, risk management strategies, and ethical principles (Cosma, Soana & Venturelli, 2018). The significance of human capital has emerged as a pivotal factor in the success of organizations, with a growing emphasis on comprehending its influence.

Relational Capital: Customer capital signifies the potential that the organization possesses for intangible assets beyond its internal framework. Indeed, customer capital encompasses the external aspects of the organization's revenue generation process. The potential for income within an organization is intricately tied to trading, reputation, strategic alliances, networks, and the communication established with both customers and suppliers.

2.2 Theoretical Framework

The human capital theory proposed by Gary Becker in 1962 posits that training and education should be viewed as investments in future productivity, rather than mere consumption of resources. This theory underpins the study at hand. This theory posits that an enhancement in human capital has the potential to elevate wages, earnings, and productivity for individuals as well as organizations. The theory posits that an employer's commitment to training and development serves as a strategic approach to attract and retain valuable human capital, simultaneously yielding enhanced returns on such investments. A company's competitive edge endures when its human resources are unique and cannot be imitated or replaced by rival firms. This theory highlights the manner in which individuals generate value, subsequently facilitating the growth and prosperity of an organization. Individuals are consequently regarded as valuable resources, as investing in their development can produce considerable benefits for organizations. This investment may be pursued in domains such as nutrition, wellness, education, or any other progressive endeavour that promises returns over time. One must recognize that a person who allocates time, financial resources, or other assets towards an endeavour aimed at enhancing their human capital is, in this context, making a strategic investment. Given that human capital constitutes a vital element of intellectual capital efficiency (ICE), this concept holds considerable importance for examining the relationship between intellectual capital and an organization's financial performance. The subsequent chapter presents a methodology to evaluate the validity of this hypothesis within the context of the current study.

2.3 Empirical Review

The existing body of literature on the investment in intellectual capital and value creation within publicly listed financial institutions, both in Nigeria and in developed nations, yield findings that are often mixed or inconclusive.

In Nigeria, Salman and Abogun (2024) examined the correlation between the market value of publicly listed firms and the efficacy of their intellectual resources. The research indicated that the knowledge assets significantly influenced the market value of the Nigerian enterprises included in the sample. Enekwe et al. (2022) conducted a study on the financial performance of publicly traded consumer goods firms in Nigeria, focusing on the implications of intellectual property. The results indicate that while SCE and CEE exhibited negative and minimal effects on ROA, HCE demonstrated a positive and substantial influence. Haruna (2021) examined the influence of intellectual capital on the performance of multinational corporations in Nigeria. The findings indicate that the performance of multinational firms in Nigeria is positively and significantly influenced by the efficiency of capital employed, whereas neither structural capital efficiency nor human capital efficiency appears to have an effect on the performance of these firms in Nigeria. Solanke and Muhammad (2021) examined the influence of intellectual capital on the financial performance of pharmaceutical companies listed on the Nigeria Exchange Group. The analysis reveals that when the data is disaggregated, return on assets, human capital efficiency, structural capital efficiency, and capital employed efficiency exert a significant negative influence on financial performance. Rehman, Aslam, and Iqba (2022) examined the extent of capital efficiency and the interrelations among its three components: human, structural, and relational capital, alongside the performance of Islamic banking, as measured by return on equity, return on assets, and Tobin's q, within Muslim countries. The findings indicate that the primary factors contributing to the success of Islamic banks are SCE and RCE. The research further indicates that the performance of Islamic banks is adversely affected by HCE. The dimensions of the banking institution and the extent of foreign ownership significantly influence the success of investment banking.

Beyond the confines of Nigeria, Onumah and Duho (2020) undertook a study examining the influence of intellectual assets on the operational efficiency of banks, utilizing data sourced from Ghana. The research revealed that efficiency scores incorporating risk factors are superior to those that exclude them. Empirical evidence indicates that IC enhances the efficiency of banking institutions. Hossain, Salam, Reza, and Hassan (2022) examined the impact of knowledge assets on the profitability, market value, and productivity of publicly listed banks in Bangladesh. The analysis revealed that the human capital of the examined banks enhanced profitability while diminishing productivity, without influencing market value. Surprisingly, throughout the study period, banks possessing greater structural capital demonstrated inferior profitability; however, this outcome remained independent of their market value or productivity levels. Turkis Mukaro, Deka, and Rukani (2023) examined the relationship between cognitive assets and the efficacy of organizations. This analysis utilizes the latest dataset pertaining to Turkey's business sectors, spanning the years 2009 to 2021. The primary findings of this study elucidate the significance of debt and equity

