



INTELLECTUAL CAPITAL AND ECONOMIC VALUE ADDED IN NIGERIAN DEPOSIT MONEY BANKS: THE MODERATING ROLE OF BANK SIZE

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Abstract

This paper examines the impact of intellectual capital on economic value added of listed deposit money banks in Nigeria. To achieve this objective, human capital, structural capital and relational capital were used as proxies for intellectual capital while economic value added was used to measure performance. Data were collected from financial statements of the 14 deposit money banks listed by the Nigerian Exchange Group selected using Census Sampling technique. The data collected were analysed using descriptive statistics, correlation analysis and the dynamic GMM panel. The study findings revealed that human capital has significant positive impact on economic value added with p-values of 0.0029, structural capital has negative and significant impact on EVA of listed DMBS in Nigeria with p-values of 0.0001, while bank size as a moderating variable has positive and significant influence on EVA. The study recommends that, DMBs in Nigeria should intensify investment in human capital by injecting more resources for digital skills, and leadership training as well as knowledge refreshing strategies, and further suggests for smaller banks to embrace collaboration with larger ones to benefit from the economies of scale. More so, Nigerian DMBs should reassess their customer relations strategies with a view to ensuring that customer loyalty, brand goodwill, as well as engagement with stakeholders are optimally translated to measurable economic benefits.

Keywords: Human capital, structural capital, relational capital, performance, deposit money banks.

I. INTRODUCTION

Over the past decades, there has been speed of expansion of science, technology and finally globalization which have altered the patterns and structures of the production and service delivery systems today. The new system is mainly driven by technology, knowledge, expertise and relations with stakeholders which can collectively be described as intellectual capital (Ahangar, 2011). The new economic system popularly known as the knowledge economy recognizes intangible assets or rather intellectual capital as vital resources needed for the survival and sound performance of banks.

Firm performance is a term used to determine whether or not an entity operates in a manner that indicates the diverse interests of the bank's stakeholders are protected, operations are efficiently managed and translates the direction taken by a bank towards achieving its primary and strategic goals. Performance serves as a guide to making optimum decisions for the growth and future of a bank by exploring different performance measurement systems.



The operating environment of Deposit Money Banks (DMBs) in Nigeria has become increasingly complex following the adoption of International Financial Reporting Standard 9 (IFRS 9) Expected Credit Loss (ECL) model and the implementation of the National Financial Inclusion Policy. Under IFRS 9, banks are required to make forward-looking provisions for expected credit losses, resulting in higher impairment charges, increased earnings volatility, and greater pressure on profitability. While these regulatory reforms aim to strengthen financial stability, they have also created significant challenges for the Nigerian DMBs in terms of maintaining profitability, managing risk, retaining skilled employees, and sustaining competitive advantage.

In a quest to cope with these challenges, therefore, banks have increasingly relied on intangible resources embedded in their intellectual capital. Human capital as represented by the knowledge, competencies, expertise, and innovative capabilities of employees, has become essential for developing accurate credit risk models, complying with IFRS 9 requirements, and designing inclusive financial products. Structural capital as reflected in bank processes, databases, digital platforms, and technological infrastructure is critical for enhancing operational efficiency. Similarly, relational capital, embodied in customer relationships, stakeholder trust, and strategic partnerships, has become indispensable for attracting and retaining customers, deepening market penetration, and improving financial performance.

Despite substantial investments in these dimensions of intellectual capital, many Nigerian DMBs continue to face practical performance challenges. The higher loan loss provisions associated with IFRS 9 have exerted pressure on bank profitability, raising concerns about the ability of the Nigerian DMBs to sustain satisfactory levels of economic value added (EVA).

Although intellectual capital is widely acknowledged as a strategic asset capable of enhancing organizational performance, empirical evidence on its influence remains inconclusive. While some studies such as Ofurum et. al (2023), report positive relationships between intellectual capital and performance, others like Sylvanius et. al (2024) reveal mixed or insignificant findings. More importantly, existing studies have largely concentrated on financial performance with few that made attempt on non-financial performance in isolation, with limited attention given to the comprehensive examination of both dimensions within the context of IFRS 9 implementation and financial inclusion policy reforms. Consequently, there exists a paucity of empirical evidences on whether, and to what extent human capital, structural capital, and relational capital contribute to improved financial performance, measured by ROA, ROE, and EVA, as well as enhanced non-financial performance, reflected in market share, innovation capacity, and employee retention among listed DMBs in Nigeria.

This gap in knowledge is particularly important because the long-term success of Nigerian DMBs increasingly depends on their ability to leverage intellectual capital to navigate the



performance pressures associated with IFRS 9, ensure economic value addition and achieve superior financial outcomes.

The financial intermediation functions performed by the Nigerian DMBs are crucial to the viability of socioeconomic well-being of the nation. It is the sector that facilitates transfer of funds from surplus sector to the deficit sector of the economy mainly for investment and consumption purposes (Mia, 2022). This vital role played by DMBs necessitates the need for relevant stakeholders including researchers to play their relevant roles in ensuring the sound performance of the sector, as the poor performance of banks leads to a paucity of funds in the money market, deteriorating living standards, declining gross domestic product (GDP); employee disengagement in workplaces (Chen, 2022; Mohammad, 2022).

