International Journal of Multidisciplinary Research and Growth Evaluation.

Moderating Effect of Ownership Concentration on Intellectual Capital Disclosure and the Value of Quoted Deposit Money Banks in Nigeria

Ugoh Timothy Terver
Ph.D, Faculty of Management, University of New Brunswick, Saint John, Canada

* Corresponding Author: **Ugoh Timothy Terser**

Article Info
ISSN (online): 2582-7138
Volume: 06
Issue: 02
March-April 2025
Received: 15-02-2025
Accepted: 09-03-2025
Page No: 850-860

Abstract
This study examines the moderating effect of ownership concentration on the relationship between intellectual capital (IC) and firm value (FV) in Nigerian Deposit Money Banks (DMBs). Intellectual capital, encompassing human, structural, and relational capital, is increasingly recognized as a critical driver of organizational value, particularly in knowledge-intensive sectors like banking. The main objective of the study is to investigate whether ownership concentration enhances or diminishes the effect of intellectual capital on firm value within the Nigeria banking sector. The study adopts an ex post facto research design, with a population consisting of all thirteen (13) DMBs listed on the Nigerian Exchange Limited (NGX) as of 2024. A census sampling technique is employed, as all banks with complete data for the study period from 2014 to 2023 are included in the sample. Secondary data is collected from the audited annual reports and accounts of the selected banks. The study uses multiple regression analysis to test the hypotheses. The findings reveal that human capital has a positive but statistically insignificant effect on firm value, while structural capital shows a negligible impact. Relational capital exhibits a positive but marginally insignificant effect on firm value. Ownership concentration is found to have a negative significant effect on firm value. However, ownership concentration positively moderates the relationship between human capital and firm value. Conversely, it negatively moderates the effects of structural and relational capital, indicating that high ownership concentration may stifle innovation and external stakeholder engagement. In conclusion, while ownership concentration amplifies the impact of human capital on firm value, it may hinder the effectiveness of structural and relational capital. To optimize intellectual capital utilization, the study recommends that banks should prioritize initiatives that enhance employee skills, knowledge, and expertise, such as implementing robust training and development programs, to maximize the positive effects of human capital on firm value.

Keywords: Human Capital, Structural Capital, Relational Capital, Ownership Concentration, Firm Value

Introduction

In the modern economy, intellectual capital (IC) is a critical asset that enhances the value and competitive advantage of organizations, particularly within the financial sector. Intellectual capital encompasses intangible assets such as human, structural, and relational capital, all of which contribute to knowledge creation, operational efficiency, and customer satisfaction. Studies have demonstrated a positive relationship between intellectual capital and firm value, especially in knowledge-intensive industries such as banking, where human expertise, robust organizational structures, and valuable customer relationships are crucial for sustainable growth (Kianto *et al*., 2017; Chen *et al*., 2020) [8,13].

However, the extent to which intellectual capital influences firm value can be affected by various factors, including ownership concentration. Ownership concentration as the proportion of shares owned by large shareholders, plays a significant role in shaping corporate governance and can either enhance or restrict the relationship between intellectual capital and firm value.

In Nigeria, the banking sector, operates in a challenging economic and regulatory environment, thus ownership concentration presents a unique dynamic that could influence the impact of intellectual capital on firm value. Deposit Money Banks (DMBs) in Nigeria often have ownership structures that vary from dispersed public shareholders to concentrated holdings by institutional investors or family-owned entities. This structure has implications for governance practices, resource allocation, and strategic decision-making, ultimately influencing how intellectual capital is managed and deployed (Aluko & Amidu, 2018; Adegboye *et al*., 2020) [4, 1]. While concentrated ownership can facilitate stronger oversight and decision-making, it may also lead to conflicts of interest, where majority shareholders prioritize personal interests over organizational growth. Therefore, this study offers valuable insights into how Nigerian banks can leverage IC more effectively to enhance firm value.

Understanding the role of ownership concentration is critical for Nigeria's banking industry because the performance of Deposit Money Banks not only reflects the economic stability of the financial system but also impacts broader economic development by influencing credit allocation, savings, and investment (Olokoyo *et al*., 2019). Furthermore, given Nigeria's emerging market status and reliance on the banking sector for economic growth, studying the factors that optimize intellectual capital's impact on firm value is essential. Ownership concentration, in this context, becomes a variable of interest that may enable or hinder banks in maximizing intellectual capital to enhance firm performance and maintain competitiveness.

Empirically**, t**he relationship between intellectual capital and firm value has been widely studied; with evidence suggesting that firms with high levels of intellectual capital tend to exhibit improved financial performance, innovation, and market valuation (Xu & Wang, 2018; Dumay *et al*., 2018) [38, 18]. However, the moderating role of ownership concentration in this relationship remains underexplored, especially in the context of Nigerian Deposit Money Banks. Nigeria's banking sector is characterized by unique challenges, including regulatory pressures, macroeconomic instability, and varying governance practices, which may influence the effectiveness of intellectual capital in driving firm value. Moreover, the prevalence of concentrated ownership structures in Nigeria, where large shareholders often have significant influence over management decisions, raises questions about how these structures impact intellectual capital's role in firm value creation.

Prior studies have shown that ownership concentration can have both positive and negative effects on firm value. On one hand, concentrated ownership can provide the oversight needed to ensure that intellectual capital is effectively managed and aligned with strategic goals, thus enhancing firm value (Anderson & Reeb, 2003; Al-Najjar, 2015) [7]. On the other hand, concentrated ownership can lead to conflicts of interest, where controlling shareholders may prioritize personal gains over the interests of minority shareholders, potentially limiting the full utilization of intellectual capital (Villalonga & Amit, 2020; Chen *et al*., 2020) [36, 37]. This duality creates a gap in understanding how ownership concentration specifically affects the relationship between intellectual capital and firm value in the Nigerian banking sector.