financing in enhancing organizational success. The findings further indicate that the presence of intellectual capital and long-term liabilities diminishes a company's profitability. Tangngisalu (2021) examined the influence of intellectual capital on the financial outcomes of real estate and property companies listed in Indonesia during the period from 2015 to 2019. The findings indicate that Value Added Capital Employed (VACA), Value Added Human Capital (VAHU), and Structural Capital Value Added (STVA) all have a significant and positive impact on financial performance. Arif, Amiruddin, Darmawati, and Muhammad (2023) investigated the correlation between knowledge assets and market performance in an empirical study of Indonesian Islamic institutions. The findings indicated that both the moderating and mediating variables exerted a considerable influence on the dependent variable, as well as the relationship between intellectual capital and market performance.

3. Methodology

3.1 Research Design

Ex-post facto and analytical research design were employed in the study due to the use of historical (secondary) data which cannot be manipulated by the researcher.

3.2 Sampling Technique and Sample Size

Purposive sampling technique was used to select twelve (12) banks out of the population of (22) based on availability of their annual reports and statement of accounts They include; Fidelity Bank PLC, First City Monument Bank (FCMB) PLC, First Bank Nigeria Ltd, Wema Bank PLC Guaranty Trust Bank PLC, Union Bank of Nigeria PLC, United Bank of Africa PLC, Zenith Bank PLC, Stanbic IBTC Bank PLC, Sterling Bank PLC, Unity Bank PLC, Access Bank PLC,

3.3 Model Specification

In line with the model of Salman and Abogun (2024) the model of the present study is as follows adopting Pulic (2004) VAIC model;

VAIC ™ = RCE + HCE -.................- (i)

VA = Value added represents the value added created by a firm (VA= OI + E + D + A)

Where:

OI = Operating Income,

E = Employee costs,

D = Depreciation,

A = Amortization,

RCE = RC/VA **------------------------------ (**ii**)**

Relational Capital (marketing costs efficiency: ratio of (RC to VA)

HCE = VA/HC ------------------------------- (iii)

Human capital is the total company investment on employee (salaries and wages, training and development cost, welfare package and compensation cost).

The model is stated thus;

$Y_{it} = \alpha + \beta_1 RCE_{it} + \beta_2 HCE_{it} + \beta_3 Size_{it} + \beta_4 Age_{it} + \beta_{it}$ - (iv)

Where:
Y it   = value creation (ROA & EPS)
ROA   = Return on Total Assets
EPS   = Earnings per Share
RCE   = Relational Capital Efficiency
HCE   = Human Capital Efficiency
SIZE   = Logarithm of Total Assets
AGE   = Log of Firm Age
Bit   = error term

3.4 Description of Variables

ROA and EPS are the dependent variables while RCE, SCE and HCE are the independent variables of the study. The study also considered size and age of banks as the control variables.

i.   Return on Assets = profit after tax divided by total assets
ii. Earnings per Share = Profit after tax and preference dividend divided by average no. of share
iii. VAIC) = Operating Income + Employee costs +Depreciation + Amortization
iv. Relational capital efficiency divided by value added RCE /VA
v.   Human capital efficiency divided by value added VA /HCE
vi. Firm size and age = log of total assets and number of years

3.5 Methods of Data Analysis
The test were done by testing for descriptive analysis, correlation analysis, unit root test, parameter stability test, (Cusum test). The Pooled Ordinary Least Square regression technique was adopted for hypothesis testing.

3.6 Apriori Expectation
The a priori expectation is represented thus; β_1 .... $\beta_3 > 0$

4. Data Analysis
The results from the analysis and the interpretations of the effect of intellectual capital investments on the value creation (EPS and ROA) of financial firms in Nigeria is here presented

4.1   Descriptive Statistics

Table 4.1: Descriptive Statistics

Variables	ROA	EPS	HCE	RCE	SIZE	AGE
Mean	0.018130	0.774141	13.01059	0.003590	8.795991	1.239844
Median	0.019722	0.865000	.2.524533	0.000438	8.839563	1.322219
Maximum	0.282878	37.48000	1264.310	0.499951	9.695083	1.875061
Minimum	-0.531254	-127.6200	-0.942202	-0.063272	7.860386	0.000000
Std. Dev.	0.063562	12.28385	101.2903	0.040459	0.468880	0.375810
Skewness	-3.664166	.7.888095	12.20479	11.91867	-0.137829	-0.720108
Kurtosis	40.33795	81.70314	151.2316	147.1486	2.062220	3.325993
Jarque-Bera	9410.875	41879.97	146694.8	138755.8	6.210220	14.17319