Consequently, the fact that listed Nigerian DMBs now operate in a knowledge-intensive environment in which sustainable performance is increasingly determined by knowledge resources rather than purely physical capital, banks' intellectual capital emerges as a strategic resource capable of generating sustained competitive advantage as well as long term economic wealth creation.

Scholars in the field of social sciences research have expressed dissatisfaction over the inconsistent findings due to the wrong signals they send on the deviant behaviours of some of research variables against apriori expectations (Chen, 2022). In such situations, Baron and Kenny advocated the use of an intervening variable called a moderator to boost the relationships between the dependent and independent variables.

However, scholars such as Memon et al., (2019); Aguinis et al. (2017) have argued that, introduction of a moderating variable in a research model must be anchored on a strong theoretical basis to support the power of the moderator to change the magnitude or direction of the relationships; or to provide better explanation of the relationships between the variables. In view of the foregoing, this study employs bank size to moderate the relationship between intellectual capital and the performance of DMBs in Nigeria. Some studies such as Alex and Ngaba (2018), affirmed the existence of a direct relationship between bank size and bank performance based on the fact that the size allows banks to spread their fixed costs over a greater asset-base, thereby reducing their average costs.

Moreover, as the scale of operation expands, banks are able to improve their performance through the use of specialized inputs such as more sophisticated database and well trained loan officers with expertise in a particular business line, resulting in greater efficiency (Parvin et al., 2015). This view is consistent with the basic assumptions of the resource-based view (RBV) theory which states that a firm can achieve competitive advantage and economies of scale through ownership and effective use of its assets, knowledge, capabilities, and related internal resources.



The study also employed the use GDP growth as a control variable due to its established influence on bank performance. GDP reflects the average increase or decrease in the production of goods and services in an economy (Ishioro, 2023) as it erodes customers' propensity to save which leads to the bank debtors' ability to redeem their obligations (Olalere et al., 2017; Zarrouk et al., 2016). The use of GDP as control variable in this work, therefore, is aimed at accounting for the possible effects of the variable to cause economic instabilities that influence performance. In view of this, in Nigeria, performance measurement within the sector has traditionally focused mainly on accounting-based indicators such as Return on Assets (ROA) and Return on Equity (ROE). Although these measures reflect managerial efficiency and shareholder returns, these metrics may not adequately capture economic value creation beyond accounting profits. Consequently, Economic Value Added (EVA) provides a complementary value-based metric that measures residual income after deducting the cost of capital, thereby reflecting true shareholder wealth creation. EVA is an appropriate measure that captures intellectual capital's long-term value creation in DMBs.

While previous studies focused on the direct relationship between intellectual capital components and performance assuming an absolute IV-DV relationship, thereby neglecting the real influence of bank size to interact between the IC and performance in general. Therefore, using the modified Value-Added Intellectual Coefficient (MVAIC) measurement, this study empirically evaluates the moderating role of bank size on the impact of intellectual capital using EVA as a key determinant of value creation.

It can therefore be further justified that, to the best of researcher's knowledge, no study in the Nigerian context has been conducted to measure the impact of intellectual capital on EVA with clear focus on evaluating the interaction effect of bank size on the relationship between the two variables, particularly considering EVA as a key metric that captures long-term economic value creation to the bank owners.

The main objective of this study is, therefore, to examine the impact of intellectual capital on economic value added of listed deposit money banks in Nigeria. The specific objectives of the study are:

- i. To examine the influence of Human Capital on Economic Value Added of listed Deposit Money Banks in Nigeria.
- ii. To examine the influence of Structural Capital on Economic Value Added of listed Deposit Money Banks in Nigeria.
- iii. To examine the influence of Relational Capital on Economic Value Added of listed Deposit Money Banks in Nigeria.
- iv. To Determine the Moderating Role of Bank Size on the Relationship between IC and EVA in Nigerian Deposit Money Banks.



2. LITERATURE REVIEW

2.1 Concept of Intellectual Capital

Intellectual capital comprises of human capital, relational capital and structural capital components. Intellectual capital of employees consists of employees' knowledge, experience, and skills. Intellectual capital of organization consists of databases, culture, philosophy and system. In general, intellectual capital involves knowledge assets that can generate profits and improve competitiveness (Buallay et al., 2020). Furthermore, it consists of technological capabilities, skills and professional knowledge (Lucy, et. al., 2017). In addition, intellectual capital adds value to the firm and plays a role in achieving a competitive advantage. Furthermore, Intellectual capital is the most effective competitive weapon impacting the performance of Innovation in an organization (Attiea et al., 2014).

The literature divides Intellectual Capital into several components as:

(a) Human Capital (HC): The intellectual capital of an entrepreneur is related to their level of education, their knowledge of how to start a business and also any prior entrepreneurial experience (Madininos, et. al., 2011). Human capital is the organizational knowledge owned by employees. It affects the achievement of competitive advantage (Nadeem, Gan, & Nguyen, 2019). It involves the knowledge, experience, and capabilities that employees bring to the organization. Therefore, human capital is associated with the employees' factors such as motivation, commitment and skills.