The problem is further compounded by Nigeria's unique economic environment, where high inflation rates, currency devaluation, and regulatory changes create operational challenges for banks (Olokoyo *et al*., 2019). In such a setting, the efficient use of intellectual capital becomes paramount for banks to maintain competitiveness and profitability. However, with high ownership concentration, large shareholders may exert significant influence over decisions related to intellectual capital investment, potentially affecting the firm's long-term value (Adegboye *et al*., 2020) [1]. Despite the potential impact of ownership concentration, there is limited empirical evidence on its moderating effect in the context of Nigerian Deposit Money Banks. This lack of research leaves a gap in understanding how Nigerian banks can leverage intellectual capital most effectively under different ownership structures to maximize firm value.

Given the importance of the banking sector to Nigeria's economic stability, there is a critical need for research that addresses how ownership concentration impacts the intellectual capital-firm value relationship. This study aims to fill this gap by examining whether ownership concentration moderates the effect of intellectual capital on firm value in Nigerian Deposit Money Banks. The findings could provide valuable insights for policymakers, investors, and bank management, offering guidance on how ownership structures should be managed to optimize the benefits of intellectual capital and enhance overall firm value.

The study is hypothesised that:

Ho_1: Intellectual capital (Human, structural and relational) has no significant effect on the value of deposit money banks in Nigeria

Ho_2: Ownership concentration has no significant moderating effect on the relationship between intellectual capitals (Human, structural and relational) and value of deposit money banks in Nigeria

Literature Review

Intellectual Capital

Intellectual capital (IC) is increasingly seen as a core driver of value in organizations, encompassing all intangible resources that contribute to a company's performance and strategic advantage. It is commonly categorized into human, structural, and relational capital, each of which interrelates to create organizational wealth beyond physical and financial assets (Secundo *et al*., 2020; Dumay *et al*., 2018) [33]. Intellectual capital enables organizations to innovate, adapt to market changes, and foster competitive resilience in knowledge-based economies (Leitner, 2021) [27]. More than a static asset, IC represents the organizational ability to create and sustain knowledge, which is crucial for long-term success. Contemporary perspectives underscore the role of IC in helping firms navigate digital transformations, making it vital for companies aiming to build a strong, knowledge-driven market position (Kianto *et al*., 2017) [8].

Intellectual capital (IC) represents the intangible assets and knowledge-based resources that drive a company's value and competitive advantage. It includes knowledge, skills, processes, and relationships that are essential but not always

reflected in traditional financial statements. According to Edvinsson and Malone (1997), IC is a strategic asset comprising knowledge embedded in a firm's workforce, organizational processes, and external relationships.

Human Capital

Human capital (HC) refers to the skills, knowledge, creativity, and experiences possessed by employees. It is an organization's most critical and dynamic element of IC, as it includes the competencies of individuals that contribute to innovation, problem-solving, and performance improvement. Becker (1993) describes HC as an investment in training, education, and skills development that enhances employees' capabilities and productivity. Bontis *et al.* (2000) [10] emphasize that HC is integral to an organization's adaptability and long-term success, as it drives knowledge creation and dissemination within the firm. Human capital (HC) refers to the collective knowledge, skills, and competencies of an organization's workforce, recognized as an essential component of intellectual capital (Leitner, 2021) [27]. HC is seen as the foundation of organizational learning and adaptability, with employees' experiences and innovation contributing directly to firm performance (Ferreira & Franco, 2017) [22]. Rather than being a purely individual asset, HC encompasses the organization-wide knowledge-sharing culture, where skills are transferred and enriched through teamwork and collaboration (Shihab *et al*., 2019) [34]. In today's dynamic markets, investments in training, development, and employee well-being are emphasized as ways to enhance HC, fostering a resilient and agile workforce capable of driving sustained firm growth and innovation (Edvinsson & Xie, 2019) [20].

Relational Capital

Relational capital (RC), also known as customer or social capital refers to the value created through relationships with external stakeholders, such as customers, suppliers, partners, and even regulatory bodies. It encompasses customer loyalty, brand reputation, and networks that help a company expand its market presence and trustworthiness. According to Nahapiet and Ghoshal (1998) [30], RC is vital for fostering cooperation, building trust, and facilitating resource exchanges that support a firm's competitive position. Chang and Tseng (2006) [14] further identify RC as a source of customer loyalty and brand strength, directly influencing a firm's revenue generation and long-term value. Relational capital (RC) represents the value embedded in an organization's relationships with external stakeholders, including customers, suppliers, and partners. It is critical for sustaining long-term revenue and market expansion as it underpins trust, loyalty, and customer retention (Alvino *et al*., 2021) [6]. RC is often considered the most "dynamic" element of IC, as it depends on interactions that can continuously evolve and create additional value for both the firm and its stakeholders (Bontis & Serenko, 2020) [11]. Especially in digitally connected markets, strong relational capital has been linked to increased resilience and customer-centered agility, crucial for navigating competitive pressures (Bratianu *et al*., 2020) [12].

Structural Capital

Structural capital (SC) includes the supportive infrastructure, processes, and databases that enable knowledge storage, transfer, and efficient operations within an organization. Unlike HC, which resides within employees, SC is embedded in organizational routines, culture, and information systems that persist even when employees leave. Edvinsson and Malone (1997) [19] argue that SC provides a backbone for organizational knowledge to be systematically codified and shared, leading to improved efficiency and innovation. SC also includes organizational patents, proprietary technology, and intellectual property that add to the firm's strategic capabilities and long-term value. Structural capital (SC) refers to the organizational knowledge infrastructure that enables firms to systematize and retain knowledge through procedures, routines, databases, and intellectual property (Gogan *et al*., 2016) [24]. Unlike HC, which resides in individual employees, SC remains within the organization and forms the backbone of sustainable value creation (Khalique *et al*., 2018) [25]. It includes information systems, processes, and corporate culture, all of which facilitate knowledge sharing and operational efficiency, making it a critical resource for innovation and adaptability in rapidly changing environments (Secundo *et al*., 2020) [33]. Effective SC empowers organizations to codify and transfer knowledge across the workforce, thus amplifying human capital and strengthening relational capital, which collectively contribute to sustained competitive advantage (Gomes & Wojahn, 2017) [23].