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Variables	ROA	EPS	HCE	RCE	SIZE	AGE
Probability	0.000000	0.000000	0.000000	0.000000	0.044820	0.000836
Sum	2.828208	120.7660	2029.653	0.559964	1372.175	193.4157
Sum Sq. Dev.	0.626216	23388.39	1590256.	0.253721	34.07650	21.89116
Observations	216	216	216	216	216	216

Source: Researchers E-View Computation

Table 4.2 showed that ROA has a positive average mean value of 0.018130, with a minimum and maximum value of -0.531254 and 0.282878 respectively. EPS mean value of is 0.774141 while the minimum and maximum value were -127.6200 and 37.48000 respectively; indicating that the sampled banks have a positive average mean value on ROA and EPS in the period under review. HCE mean value is 13.01059 and minimum and maximum values are -0.942202 and 1264.310 respectively while the mean value of RCE is 0.003590, with -0.063272 and 0.499951 as the minimum and maximum value. Mean value of bank size is 8.795991 with minimum and maximum value of 7.860386 and 9.695083 respectively, while AGE has a mean value of 1.239844 with a minimum and maximum value of 0.000000 and 1.875061 respectively.

4.2 Correlation Analysis

Table 4.2: Correlation Analysis

Variables	ROA	EPS	HCE	RCE	AGE	SIZE
ROA	1.000000	0.239465	0.293218	0.018270	-0.101095	0.044842
EPS	0.239465	1.000000	0.011416	0.147358	-0.021077	0.113964
HCE	0.293218	0.011416	1.000000	-0.006945	0.068314	-0.082013
RCE	0.018270	0.147358	-0.006945	1.000000	-0.202322	-111344
SIZE	0.044842	0.113964	-0.082013	-0.111344	0.162677	1.000000
AGE	-0.101095	-0.021077	0.068314	-0.202322	1.000000	0.162677

Source: Researcher's E-View Computation

Table 4.3 shows the correlation matrix of the variables under study, which check for multicollinearity and the relationship between each dependent and independent variables. The table showed that ROA has a positive association with EPS. This justifies the use of two measures as a proxy for banks value creation. The table also reveals that ROA is negatively associated with AGE (control variable) and positively associated with HCE, RCE and SIZE (control variable). EPS is also positively related with HCE and SIZE (control variable) and negatively related with AGE (control variable). HCE is positively related with AGE (control variable) and negatively related with RCE and SIZE (control variable). RCE is negatively related with SIZE (control variable) and AGE (control variable). In checking for multicollinearity, the study observed that no two independent variables were perfectly correlated.

Table 4.3 Unit Root Test

Variables	ADF t-test	AT 5%	AT 10%	P-Value	Difference
ROA	-7.11446	-3.4490	-3.1497	0.0000	1(0)
EPS	-7.6025	-2.8876	-2.5808	0.0000	1(0)
LITC	-5.0276	-2.8862	-2.5800	0.0000	1(0)
LCV.	-5.8119	-3.4497	-3.1501	0.0000	1(0)

Source: Researchers computation

Where:
LITC= Log of Intellectual Capital Coefficient
LCV = Log of Control Variables,
ADF-Fisher **=** Augmented Dickey Fuller Fisher Chi–Square Test.

The study observed that the constant and trend were not absolutely restricted simply because some trends were not statistically significant at 5% level, while some are. Since some of their respective probability values are not > 5% level of significance, therefore we failed to ignore them by choosing (at intercept or trend or both). There is no evidence of unit root among the series since the p-value of t-statistics is < 5% significant level. The (ADF) values are > than the critical values at 5% level in absolute. The series are said to be stationary at this point since there is no evidence of unit root therefore, the null hypothesis (presence of unit root) is not accepted.

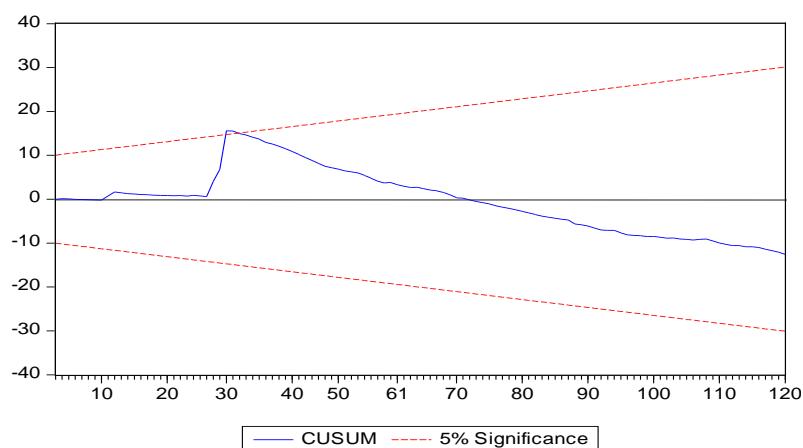## 4.4 Parameter Stability Test

Figure 4.1 Parameter Stability (ROA)