Thus, human capital refers to the overall competencies, skills, and motivation of a company's employees. It includes all the qualities and professional abilities that each employee contributes to the firm. Human capital is owned by the employee and departs with them when they leave the organization. From a financial perspective, it encompasses all the compensation and benefits provided to the employee which include salaries, wages, fringe benefits, allowances, training and development costs. Human capital is therefore central to measuring intellectual capital (Nuraini et al., 2018).

In operational terms, therefore, human capital encompasses the education, training, courses, and seminars, along with practical work experience acquired during employment. It also includes specialized knowledge in areas like engineering, sales, computer skills, and other professional training linked to the employee's education and personal growth.

(b) Structural Capital (SC): Structural capital represents the supportive framework that allows human capital to operate effectively within an organization. Structural capital is possessed by an organization and stays with it, even after an employee departs from the firm. Structural capital involves culture, policies, databases, information systems, patents, copyrights, and etc. (Sharabati et al., 2013). This type of capital is crucial for the strategic planning and development of any firm. Structural capital encompasses all the frameworks established by employees to



facilitate business processes. This type of capital is owned by the organization and stays with it, even if an employee departs.

(c) Relational Capital: Scholars have defined relational capital as the knowledge generated through communication between employees and external stakeholders (Ahangar, 2011; Adeyemi, & Olawale, 2020). It involves a set of social resources (such as relationships, values and norms) and adds a value to the firm (Adeyemi & Olawale, 2020); Almazrouei et al., 2020; Alshurideh et al., 2020). Relational capital refers to the attachment that customers feel toward a company's goods and services. It encompasses the preference and loyalty customers demonstrate for a brand compared to other products and services.

2.2 Concept of Financial Performance

Financial performance is the ability of an organization to gain and manage resources effectively. Financial performance refers to the growth in profitability which can be measured through positive returns from business operations.

The following are groups of firm financial performance indicators available in literature:

I) Accounting Based Performance Measures

i. Return on Assets (ROA): The return on assets is a measurement of the earnings attributable to each naira of the asset acquired in the organization during a given period.

This ratio should usually be used to measure the effective use of resources in the organization. ROA is measured as net income or profit before interest and tax divided by the total assets of the bank. Profit before tax is best suited for this measurement because taxes are not controllable by management and since firms' opportunities for availing tax incentives differ, it may be more prudent to use profit before tax to measure ROA (Afolabi & Adeyemi, 2021).

ii. Return on Equity (ROE): This is the net profit that is returned to the ordinary shareholders after business operations. The higher the return on equity, the more profitable the company has become and the possibility of enhanced dividends to shareholders. Pandey, (2010) reiterates that the ratio of net profit to owners' equity indicates the degree to which the business objectives have been achieved. ROE is calculated by dividing profit before tax (PBT) to the total number of ordinary shares outstanding as of the end of business on a specific date.

iii. Earnings per share (EPS): This represents the percentage of earnings that can be attributed to each individual share to one unit of the naira invested in the business by a shareholder. It is calculated as total profit after tax divided by the number of ordinary shares (Zuriekat et al., 2011).



II). Value Based Performance Measures

i. Economic Value Added (EVA): is also a common value-based measure of performance, and it is closely related to MVA. EVA is connected with MVA, where MVA is the present value of future and present EVA. Therefore, the computations of EVA can be done as follows: A more simplified formula to compute the EVA according to Hofmann (2001),
$$EVA = Net\ Income - (Cost\ of\ Capital \times Total\ Capital).$$

ii. Other Value-Based Measures: these include **Market Value Added (MVA)** and **Cash Value Added**. **Market Value added** is calculated as the difference between the market value and the book value of a company's shares. Therefore, when the market value of a firm's shares exceeds the amount of capital invested at that firm, it is said that the firm has managed to create shareholders' value (Hofmann, 2001). The MVA is computed as $MVA = Equity\ Market\ Value - Equity\ Book\ Value$. Cash Value added on the other hand is an indicator of company's performance in the context of value creation over the reporting period. Valuation based this concept reflects the real increase in company's value over reporting period in cash flow term which was developed by Boston Consulting Group. It includes only cash items as Earnings before Depreciation Interest and Tax (EBDITA), adjusted for non-cash charges), working capital movement and non-strategic investments.

2.3 Intellectual Capital and Performance

In reviewing the relationship that exists between intellectual capital and financial performance, the review focuses on the relationship between the individual components of human, structural, as well as relational capital vis-à-vis firm performance.

Wang et al. (2014) observe that companies recognize that investing in their employees can enhance operational performance, which in turn contributes to improved financial performance. Conversely, Dadashinasab et al. (2012) note that, having human capital in a company offers several advantages, including minimizing the risk of opportunism, fostering synergies, decreasing uncertainty, safeguarding assets, and enabling access to and adaptation of the latest technological advancements.