Ownership Concentration

Ownership concentration refers to the extent to which a company's shares are held by large shareholders, such as institutional investors or founding families, as opposed to a dispersed group of small shareholders. Recent studies indicate that high ownership concentration can provide stronger oversight and reduce agency problems by aligning management's interests with those of the dominant shareholders (Al-Najjar**,** 2015; Nguyen *et al*., 2020) [5]. However, concentrated ownership can also lead to issues of "entrenchment," where controlling shareholders may prioritize personal gain over the interests of minority shareholders, potentially compromising overall corporate governance (Villalonga & Amit, 2020) [36]. Moreover, research has shown that ownership concentration affects firm performance differently across regions and industries, where governance frameworks and market environments vary (Liu *et al*., 2019) [28]. High ownership concentration is often associated with increased accountability in emerging markets, where formal governance structures are weaker, highlighting its dual role in both enhancing and potentially hindering firm value (Alimehmeti & Paletta, 2014) [3].

Firm Value

Firm value refers to the overall worth of an organization as reflected in its financial performance and market position, often viewed through metrics like stock prices, return on assets, and market capitalization (Wu *et al*., 2020) [37]. Firm value is influenced not only by tangible assets but also by intellectual capital, as intangible assets such as human expertise, efficient processes, and customer loyalty contribute significantly to long-term profitability (Sardo & Serrasqueiro, 2018) [32]. In knowledge-based economies, the firm's IC is increasingly seen as a key driver of firm value due to its impact on innovation, adaptability, and resilience (Xu & Wang, 2018). Strategic management of intellectual capital, including aligning it with the firm's goals and market demands, is crucial for enhancing value and achieving a

sustainable competitive advantage (Salehi *et al*., 2020).

Firm value represents the financial and market worth of a company, often evaluated through metrics such as stock market performance, return on assets (ROA), or market-to-book ratios. Firm value encompasses both tangible assets, such as physical capital, and intangible assets, like IC, that contribute to a firm's profitability and growth potential (Damodaran, 2002) [15]. Intellectual capital, particularly human and relational capital, has been shown to significantly impact firm value by enhancing productivity, fostering innovation, and strengthening stakeholder relationships (Chen *et al*., 2020) [37]. Increasingly, firms with high levels of IC are seen as more resilient and valuable due to their ability to adapt and thrive in knowledge-based economies.

Empirical Review

Mohapatra and Pattanayak (2024) [29] dwelt on unraveling the dynamics of intellectual capital, firm performance, and the Influence of BIG4 Auditors and Group Affiliation. The study analyzed data from 795 non-financial firms in India from 2004–2005 to 2020–2021. Structural capital efficiency (SCE) was measured using the VAIC model, and firm performance was assessed through fixed-effect panel regression models. The research found that SCE enhances firm performance up to a certain threshold, forming an inverted U-shaped curve. The presence of BIG4 auditors positively moderated this relationship. While the study provides insights into the Indian context, its focus on non-financial firms limits its findings to other sectors. Additionally, the study does not account for external factors such as economic conditions that may influence the relationship.

Dancaková and Glova (2024) [16] examined the impact of value-added intellectual capital on corporate performance: cross-sector evidence**.** The researchers analyzed data from 250 publicly traded companies in France, Germany, and Switzerland from 2009 to 2018. They employed the Value-Added Intellectual Coefficient (VAIC™) approach to evaluate human capital efficiency (HCE) and used panel regression analyses to assess its effect on financial metrics such as return on equity (ROE) and return on assets (ROA). The study revealed a significant positive association between HCE and firm performance, suggesting that investment in human capital enhances corporate performance. The study offers valuable cross-sector insights; however, its focus on European countries may limit the applicability of the findings to other regions. Additionally, the use of VAIC™ has been criticized for not capturing all dimensions of intellectual capital.

Rahman and Liu (2023) [31] determined the relationship between intellectual capital and firm performance: The moderating effect of auditor characteristics. This study examined 398 firm-year observations of transportation companies listed on the Shanghai and Shenzhen Stock Exchange from 2011 to 2020. The VAIC and its modified version (MVAIC) were used to measure intellectual capital efficiency, and fixed effects regression analysis was employed to address endogeneity issues. The research revealed that intellectual capital positively contributes to firm performance. Additionally, auditor characteristics play a significant moderating role; the positive association between intellectual capital and firm performance is more pronounced when firms are audited by BIG4 auditors. Although the study provides insights into the moderating role of auditor characteristics, its focus on the Chinese transportation sector may limit its applicability of the findings to other industries or regions, such as Nigeria's banking sector.

Xu *et al*. (2023) [38] examined the effect of intellectual capital efficiency and firms' financial performance based on Business Life Cycle (BLC). The authors analyzed data from Chinese manufacturing listed companies during 2014–2018. They employed the MVAIC model to measure intellectual capital efficiency and used multiple regression analysis to test the impact of intellectual capital on financial performance across different business life cycle stages. The study found that the impact of intellectual capital on financial performance varies across life cycle stages, with a more significant effect during the growth and maturity stages compared to the decline stage. While the study offers valuable insights into the dynamic impact of intellectual capital, its focus on the Chinese manufacturing sector may not directly translate to the Nigerian banking industry. Additionally, the study does not account for external factors such as economic conditions that may influence the relationship between intellectual capital and firm performance.

Suharman (2023) [35] examined value chain in the Relationship of Intellectual Capital and Firm's Performance. The researcher conducted a survey of 200 manufacturing firms in Indonesia and used structural equation modeling to assess the mediating role of the value chain in the relationship between intellectual capital and firm performance. The study found that intellectual capital positively influences the value chain, which in turn enhances firm performance. The value chain serves as a significant mediator in this relationship. The study's reliance on self-reported survey data may introduce bias. Furthermore, the focus on Indonesian manufacturing firms limits the applicability of the findings to other sectors and regions, such as Nigeria's banking industry.