In figure 1, the dependent variable was displayed graphically through the application of cusum test for parameter stability. The study observed that the parameters are relatively stable over the period under study since the blue line lies in -between the 5% significant boundaries (two red line) as indicated on the graph. There is an evidence of slight deviation from the line but later corrected along x axis.
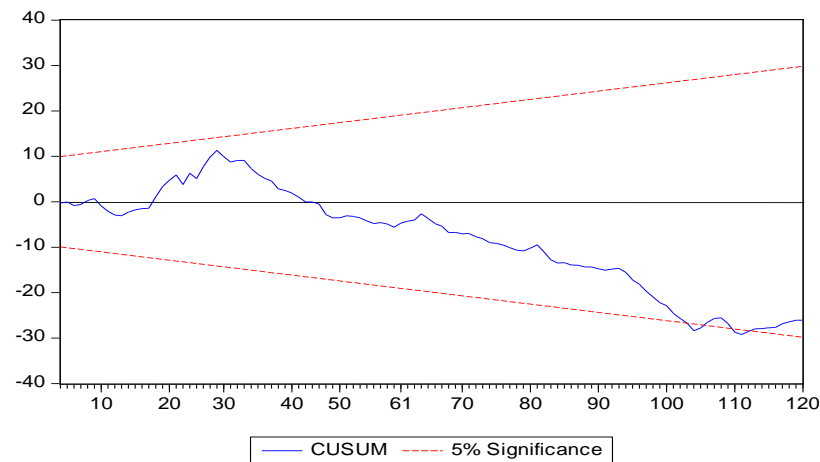
Figure 4.2 Parameter Stability (EPS)

In Figure 2, the dependent variable was displayed graphically through the application of cusum test for parameter stability. The study observed that the parameters are relatively stable over the period under study since the blue line lies in -between the 5% significant boundaries (two red lines) as indicated on the graph. There is no evidence of slight deviation from the line.

4.5 Test of Hypotheses

Table 4.4:   ROA Model
Dependent Variable: ROA

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.042999	0.090747	-0.473838	0.6363
HCE	0.000187	4.74E-05	3.937590	0.0001
RCE	-0.085856	0.124256	-0.690957	0.4907
SIZE	0.010106	0.010400	0.971769	0.3327
AGE	-0.029088	0.013260	-2.193623	0.0298
R-squared	0.259206	Mean dependent var		0.018130
Adjusted R-squared	0.23 1180	S.D. dependent var		0.063562
S.E. of regression	0.059246	Akaike info criterion		-2.776524
Sum squared resid	0.526519	Schwarz criterion		-2.659222
Log likelihood	222.5689	Hannan-Quinn criter		-2.728881
F-statistic	5.680558	Durbin-Watson stat		1.515441
Prob(F-statistic)	0.000079			

Source: Researcher's E-View Computation (2024)

In table 4.4 the R² of 26% measures the goodness of fit of the panel regression line model. The R² of 26% shows the model reliability and the variation in the dependent variable accounted for by the independent variable with an unexplained variation of 74%. The F- statistic of 5.680558 with the matching probability value of 0.000079 infers that the model is all-inclusive and is positive and statistically significant for reliable analysis. The Durbin Watson Statistics of 1.515 approximates 1.52 shows the existence of first-order positive autocorrelation in the model as 1.5 is < 2 which is Durbin-Watson statistics benchmark. This means that the independent variables are statistical significant in explaining the effect of ROA.