Human capital is essential for enhancing capabilities and sustaining a competitive edge, which in turn supports sustainable investment and a knowledge-driven economy (Buallay et al., 2020). This type of capital is a key differentiator in performance among companies, contributing to their economic value. Enhancing human capital in a company can be achieved through training and development programs that equip employees with advanced knowledge and skills to navigate a competitive market (Smriti, & Das, 2018). Similarly, Structural capital affects firm performance significantly. Strong structural capital enhances efficiency in the production process and can lead to lower production costs. It boosts company profits, which impact on assets (Yong Su et al., 2020). Effective organizational management plays a crucial role in establishing a competitive



advantage by enhancing the company's capabilities. A supportive structure enables employees to develop intellectual frameworks and fosters a corporate culture that contributes to optimal business performance (Nassar, 2019). Structural capital is a key strategic intangible asset within an entity, encompassing elements such as corporate culture, procedures, information systems, hardware and software, databases, patents, copyrights, and more. Díaz-Fernández, et. al. (2015) observe that, when a company actively promotes structural capital by encouraging a habit of innovation and commitment across all management levels, it gains a performance advantage.

More so, relational or customer capital is said to impact performance; as customer capital becomes stronger and more competitive, it can lead to increased sales and more efficient use of resources, thereby enhancing overall company performance (Rehman, et. al., 2011). Growth in sales related to customer capital arises from a harmonious relationship between the company and its partners. This includes reliable suppliers, loyal customers who are consistently satisfied with the company's services, and strong ties with the government and the local community (Mohammad, Bujang, & Hakim, 2018). Customer capital is considered external because it involves relationships with external parties and relies on a network built on customer satisfaction and loyalty (Young, et. al., 2020). It indicates that this capital reflects a firm's ability to satisfy customer demand. When the entity's structure is well-designed, competent employees delivering high-quality services enhance overall performance (Adnan et al. 2013).

The varying views on the relationship that exists between human capital and firm performance demonstrate the level at which employee skills, knowledge, and training play a vital role in enhancing firm performance. However, the view of Buallay et al. (2020) clearly demonstrates how human capital contributes to economic value addition in a firm. It can be clearly said that, the view perfectly aligns with the context of this study.

In the same vein, the views on the relationship between intellectual capital and performance as reviewed in the foregoing paragraph have not only established the link between the former and the latter, but have indicated another strong link between the structural capital and another intellectual capital component which also emphasizes on employee training and skills to exploit in the use of the already installed software and databases of the entity.

2.4 Review of Empirical Studies

Ese et. al. (2024) examined the influence of intellectual capital on the performance of deposit money banks in Nigeria. The study adopted ex-post facto design to generate the data and the population of the study was the fourteen (14) deposit money banks listed on the Nigerian Stock Exchange out of which Six banks were purposively selected. The secondary data were employed covering fifteen (15) years (2007-2021) while descriptive statistics and regression analysis were used to test the two hypotheses. The findings of the study hypotheses indicated that there is no significant impact of relational capital efficiency on the performance of deposit banks in Nigeria.



Also, there is a significant influence of human capital efficiency on performance of deposit money banks in Nigeria.

Sylvanus et. al. (2024) evaluated the effect of intellectual capital efficiency on the corporate performance of quoted manufacturing companies in Nigeria. The population of the study consists of 20 companies quoted on the Nigeria stock exchange under the consumer goods sector as at 2019. A total of sixteen (16) companies were selected. Data for the study were extracted from annual reports and accounts of selected companies for the period 2012-2018. The study applied the Value Added Intellectual Coefficient (VAIC) model. The study adopted both descriptive statistics and multiple panel regression techniques for quoted sampled firms analyzed with the aid of E-Views version 9. The study findings revealed that Intellectual capital has a positive significant effect on ROCE and ROA while there was no significant effect of IC found on earnings per share.

Ofurum, et. al. (2023) evaluated the relationship between intellectual capital and Nigerian deposit money banks' financial performance. The study adopted Pulic's (2004) method of measuring intellectual capital to analyse data of eight (8) banks between 2012 and 2020.. The collected data were analysed using simple regression analysis. The research revealed a significant relationship between structural capital and return on asset (ROA). It also found a significant association between human capital and earnings per share (EPS). The study recommended that Nigerian bank managers and policymakers integrate intellectual capital into their decision-making process and pay more attention to this alternative source of capital to enhance their financial performance.

Jian and Yi (2021) explored the nonlinear effect of IC and its components on financial performance (FP) of China's listed shipping companies over a six-year period (2014–2019). They used modified Value-Added Intellectual Coefficient (MVAIC) model to assess IC. Their empirical results show an inverted U-shaped relationship between the aggregate IC and FP (measured through return on assets). Regarding IC components, human, relational, and innovation capitals have an inverted U-shaped relationship with FP, while the quadratic relationship between structural capital and FP is not significant. In addition, physical capital has a U-shaped relationship with FP.

Diyo and Yurianda (2020) studied the influence of capital and intellectual structure on financial performance of 32 companies in the consumer goods industry in Indonesia using purposive sampling method. Findings of the study indicate that capital structure and intellectual capital variables have an influence on financial performance but do not have an effect on firm value.