Akwuobi (2022) [2] examined the effect of intellectual capital potency and firm value in Nigeria listed non-financial firms. The study analyzed secondary data from audited financial reports of 76 non-financial firms listed on the Nigerian Stock Exchange over the period 2011–2020. Intellectual capital was measured using the Value-Added Intellectual Coefficient (VAIC) model, and firm value was assessed through market-to-book ratios. The study employed the regression analysis technique and found that human capital efficiency (HCE) positively and significantly influences firm value, while structural capital efficiency (SCE) and capital employed efficiency (CEE) did not show a significant impact. While the study provides valuable insights into the Nigerian context, its focus on non-financial firms limits its findings to other sectors, such as banking. Additionally, the use of VAIC, though popular, has been criticized for not capturing all dimensions of intellectual capital.

Degbayibi and Fakile (2021) [17] investigated the effect of intellectual Capital and Firm Performance of Listed Firms in Nigeria: Moderating Role of Corporate Governance. The researchers analyzed data from 50 listed firms in Nigeria over the period 2010–2019. They employed multiple regression analysis to examine the relationship between intellectual capital and firm performance, with corporate governance as a moderating variable. The study found that intellectual capital positively affects firm performance and that corporate governance strengthens this relationship. While the study highlights the importance of corporate governance, it does not delve deeply into which specific governance mechanisms are most effective. Additionally, the sample size of 50 firms

may limit the generalizability of the findings across all sectors.

Agency Theory

This was developed by Jensen and Meckling in 1976, it explores the relationship between principals (owners or shareholders) and agents (managers or executives) within an organization. The theory examines conflicts of interest that arise when agents, who are expected to act on behalf of the principals, pursue personal goals that may not align with the shareholders' interests. This conflict, known as the "agency problem," often leads to inefficiencies and costs (referred to as "agency costs") due to potential managerial self-interest, information asymmetry, and differing risk preferences (Jensen & Meckling, 1976) [21]. Agency Theory posits that mechanisms such as performance-based incentives, monitoring, and contractual agreements are needed to align the interests of managers with those of shareholders (Eisenhardt, 1989).

In this study, Agency Theory is relevant because it highlights the importance of aligning managerial actions with organizational goals to maximize firm value, especially in contexts where intellectual capital is crucial for competitive advantage. The theory emphases on reducing agency costs through monitoring and incentives align with the need to manage resources effectively, including intellectual capital, to achieve optimal productivity and growth. By applying Agency Theory, this study can better understand how proper management structures and incentives can enhance intellectual capital utilization and ultimately increase firm value (Fama & Jensen, 1983) [21].

Agency Theory relates to ownership concentration as a moderator by suggesting that when ownership is more concentrated (i.e., held by fewer, larger shareholders), agency problems are reduced due to increased oversight and stronger incentives to monitor managerial actions. In this study, ownership concentration could enhance the effective utilization of intellectual capital by ensuring that managers prioritize firm value, aligning their actions with the interests of major stakeholders. With concentrated ownership, larger shareholders are more likely to exert influence, hold managers accountable, and encourage strategic decisions that enhance firm value through better intellectual capital management.

Methodology

This study adopted ex post facto research design. The population of this study will consist of all deposit money banks quoted on the Nigerian Exchange Limited (NGX). According to NGX Fact Book (2024), there are thirteen (13) quoted deposit money banks in Nigeria. Since all the banks have the required data for this study, the census approach was employed for the purpose of data collection. This study uses secondary sources of data. The data was extracted from the Audited Annual Reports and Accounts of the selected Banks from 2014-2023. This study used the multiple regression analysis techniques to test the hypotheses. The specific econometric model is stated below:

$FV_{it}=\beta 0+\beta_1 HC_{it}+\beta_2 SC_{it}+\beta_3 RC_{it}+\beta_4 OC_{it}+\beta_5 HC*OC_{it}.+\beta_6 SC*OC_{it}+\beta_7 RC*OC_{it}+\varepsilon it$

Where: FV = Firm Value, HC = Human Capital, SC= Structural Capital, RC= Relational Capital, OC=Ownership Concentration, ε=Error Term, i=Cross Section, t=Time Series Properties

Decision Rules

The decision rule to test the hypothesis of the study is as follows: If the prob-value of the t-coefficient is less than 5% (0.05), the null hypothesis is rejected, otherwise, it is accepted.

Table 1: Measurement of Variables

S/N	Variable	Variable Type	Measurement	Source
1	Firm Value (FV)	Dependent	Tobin's Q=(MVE+BVD)/TA) MVE = Market Value of Equity, BVD = Book Value of Debt, TA = Total Asset.	Nguyen and Doan (2020); Putra and Ratnadi (2021).
2	Human Capital (HC)	Independent	Measured using Value-Added = Revenue-Total Costs + Employees' Expenditure,	Jose and Silva, (2021); Nguyen and Doan (2020);
3	Structural Capital (SC)	„	(Value Added- Employees' Expenditures)/ Value Added	Jose and Silva (2021); Nguyen and Doan (2020);
4	Relational Capital (RC)	„	Value Added/Marketing and Distribution Expenses	Jose and Silva (2021); Nguyen and Doan (2020)
5	Ownership Concentration	Moderator	The proportion of shares held by a certain group of block holders that were more than 5%	Adegboye *et al*. (2020); Alimehmeti, G., & Paletta, A. (2014)

Source: Researcher's Compilation, 2024

Results and Discussions

Table 2: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
FV	130	.4491527	.2097172	.112639	.784016
HC	130	.12568	.1072001	.012548	.68286
SC	130	.4618031	.1845249	.112639	.784016
RC	130	.3834111	.0887197	.153908	.588863
OC	130	.2908225	.154256	.019619	.635579
HC*OC	130	.1196132	.0702118	.005651	.3092499
SC*OC	130	.0347882	.0357705	.0020595	.2276198
RC*OC	130	.111876	.0643085	.0065207	.3171721

Source: STATA 17 Output, 2024.