Table 4.5: EPS Model
Dependent Variable: EPS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-22.71701	17.34719	-1.309550	0.1924
HCE	0.000384	0,009057	0.042360	0.0391
RCE	19.57788	23.75275	0.824236	0.4111
SIZE	2.763274	1.988010	1.389970	0.1666
AGE	-2.31345	2.534785	-0,912683	0.3629
R-squared	0.277368	Mean dependent var		0.774141
Adjusted R-squared	0.249947	S.D. dependent var		12.28385
S.E. of regression	11.32550	Akaike info criterion		7.729693
Sum squared resid	19240.04	Schwarz criterion		7.846995
Log likelihood	-596.9160	Hannan-Quinn criter		7.777336
F-statistic	6.468313	Durbin-Watson stat		2.525599
Prob(F-statistic)	0.000018			

Source: Researcher's E-View Computation (2024)

In table 4.5, the R² of 28% measures the goodness of fit of the panel regression line model. The R² of 28% shows the model reliability and the variation in the dependent variable accounted for by the independent variable with an unexplained variation of 72%. The F- statistic of 6.468313 with the matching probability value of 0.000018 infers that the model is all-inclusive and is positive and statistically significant for reliable analysis. The Durbin Watson Statistics of 2.5256 approximates 2.5 rules out possible existence of first-order positive autocorrelation. This means that the independent variables are statistical and significantly negative as 2.5 is greater than the Durbin-Watson benchmark of 2.

4.6 Discussion of Findings

HO₁   Human capital efficiency does not significantly affect earnings per share and return on assets of financial firms in Nigeria

Table 4.4 and 4.5 revealed that;
    i. HCE has a positive significant effect on ROA as evident by p-value of 0.0001 being <5% level of significance, with a coefficient intercept of 0.000187, while the t-statistics value is 3.937590.
    ii. HCE has a positive significant effect on EPS as evident by p-value of 0.0391 being <5% level of significance, with a coefficient intercept of 0.0003 84 and t-statistics value of 0.042360.

Therefore, the null hypothesis was rejected and the finding is consistent with the findings of Ousama, Hammami and Abdulkarim (2020) whose study revealed that both Capital Employed Efficiency and Human Capital Efficiency have impact on the ROA and ROE of Islamic banks. The implication of this finding is that an increase in the human capital investment will bring a positive and significant boost in the value creation of the banks and vise-versa. This finding supports the human capital theory on which the present study is anchored and it proposes that sustainable competitive advantage is attained when the firm has a human capital that cannot be imitated or substituted by its rivals, for the employer investment in training and developing people is a means of attracting and retaining human capital as well as getting better returns from those investments.

HO$_2$ **Relational capital efficiency does not significantly affect earnings per share and return on asset of firms listed in the Nigerian financial institutions**

The regression result in table 4.8 and 4.9 revealed that;
- RCE has a negative insignificant impact on ROA with a p-value of 0.4907 being >5% level of significance, coefficient intercept of 0.085856 and t-statistics of -0.690957.
- RCE has a positive insignificant effect on EPS with a p-value of 0.4111 being <5% level of significance, coefficient intercept value of 19.57788 and t-statistics of 0.824236

Therefore, the null hypothesis was accepted and the finding is in tandem with the results of Yusuf (2018) and Aljuboori, Singh, Hadad, Al-Ramahi and Ali, (2022) whose studies revealed that RCE and SCE showed a non-significant impact with the performances of DMBs in Nigeria. The implication of this finding is that an increase in the relational capital efficiency will boost the value created by the banks over time. The reason is that when a firm develops a good relationship with its' customers and investors, it gives such firm an edge over their counterparts.

5. Conclusion

Based on the findings, the study concludes that intellectual capital components have effect on the value creation of listed banks in Nigeria, which implies that capitalization of intellectual capital investment in the annual reports of banks can increase financial strength of such firms. The study suggests among other things, that corporate managers should have a safe and appropriate working atmosphere, as well as involve employees in regular training and development programs that will automatically improve their performance and productivity in the nearest future; hence, intellectual capital investment yield; is futuristic. Banks should

also exhibit high intellect of salesmanship and marketability with its sales team and open access to customers, so as to enhance effective and efficient banker-customer relationship

5.1 Contributions to Knowledge

The study has contributed to the body of knowledge on the research topic intellectual capital investment and firm value creation as there is insufficient literature around the area. The present study combined two intellectual capital components using two financial performance indicators for 18years (2006-2023) on twelve sampled banks in Nigeria and also modified the functional value added intellectual coefficient (VAIC) of Salman and Abogun (2024), which will aid future researchers in making proper and current references; as different periods produce different results.

5.2 Suggestions for Further Study

The researcher recommends that subsequent research on this topic should be carried out in other sector of the economy other than financial service sector using different financial performance indicators and different analytic tools in order to confirm the results of the present study

Authors' contributions/Declarations:
This work was carried out in collaboration among all authors. All authors read and approved the final manuscript

Disclaimer (Artificial Intelligence)
Authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT etc.) and text-to-image generators have been used during writing or editing of this manuscript

Competing Interests
Authors hereby declare that no competing interests exist.

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