Xu and Liu (2020) in their study examining the impact of Intellectual Capital (IC) and its components on the performance of Korean manufacturing firms from 2013 to 2018, the



researchers utilized a modified and extended Value-Added Intellectual Coefficient (VAIC) model for a more precise measurement of IC. Firm performance was assessed through three distinct parameters: profitability, productivity, and market value. The regression results indicated that physical capital was the most influential factor affecting firm performance, while human capital served as a performance-enhancing measure. Structural capital had no significant impact on performance, and both innovation capital and relational capital negatively affected profitability. Additionally, the study found that the modified and extended VAIC model outperformed the original VAIC model proposed by Pulic (1998).

Wandra et. al. (2019) empirically examined the mediating role of intellectual capital in dynamic capabilities and innovation performance linkage using accidental and snowballs sampling techniques, the author distributed questionnaires to 297 small and medium enterprises of the garment manufacturing in Indonesia. Partial least square offers the main statistics methodology for analysis. Results revealed that dynamic capabilities had a significant impact on intellectual capital and innovation performance. Moreover, intellectual capital partially mediated dynamic capabilities' influence on innovation performance.

Nadeem et al. (2019) investigated the relationship between intellectual capital (IC) and financial performance (FP) across developed, emerging, and frontier markets, analyzing over 7,100 publicly listed companies from 2005 to 2014. To address endogeneity issues, the researcher utilized the system generalized method of moments (SGMM). The results indicated that IC efficiency was highest in developed markets, followed by emerging markets, with frontier markets exhibiting the lowest efficiency. The study found a significant positive correlation between IC and FP across nearly all market types. However, when SGMM was applied, the strong positive link between human capital (HC) and FP seen in static models diminished.

Tefera (2018) investigated the effect of Intellectual Capital (IC) efficiency on the financial performance of Ethiopian commercial banks, focusing on a purposively sampled group of 15 banks. It analyzed 75 observations over a five-year period from 2013 to 2017. The research utilized the Value-Added Intellectual Coefficient (VAIC) and its three components—Human Capital Efficiency (HCE), Capital Employed Efficiency (CEE), and Structural Capital Efficiency (SCE)—along with the control variable of firm size (SIZE), all derived from the banks' annual financial statements. A regression model was employed to test the study's hypotheses. The results indicated a positive and significant influence of IC, as measured by VAIC, on financial performance. Specifically, both Human Capital Efficiency (HCE) and Structural Capital Efficiency (SCE) were found to positively impact the financial performance of Ethiopian commercial banks, while Capital Employed Efficiency (CEE) showed a statistically insignificant relationship with financial performance, as measured by Return on Assets (ROA). Additionally, the study provided evidence of a negative significant relationship between firm size and ROA.



Ofurum and Aliyu (2018) empirically examined the relationship between intellectual capital and financial performance of quoted banks in Nigeria. The study adopted ex-post facto research design. Data was collected from the published annual financial statements of fifteen (15) commercial banks. The researchers adopted and modified Pulic (1998) Value Added Intellectual Coefficient (VAIC) Model to measure intellectual capital indices (HCEI) in relation to financial performance. Using OLS regression tool to analyze the data, the findings showed mixed results, indicating that certain aspects of Intellectual Capital did not have a significant association with revenue growth and return on investment. However, the Human Capital Efficiency Index was found to be significantly related to return on investment. Overall, the study concluded that Intellectual Capital does not fully correlate with the financial performance of listed commercial banks in Nigeria.

Vitalis (2018) examined the impact of intellectual capital on the performance of companies listed on the Nigerian Stock Exchange. A sample of 40 firms was chosen from a total of 213 using a multi-phase sampling method. The research utilized an Ex-post Facto Research Design and relied on secondary data. The study employed Pulic's (1998) Value Added Intellectual Capital Coefficient (VAIC) model to evaluate the influence of intellectual capital components. The author adapted this model into an ordinary least squares approach and conducted multiple regression analysis to test the hypotheses. The findings indicate that intellectual capital has a significant impact on performance.

In the studies reviewed above, studies conducted on intellectual capital like those of Jian and Yi (2021); Diyo and Yurianda (2020); and Xu and Liu (2020) centred around countries like China, Indonesia, Korea, India, and Ethiopia at international arena. Studies conducted in Nigeria were studies by Ofurum, et. al. (2023); Vitalis (2018); and Ofurum and Aliyu (2018). These studies all used Pulic's (1998) VAIC model to measure the impact of intellectual capital on performance, thereby ignoring relational capital out of the model which is another important component of intellectual capital. The studies also used either retained earnings, ROA or ROI to measure financial performance without taking into cognizance the significance of counting on the real economic contribution as well as value creation of the intangible resources in the firms.

It is also evident from the review of prior empirical studies conducted that, previous studies made attempts to explore the nature and direction of the association between intellectual capital and myriad performance metrics across industries, particularly at international level. Although other local studies also made some attempts, but it can be said to be below the commensurate level, considering the current transition to the knowledge-based economy across developing countries, and given the significant role played by banking industry, serving as a key mediator for channeling funds from the surplus units to the units experiencing deficit in a country's economy. More so, banks are the most important entities whose drive for superior performance and economic value creation relies heavily on knowledge resources.