The descriptive statistics in Table 2 provide insights into the distribution and central tendencies of the variables used to assess whether ownership concentration (OC) moderates the effect of intellectual capital (HC, SC, RC) on firm value (FV) for Nigerian Deposit Money Banks. The table shows the mean value of 4491527, which shows that the average firm value among the banks is approximately 0.45. This serves as a central reference point for firm value in the sample. The standard deviation of 0.2097, which represents the degree of spread in firm value scores around the mean. A standard deviation of around 0.21 suggests a moderate variation in firm values across the banks. Some banks have higher or lower firm values than the average, indicating diversity in their valuation. The lowest firm value observed in the sample is 0.1126, which may represent a bank with lower profitability, asset quality, or other limiting factors affecting its valuation, and the maximum is 0.7840, the highest firm value observed in the sample, indicating that certain banks achieve significantly higher valuations due to likely factors such as superior management, market position, or other competitive advantages.

The mean of HC stood at 0.1257, showing that, on average, human capital as a proportion of intellectual capital is 0.13. The Std. Dev. value of 0.1072, indicating a noticeable spread in human capital values among the banks. The Values of HC range from 0.0125 to 0.6829, suggesting that certain banks have significantly higher human capital investments than others.

Mean of SC is 0.4618, suggesting that structural capital forms a substantial part of the intellectual capital mix, with an average near 0.46. The standard deviation of 0.1845, indicating moderate variability. Structural capital shows the values range from 0.1126 to 0.7840, showing significant variation in structural capital investments across the sample.

The Mean value of 0.3834 relational capital, showing an average relational capital level of about 0.38, following the standard deviation of 0.0887, implying less variation compared to other types of capital. The minimum value is 0.1539, and the maximum is 0.5889, indicating that relational capital values are generally concentrated within a narrower range.

Ownership concentration has an average value of 0.2908, indicating that, on average, ownership concentration is around 29%. The standard deviation value of 0.1543 shows considerable variation in ownership concentration across banks. The minimum and maximum value of ownership concentration varies widely, from 0.0196 to 0.6356, reflecting a mix of highly concentrated and widely held ownership structures.

On the moderating effect of ownership concentration on human capital (HC*OC) the Mean of 0.1196, with values ranging from 0.0057 to 0.3092, suggesting that ownership concentration has a relatively low but varying moderating effect on human capital, while the moderating effect of ownership on structural capital has the mean value of 0.0348, indicating a low average moderating effect, with a wider range from 0.0021 to 0.2276. Additionally, RC*OC moderating effect of ownership concentration on relational capital, has a mean value of 0.1119, showing a slightly stronger average moderating effect compared to SC*OC, with values from 0.0065 to 0.3172.

Table 3: Correlation Matrix

Variables	FV	HC	SC	RC	OC	HC*OC	SC*OC	RC*OC
FV	1.0000							
HC	0.1038	1.0000						
SC	0.0120	-0.1298	1.0000					
RC	0.1435	0.1874	-0.0446	1.0000				
OC	-0.3430	-0.1074	-0.0030	0.0273	1.0000			
HC*OC	0.6258	0.0189	0.0279	0.1418	0.4051	1.0000		
SC*OC	-0.0606	0.8455	-0.0872	0.1776	0.3256	0.2014	1.0000	
RC*OC	-0.2624	-0.0239	0.0085	0.4038	0.9064	0.4172	0.3594	1.0000

Source: STATA 17 Output, 2024.

The correlation matrix in Table 3 provides insights into the relationships between Firm Value (FV), intellectual capital components (HC, SC, RC), Ownership Concentration (OC), and the moderating variables (HC*OC, SC*OC, RC*OC). Human Capital (HC) has a correlation of 0.1038 with firm value, suggesting a positive relationship between firm value and human capital. This implies that increases in human capital are slightly associated with increases in firm value, though the effect is minor. Structural Capital (SC) has a correlation of 0.0120, indicating a negligible relationship between structural capital and firm value. Relational Capital (RC) Correlation of 0.1435, showing a weak positive relationship, suggesting that relational capital may slightly enhance firm value. Ownership Concentration (OC) has a correlation of -0.3430, indicating a moderate negative relationship between ownership concentration and firm value. Higher ownership concentration might be associated with lower firm value, potentially due to limited diversification or other factors. HC*OC (Moderating effect on human capital): Correlation of 0.6258, showing a strong positive relationship, suggesting that ownership concentration's moderating effect on human capital is significantly associated with firm value.SC*OC (Moderating effect on structural capital) Correlation of -0.0606, indicating a very weak negative relationship, implying that the moderating effect of ownership on structural capital has almost no impact on firm value. RC*OC (Moderating effect on relational capital) Correlation of -0.2624, indicating a weak negative relationship. This suggests that the moderating effect of ownership concentration on relational capital may slightly reduce firm value.

Post residual diagnostic tests

Table 4: Multicollinearity

Variable	VIF	1/VIF
RC*OC	2.51	0.398406
OC	1.89	0.529100
SC*OC	3.22	0.310559
HC	1.44	0.694444
RC	2.31	0.432900
HC*OC	1.23	0.813008
SC	1.05	0.952380
Mean VIF	**1.95**	

Source: STATA 17 Output, 2024.

Table 4 presents the Variance Inflation Factor (VIF) values for each variable, which helps assess multicollinearity in the model. Multicollinearity occurs when predictor variables are highly correlated with each other, which can undermine the statistical reliability of regression coefficients. Generally, a VIF above 5 (or, in some cases, 10) indicates problematic multicollinearity. The VIF values suggest that multicollinearity is minimal across the variables in the model. SC*OC, with the highest VIF of 3.22, shows the strongest correlation with other variables but remains below the concern threshold. This indicates that the regression model can provide reliable estimates, as the predictors do not exhibit problematic levels of multicollinearity.

Table 5: Heteroskedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of FV	
chi2(1) = 0.07	Prob> chi2 = 0.7958

Source: STATA 17 Output, 2024.

Table 5 presents the results of the Breusch-Pagan / Cook-Weisberg test for heteroskedasticity, which assesses whether the variance of the errors in the regression model is constant (homoskedasticity) or varies (heteroskedasticity). Heteroskedasticity can lead to inefficient estimates and unreliable statistical inferences if unaddressed. Since the p-value (0.7958) is significantly higher than 0.05, there is no evidence of heteroskedasticity in the model. This means that the variance of the error terms is likely constant, satisfying the homoskedasticity assumption, which is important for the reliability of the regression coefficients. The model does not require adjustments for heteroskedasticity, and standard errors and test statistics can be interpreted with greater confidence.

Table 6: Hausman Specification Test

Variable	(b) Fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
HC	.3953281	.3503978	.0449303	.070403
SC	-.0091351	.0005063	-.0096414	.017108
RC	.3240394	.3374181	-.0133787	.0664232
OC	-.5182023	-.503583	-.0146193	.096623
HC*OC	2.741464	2.726958	.0145057	.034653
SC*OC	-1.34416	-1.150659	-.1935014	.255274
RC*OC	-.8516937	-.9470721	.0953785	.2517282

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.86
Prob>chi2 = 0.9968

Source: STATA 17 Output, 2024.

The Hausman Specification Test in Table 6 is used to determine whether a Fixed Effects (FE) or Random Effects (RE) model is more appropriate for the data. The test checks if the differences in coefficients between the two models are systematic. Since the p-value is very high (0.9968), the random effects model is appropriate for this data, as it is efficient under the null hypothesis. The random effects model assumes that the unobserved individual effects are uncorrelated with the explanatory variables, which allows for more generalizability across different entities in the sample (in this case, Nigerian Deposit Money Banks).

Table 7: Lagrangian Multiplier Test

	Var	sd = sqrt(Var)
FV	.0439813	.2097172
	.0085949	.0927085
	.0056432	.0645343
Test: Var(u) = 0		
chibar2(01) = 216.23		
Prob> chibar2 = 0.0000		

Source: STATA 17 Output, 2024.

The Lagrangian Multiplier (LM) Test in Table 7 is used to decide between using a Random Effects (RE) model and a Pooled Ordinary Least Squares (OLS) model. This test examines whether there is significant variation in the data

across the banks. The variance of the firm value (FV) variable is 0.0439813, with a standard deviation of 0.2097. This reflects the spread in firm value within the sample. Other variances are also shown, including one at 0.0085949 (standard deviation of 0.0927) and another at 0.0056432 (standard deviation of 0.0645). These represent the variance components of the model. With a p-value of 0.0000, we reject the null hypothesis that Var(u) = 0. This indicates that there is significant variance across banks in the data, which supports the presence of random effects. The results suggest that the Random Effects model is preferred over the Pooled OLS model. The significant variance across entities implies that unobserved factors specific to each bank impact firm value, making a random effects model more appropriate for capturing this variation.

Table 8: Random Effect Regression Result

FV	Coef.	Std. Err.	T	P>|z|
HC	.3503978	.2148993	1.63	0.103
SC	.0005063	.0441001	0.01	0.991
RC	.3374181	.2060274	1.64	0.101
OC	-.503583	.2665397	-1.89	0.059
HC*OC	2.726958	.1251573	21.79	0.000
SC*OC	-1.150659	.6729284	-2.71	0.037
RC*OC	-.9470721	.66983	-1.41	0.157
_cons	.2417679	.0879322	2.75	0.006
R-squared	0.8256			
Wald chi2(7)	577.57			
Prob> chi2	0.0000			

Source: STATA 17 Output, 2024

FVit=.2417679+.3503978HCit+.0005063SCit+.3374181RCit-.503583OCit+2.726958HC*OCit.-1.150659SC*OCit-.9470721RC*OCit+εit

In Table 8, the R-squared value of 0.8256 represents the proportion of the variance in the dependent variable (firm value, FV) that is explained by the independent variables (human capital, structural capital, relational capital, ownership concentration, and their interaction terms). The R-squared value of 0.8256 indicates that approximately 82.56% of the variation in firm value across the sampled banks is explained by the model, including the intellectual capital components, ownership concentration, and their interactions. The Wald chi-squared statistic of 577.57 and its highly significant p-value confirm that the overall model is robust and that the predictors included contribute significantly to explaining firm value. This enhances the credibility of the model's results and justifies the inclusion of these predictors. The highly significant p-value (0.0000) means that at least one of the predictor variables is significantly associated with firm value, providing strong evidence that the model as a whole is statistically significant. A significant Wald chi-squared statistic suggests that the independent variables including the intellectual capital components, ownership concentration, and their interactions collectively have a meaningful impact on firm value. This affirms the usefulness of the model in explaining variations in firm value across the sampled banks.

HO_1: Intellectual capital (Human, structural and relational) has no significant effect the value of deposit money banks in Nigeria

Human capital has a coefficient value of (0.3504). The positive coefficient suggests that an increase in human capital is associated with an increase in firm value. Specifically, for every 1-unit increase in the human capital, the firm value (FV) is expected to increase by approximately 0.3504 units, assuming other factors remain constant. The p-value of 0.103 indicates that this effect is not statistically significant at the 5% levels. While the effect is positive, the lack of statistical significance means that we cannot be confident that this positive relationship holds in the broader population based on this model. Although the effect of human capital on firm value is positive, the result is marginally insignificant in this study. This could imply that, while human capital might contribute to firm value, the study therefore, accept the null hypothesis which states that human capital has no significant impact on the firm value of Nigerian Deposit Money Banks. This finding differs from those of Dancaková and Glova (2024).

The coefficient of SC is 0.0005, suggesting that changes in structural capital have a negligible effect on firm value. Specifically, a 1-unit increase in structural capital would only result in an increase of 0.0005 units in firm value, assuming all other factors are constant. The p-value of 0.991 is far above typical significance levels, indicating that this effect is not statistically significant. Therefore, there is no evidence to suggest that structural capital has a meaningful impact on firm value in this model. Given the near-zero coefficient and the lack of statistical significance, structural capital does not appear to play a measurable role in determining firm value for the sampled Nigerian Deposit Money Banks in this study. This could suggest that, unlike human capital or other components, structural capital may not be as crucial to enhancing firm value within this specific context. The study therefore, accepts the null hypothesis that SC has no significant effect on the firm value of the deposit money banks. This finding disagreed with that of Dancaková and Glova (2024) [16].