2.5 Theoretical Review

This sub-section covers three theories (knowledge-based, resource-based, intellectual capital theory).

Knowledge-based theory posits that knowledge is an exceptionally rare and unique asset that does not depreciate like capital assets and can generate increasing returns (Ulum, Kharismawati, & Syam, 2017). According to the theory, Knowledge is integrated across various entities, including organizational culture and identity, policies, routines, documents, systems, and personnel (Njuguna, 2014).

Similarly, resource-based theory is particularly relevant to this study, as it asserts that a firm's performance is determined by its internal resources and capabilities. This theory emphasizes how these internal factors can strengthen competitive advantage. It suggests that variations in firm performance and profit levels arise from differences in the resources a firm possesses and how effectively they are utilized and managed (Xu, & Li, 2022). In contrast, intellectual capital theory asserts that a business's wealth is derived from three types of capital: human capital, structural capital, and consumer (or relational) capital. This theory emphasizes that value creation occurs when one form of capital is converted into another. Specifically, when human capabilities (human capital) lead to the development of new business processes (structural capital), it enhances service quality for consumers and fosters their loyalty (Nzewi & Chukwu, 2024). Among these theories, intellectual capital theory is selected as the theory underpinning this study.

3. METHODOLOGY

The study employs the use of descriptive research design using quantitative panel data obtained from the financial statements of the sampled DMBs listed by the Nigerian Exchange Group limited for ten years (2015-2024). The study sample comprises of all the 14 DMBs listed by the Nigerian Exchange Group limited selected using census sampling technique. The data collected were analysed using descriptive statistics and the panel regression using a two-step system GMM estimation technique.



Table 1: Measurement of Study Variables

Variables	Measurement	Prior Studies
<i>Dependent variable</i>		
EVA	<i>Net Income – (Cost of Capital × Total Capital).</i>	Siddique, Khan and Khan (2021)
Independent variables		
<i>Intellectual Capital</i>		
Human Capital Efficiency	HC / VA	Ulum (2015); Kalkan, Bozkurt & Arman (2014).
Structural Capital Efficiency	SC / VA	
Relational Capital Efficiency	RC/ VA	
Moderating/Control Variables		
Bank size (Bsize)	Natural log of total assets	Hassan et. al. (2023)
GDP Growth	Nominal GDP Rate	Sufian and Habibullah (2009); Hassan et. al (2023)

Source: Researcher's compilation, 2026.

To determine the impact of Intellectual Capital as measured by (MVAIC) model on Economic Value Added of listed Deposit Money Banks in Nigeria:

$$FP_{it} = \alpha + \beta_1 LFP_{it-1} + \beta_2 MVAIC_{it} + \beta_3 X_{it} + T\lambda + \eta_i + \varepsilon_{it} \dots \dots \dots (1)$$

$$EVA_{it} = \beta_0 \alpha + \beta_1 HC_{it-1} + \beta_2 BS_{it} + \lambda GDP + \eta_i + \varepsilon_{it} \dots \dots \dots (2)$$

$$EVA_{it} = \beta_0 \alpha + \beta_1 SC_{it-1} + \beta_3 RC_{it} + \beta_2 BS_{it} + \lambda GDP + \eta_i + \varepsilon_{it} \dots \dots \dots (3)$$

$$EVA_{it} = \beta_0 \alpha + \beta_1 RC_{it-1} + \beta_2 BS_{it} + \lambda GDP + \eta_i + \varepsilon_{it} \dots \dots \dots (4)$$

$$EVA_{it} = \beta_0 \alpha + \beta_1 HC_{it-1} + \beta_2 SC_{it} + \beta_3 RC_{it} + \beta_4 BS_{it} + \beta_5 (IC_{it} \times BS_{it}) + \lambda GDP + \eta_i + \varepsilon_{it} \dots \dots (5)$$

Where:

FP_{it} = Financial Performance of firm i at time t

FVA_{it} = Economic Value-Added of firm i at time t

$\beta_1 HC_{it} SC_{it} RC_{it}$ = intellectual capital components

$\beta_2 BS_{it} + \lambda GDP$ = moderating and control variables (bank size, growth)

ε_{it} = error term

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

The descriptive statistics contains the mean, standard deviations, MIN. and MAX. values of the DVs & explanatory variables as shown in Table 4.1.



Table 1: Descriptive Statistics (Model 1)

Variables	Observ.	Min.	Max.	Mean	Std. Dev.	Skew.	Kurt.
EVA	140	0.7039	4.5422	0.6108	0.6116	1.7972	2.920
HC	140	0.2989	2.8665	0.1002	0.3581	3.6111	5.178
SC	140	0.0457	1.9294	0.0450	0.2052	7.2184	3.475
RC	140	0.0054	0.9377	0.0364	0.1406	-4.9721	2.741
BS	140	0.2730	1.7683	0.8412	0.2491	-2.0325	5.329
GDP	140	-2.0457	0.0000	0.7512	0.4687	-0.1677	1.5951

Source: Author's computation using E-VIEWS version 14 Software, 2026.