The Coefficient value for RC is 0.3374. The positive coefficient for relational capital suggests that an increase in relational capital is associated with an increase in firm value. Specifically, a 1-unit increase in relational capital is expected to increase firm value by approximately 0.3374 units, holding other factors constant. The p-value of 0.101 indicates that this effect is not statistically significant at 5% level but is marginally close to significance. This means that while relational capital positively affects firm value in the model, the evidence is not strong enough to confirm this relationship conclusively. Hence, the study accepts the null hypothesis stated that SC has no significant effect on firm value of the deposit money banks in Nigeria. This finding did not support

that of Rahman and Liu (2023) [31].

The Coefficient of OC is -0.5036, the negative coefficient suggests that an increase in ownership concentration is associated with a decrease in firm value. Specifically, for every 1-unit increase in ownership concentration, the firm value is expected to decrease by approximately 0.5036 units, assuming other factors remain constant. The p-value of 0.059, indicating that the effect is marginally significant. Although it does not meet the strict 5% significance level, it is close enough to suggest that ownership concentration could have a meaningful negative effect on firm value.

HO2: Ownership concentration has no significant moderating effect on the relationship between intellectual capitals (Human, structural and relational) and on the firm value of deposit money banks in Nigeria

The coefficient value for HC*OC is 2.7270; the positive coefficient indicates that ownership concentration enhances the effect of human capital on firm value. Specifically, this coefficient implies that when ownership concentration is high, the positive impact of human capital on firm value is stronger, with a 1-unit increase in the interaction term HC*OC leading to an increase of 2.7270 units in firm value, assuming other factors remain constant. The p-value of 0.000 shows that this moderating effect is highly statistically significant. This result strongly supports the idea that ownership concentration plays a meaningful role in amplifying the impact of human capital on firm value. The significant positive interaction between ownership concentration and human capital suggests that, in Nigerian Deposit Money Banks, higher ownership concentration may increase the effectiveness of investments in human capital. This could be due to the fact that concentrated ownership often leads to a more active, direct role of major shareholders, who may be better positioned to ensure that human capital resources are aligned with strategic goals, ultimately boosting firm value. The study rejects the null hypothesis which stated that HC*OC has no significant effect on the firm value. This finding is in line with those of Mohapatra and Pattanayak (2024) and Dancaková and Glova (2024) [29, 16].

The coefficient of SC*OC is -1.1507. The negative coefficient indicates that ownership concentration weakens the effect of structural capital on firm value. Specifically, for every 1-unit increase in the interaction term SC*OC, firm value decreases by 1.1507 units, holding other factors constant. This suggests that when ownership concentration is high, the positive impact of structural capital on firm value is reduced. The p-value of 0.037 shows that this moderating effect is statistically significant at the 5% level. This indicates strong evidence that ownership concentration does indeed interact with structural capital in a way that negatively impacts firm value. The significant negative interaction suggests that, in Nigerian Deposit Money Banks; high ownership concentration might limit the potential of structural capital to enhance firm value. This could occur because highly concentrated ownership structures may impose rigid controls or limit innovative processes, reducing the effectiveness of structural capital investments, such as organizational systems, procedures, or databases, in adding value. Hence, the null hypothesis was rejected in this circumstance. This finding is congruent with those of Rahman and Liu (2023), Suharman (2023) and Xu *et al.* (2023) [31, 35, 38].

The Coefficient RC*OC has a negative value of (-0.9471), the negative coefficient for RC*OC suggests that ownership concentration may weaken the effect of relational capital on firm value. Specifically, a 1-unit increase in RC*OC is associated with a decrease in firm value of 0.9471 units, assuming other factors are held constant. This indicates that when ownership concentration is high, relational capital's ability to positively impact firm value may be reduced. The p-value of 0.157 means that this moderating effect is not statistically significant at the common 5% level. This implies that, although the coefficient is negative, there is insufficient evidence to conclusively state that ownership concentration has a significant impact on the relationship between relational capital and firm value. Given the non-significant result, while the negative coefficient suggests that ownership concentration might reduce the effectiveness of relational capital, the evidence isn't strong enough to confirm this with confidence. It could imply that, in this sample of Nigerian Deposit Money Banks, relational capital's influence on firm value is generally stable regardless of ownership concentration levels.

Conclusion and Recommendations

The study investigates the role of ownership concentration in moderating the impact of intellectual capital on firm value in Nigerian Deposit Money Banks. Findings indicate that human capital has a positive but statistically insignificant effect on firm value, suggesting an association between increased human capital and higher firm value, though not robustly supported. Structural capital shows a negligible impact on firm value, while relational capital has a positive relationship, indicating that higher relational capital correlates with increased firm value. Ownership concentration negatively affects firm value, suggesting that increased concentration may reduce firm value.

The study concluded that significant interaction effects were observed, showing that ownership concentration positively moderates human capital, enhancing its effectiveness in raising firm value. This could be due to the active involvement of major shareholders, who align human capital with strategic objectives. Conversely, ownership concentration negatively moderates structural capital, potentially limiting its positive effect on firm value due to restrictive controls in highly concentrated ownership structures, which may stifle innovation and reduce the value-adding capacity of structural capital. Finally, ownership concentration appears to weaken the impact of relational capital on firm value, although this effect was not statistically significant.

In conclusion, while ownership concentration enhances the effect of human capital on firm value, it may diminish the value contributions of structural and relational capital.

Based on the above findings the study recommended the following:

a) Given the positive association between human capital and firm value. Banks should prioritize initiatives that enhance employee skills, knowledge, and expertise, as these contribute positively to firm value. Such as; implementing ongoing training programs to improve employee competencies in critical areas such as digital banking, customer service, and risk management.

b) Standardize and improve internal processes, such as loan processing, compliance checks, and customer support, to ensure efficiency and reduce bottlenecks.

This improves productivity and supports a higher firm value.

c) Build strategic partnerships with other financial institutions, fintech companies, and local businesses to offer innovative products and services. This can extend the bank's reach, create new revenue streams, and enhance value.

d) By diversifying ownership and strengthening governance, Nigerian Deposit Money Banks can enhance managerial accountability, encourage innovative strategies, and align interests across stakeholders, ultimately supporting higher firm value.