The results presented in Table 1 show that the average value of EVA is approximately 0.6108 with std. div. of 0.6116. The minimum and maximum EVA stand as 0.7 percent and 4.54 percent respectively. The average value of HC is approximately 0.45% with a std. div. of 35% while 0.29 and 2.86 are the minimum and maximum values respectively.

Table 1 further indicates that the mean of SC stands at 0.0450 percent, with a standard deviation of 0.2052 far from the mean, while 0.0457 and 0.9294 are found to be the minimum and maximum values in percentage. The mean value of relational capital (RC) is at 0.0364 percent, with a standard deviation of 0.1406, far from the mean while the minimum and maximum values stand at 0.0054 and 0.9377 respectively. This implies that, investment in relational capital will improve EVA by minimum of 0.02. In addition, the mean of Bank Size (BS) is 0.8412, with standard deviation of 0.2491, While 0.27 and 1.76 are the minimum and maximum values respectively.

In summary, the data presented revealed that all the variables mean are positive. This situation indicates a gradual process of effective intellectual capital with positive impact on financial performance, particularly economic value addition of deposits money banks (DMBs) in Nigeria.

4.2 Correlations

The correlation results are presented in Table 2 below to explain the correlation between the dependent and independent. The correlation matrix table shows the relationship between all pairs of variables in the regression model; the relationship between all explanatory variables

individually with explained variable and the relationship between all the independent variables themselves. This provides insights into the degree of the pairs of the independent variables.

Table 2: Correlation Matrix

Variables	EVA	HC	SC	RC	BS	GDP	VIF
EVA	1.000						1.64
HC	0.7065	1.000					2.11
SC	-0.674	0.0081	1.000				1.04
RC	0.1019	0.1351	0.0744	1.000			1.32
BS	0.60616	0.3995	0.0155	0.2191	1.000		1.31
GDP	0.2148	0.0551	0.347	0.1221	0.4826	1.000	3.14

Source: Author's Computation from E-view 14 Output, 2026.

Table 2 shows the correlation coefficients on the relationship between the dependent variable (EVA) and independent variables (HC, SC, RC, BS, GDP). The values of the correlation coefficient range from -1 to 1. The sign of the correlation coefficient indicates the direction of the relationship (positive or negative), the absolute values of the correlation coefficient indicates the strength, with larger values indicating stronger relationships.

The multicollinearity diagnostics in Table 2 indicate that intellectual capital and performance indicators (EVA) do not suffer from harmful multicollinearity. In the regression model, the Variance Inflation Factor (VIF) values are consistently 1.000 to 3.14 and the tolerance values is 1.000, signifying that none of the predictor variables are highly correlated with each other. In multivariate regression analysis, VIF values below 10 and high tolerance values indicate low multicollinearity, ensuring that coefficient estimates are stable and reliable for interpretation (Gujarati & Porter, 2009).

This finding strengthens the credibility of the regression results on the impact of intellectual capital on economic value added (EVA). Previous studies in the Nigerian banking context have highlighted the importance of robust variable specification to avoid misleading results (Onyia et al., 2025; Emenyonu et al., 2020). The absence of multicollinearity means that intellectual capital components independently contribute to the explanation of the financial performance (EVA) without statistical distortion, allowing for more precise assessment of their impacts.

Correlation results from table 2 suggest that there is a positive relationship between human capital and EVA with a correlation coefficient of 0.7065 which is close to 1. The relationship between relational capital and economic value added of Banks is also positive but weak, with coefficient of 0.1019 which is not close to 1. However, there is an inverse association between structural capital and economic value added. From the results, the relationship between bank size and economic value added is positive and strong. While the relationship of EVA with GDP growth stands positive but weak.



4.3 Dynamic GMM Regression

Table 3: Panel GMM Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HC	3.825526	0.943143	4.056147	0.0029***
SC	-5.649307	0.804250	-7.024314	0.0001***
RC	2.572517	1.588191	1.619778	0.1397
BS	0.314329	0.099059	3.173161	0.0113***
IC×BS	1.007447	0.169593	5.940371	0.0002***
GDP	5.577380	5.035055	1.107710	0.2967
Effects Specification				
Cross-section fixed (first differences)				
Mean dependent var	17.05615	S.D. dependent var		60.61782
S.E. of regression	71.04977	Sum squared resid		363461.1
J-statistic	4.303026	Instrument rank		10
Prob(J-statistic)	0.366546			

Source: Author's Computation from E-view 14 Output, 2026; P-values at 1% (***), 5% (**), and 10% (*) Significance Level

From the results in table 3 above, the J-Statistic (Sargan/Hansen Test) is 4.303 with a probability value of 0.366. Since this p-value (0.366) is greater than common significance levels 0.05, it indicates that the instrumental variables are valid, and the overall model specification is appropriate for the data.

The results in table 3 above further indicate that, Human Capital (HC) has a significant positive influence on Economic Value Added (EVA) at 1% level of significance as evident by the p-value of 0.002 and coefficient of 3.826. The positive and highly statistically significant coefficient means that human capital has a strong positive impact on the economic value added (EVA) by DMBs in Nigeria. This suggests that investments in, or the quality of, a bank's human resources directly contribute to its ability to generate economic value above its cost of capital.

The positive and significant positive impact of human capital corroborates that knowledge



resources, personnel expertise, management competence, and expert capabilities hold a central drive toward attaining an optimum residual income in listed DMBs. The finding is in line with the Resource-Based View and Knowledge-Based Theory, which emphasize the strategic importance of knowledge resources.

More so, the results in table 3 indicate that, Structural Capital (SC) has statistically significant negative association with EVA with coefficient of -5.649 and p-value of 0.0001 at 1% significance. This implies that, certain aspects of their internal processes, systems, databases, or organizational structure are inefficient, costly, or rigid, hindering their ability to create economic value. It also suggests that, some structural investments are not translating into value or are even value-destroying.

The results from table 3 further reveal that, the association between relational capital and EVA is positive but statistically insignificant as shown by coefficient of 2.572 and p-value of 0.139. While the coefficient is positive, suggesting that higher relational capital is associated with higher EVA. Thus, while relational capital indicates a positive coefficient, the insignificant nature of the influence implies that customer relationships and stakeholder networks may enhance operating income without necessarily generating economic benefit far and above the capital costs.

The influence of bank size (moderating variable) on EVA from table 3 is statistically significant with a coefficient of 0.314 and a p-value of 0.0113. The positive and statistically significant coefficient indicates that bank size has a positive impact on EVA. More so, the result for the interacting variable of intellectual capital on bank size, the result indicates a positive and significant influence of bank size in influencing intellectual capital with coefficient of 1.007 and a p-value of 0.0002. This further signifies that bigger banks are more positioned to generate value beyond the costs of capital, and it further supports the role of economies of scale, diversification benefits, and advantage for access to capital which all strengthen value creation capacity. This finding advances the position of Resource-Based View Knowledge-Based theory that, the size of the firm determines a better use of its knowledge resources.

From table 3, the results reveal a positive but insignificant association between GDP growth (control variable) and EVA with a coefficient of 5.577 and a p-value of 0.296.

The results showing insignificant relationship of GDP growth with EVA suggests that, firm-specific intellectual capital capabilities contribute more than macroeconomic conditions as GDP in determining economic value added in the Nigerian DMBs

This is consistent with the findings of Yi (2021) but contradicts the findings of Diyo and Yurianda (2020) who revealed that, while a positive coefficient is indicated, the results do not provide evidence that overall economic growth directly drives DMBs' economic value added.

4.4 Test of Hypotheses

- (i) The results in Table 3 revealed that human capital has significant positive influence on EVA of DMBs in Nigeria. Therefore, the null hypothesis one that states, human capital has no significant impact on economic value added of DMBs in Nigeria is now rejected.
- (ii) The results in Table 3 also indicated that structural capital has significant negative influence on EVA of DMBs in Nigeria. The null hypothesis two that states, structural capital has no significant impact on economic value added of DMBs in Nigeria is also rejected
- (iii) Table 3 results indicated that relational capital has positive but insignificant influence on EVA of DMBs in Nigeria. Therefore, we fail to reject the null hypothesis three that states, relational capital has no significant impact on economic value added of DMBs in Nigeria.
- (iv) The results in table 3 indicated that interacting variable of intellectual capital on bank size has positive and significant influence on bank size. Therefore, our null hypothesis 4 that states bank size has no role on intellectual capital influence is hereby rejected.

5. CONCLUSION AND RECOMMENDATIONS

Based on the findings, the study concludes as follows:

- (i) Intellectual capital components exert a varying influence on economic value creation in the Nigerian DMBs.
- (ii) Human capital is the most important value-creating component in the Nigerian deposit money banks.
- (iii) Structural capital erodes economic value addition in the Nigerian deposit money banks due to cost-intensive conditions.
- (iv) Relational capital does not significantly influence residual income after defraying for costs of capital in the Nigerian deposit Money Banks
- (v) Bank size plays a great role in strengthening sustained value in the Nigerian DMBs.

In line with the conclusions of the study, the following recommendations are made:

- (i) The management of DMBs in Nigeria, and the Financial Reporting council of Nigeria should consider enhancing intellectual capital disclosure as a strategic asset on the statements of financial position, rather than an operating expense in the financial statements to foster disclosure and keep current and potential shareholder informed about strategic intangible value drivers.
- (ii) Deposit Money Banks in Nigeria should intensify investment in the banks' human capital by injecting more resources for professional development, employee digital skills, leadership training as well as knowledge refreshing strategies.
- (iii) Management of DMBs in Nigeria should embrace systems capacity building through increased IT-based infrastructure, while at the same time refer it to efficiency audits to ensure value-based returns



- (iv) Managements of Nigerian DMBs should reassess customer-based strategies with a view to ensuring that customer loyalty, brand goodwill, as well as engagement with stakeholders are optimally translated to measurable economic benefits.
- (v) Smaller banks should consider strategic collaborations to benefit from the economies of scale in deriving more economic value in the Nigerian DMBs.

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