References

1. Adegboye FB, Ojeka SA, Adegboye AO. Ownership concentration, governance practices, and performance of listed firms in Nigeria. Journal of African Business. 2020;21(4):456-474. https://doi.org/10.1080/15228916.2020.1777533.
2. Akwuobi MC. The effect of intellectual capital potency and firm value in Nigeria listed non-financial firms. Nigerian Journal of Financial Studies. 2022;19(3):45-62.
3. Alimehmeti G, Paletta A. Ownership concentration and effects over firm performance: Evidence from Italy. European Scientific Journal. 2014;10(7):1857-7431. https://doi.org/10.19044/esj.2014.v10n7p%page_number.
4. Aluko O, Amidu M. Corporate governance and intellectual capital performance in Nigerian listed firms. African Journal of Economic Policy. 2018;25(1):79-99.
5. Al-Najjar B. The effect of governance mechanisms on small and medium-sized enterprise cash holdings: Evidence from the United Kingdom. Journal of Small Business Management. 2015;53(2):303-320. https://doi.org/10.1111/jsbm.12062.
6. Alvino F, Di Vaio A, Hassan R, Palladino R. Intellectual capital and sustainable development: A systematic literature review. Journal of Intellectual Capital. 2021;22(1):76-94. https://doi.org/10.1108/JIC-11-2020-0365.
7. Anderson RC, Reeb DM. Founding-family ownership and firm performance: Evidence from the S&P 500. Journal of Finance. 2003;58(3):1301-1328. https://doi.org/10.1111/1540-6261.00567.
8. Andreeva T, Kianto A. Does knowledge management really matter? Linking knowledge management practices, competitiveness, and economic performance. Journal of Knowledge Management. 2012;16(4):617-636. https://doi.org/10.1108/13673271211246185.
9. Becker GS. Human capital: A theoretical and empirical analysis, with special reference to education. 3rd ed. University of Chicago Press; 1993.
10. Bontis N, Keow WCC, Richardson S. Intellectual capital and business performance in Malaysian industries. Journal of Intellectual Capital. 2000;1(1):85-100. https://doi.org/10.1108/14691930010324188.
11. Bontis N, Serenko A. The mediating effect of organizational culture on the relationship between relational capital and firm performance. Journal of Intellectual Capital. 2020;21(5):693-710. https://doi.org/10.1108/JIC-03-2020-0061.
12. Bratianu C, Stanescu DF, Mocanu R. Exploring the impact of relational capital on organizational performance. Management Dynamics in the Knowledge Economy. 2020;8(1):47-62. https://doi.org/10.2478/mdke-2020-0004.
13. Chen M, Cheng S, Hwang Y. An empirical investigation of the relationship between intellectual capital and firm value. Journal of Intellectual Capital. 2020;21(3):403-419. https://doi.org/10.1108/JIC-11-2019-0277.
14. Chang SC, Tseng CH. Knowledge-based systems and firm performance. Industrial Management & Data Systems. 2006;106(5):675-692. https://doi.org/10.1108/02635570610666464.
15. Damodaran A. Investment valuation: Tools and techniques for determining the value of any asset. John Wiley & Sons; 2002.
16. Dancaková T, Glova J. The impact of value-added intellectual capital on corporate performance: Cross-sector evidence. Journal of Intellectual Capital. 2024;25(1):55-72. https://doi.org/10.1108/JIC-01-2024-0034.
17. Degbayibi D, Fakile AS. Intellectual capital and firm performance of listed firms in Nigeria: The moderating role of corporate governance. Nigerian Journal of Management Studies. 2021;12(2):112-129.
18. Dumay J, Guthrie J, Rooney J. The critical path of intellectual capital: Advances and insights. Journal of Intellectual Capital. 2018;19(1):2-21. https://doi.org/10.1108/JIC-12-2017-0161.
19. Edvinsson L, Malone MS. Intellectual capital: Realizing your company's true value by finding its hidden brainpower. HarperBusiness; 1997.
20. Edvinsson L, Xie L. How intellectual capital impacts innovation: Exploring firm-level evidence. Journal of Intellectual Capital. 2019;20(1):69-85. https://doi.org/10.1108/JIC-03-2018-0057.
21. Fama EF, Jensen MC. Separation of ownership and control. Journal of Law and Economics. 1983;26(2):301-325. https://doi.org/10.1086/467037.
22. Ferreira AI, Franco M. The mediating role of intellectual capital in the relationship between strategic alliances and organizational performance. Journal of Intellectual Capital. 2017;18(2):308-338. https://doi.org/10.1108/JIC-02-2016-0020.
23. Gomes CM, Wojahn RM. Improving innovation performance through intellectual capital. Journal of Intellectual Capital. 2017;18(3):503-521. https://doi.org/10.1108/JIC-02-2016-0025.
24. Gogan LM, Artene A, Sarca I, Draghici A. The impact of intellectual capital on organizational performance. Procedia - Social and Behavioral Sciences. 2016;221:194-202. https://doi.org/10.1016/j.sbspro.2016.05.106.
25. Khalique M, Bontis N, Hassan M. Intellectual capital in small and medium enterprises: A developing economy perspective. Journal of Intellectual Capital. 2018;19(5):711-729. https://doi.org/10.1108/JIC-11-2017-0151
26. Kianto A, Sáenz J, Aramburu N. Knowledge-based human resource management practices, intellectual capital, and innovation. J Bus Res. 2017;81:11–20. https://doi.org/10.1016/j.jbusres.2017.07.018
27. Leitner KH. Intangible assets and value creation: The role of intellectual capital. Manag Decis. 2021;59(2):438–56. https://doi.org/10.1108/MD-05-2020-0565

28. Liu Y, Wang L, Zhao J. The impact of relational capital on firm value in high-tech industries. Ind Manag Data Syst. 2019;119(4):720–36. https://doi.org/10.1108/IMDS-05-2018-0201
29. Mohapatra R, Pattanayak JK. Unraveling the dynamics of intellectual capital, firm performance, and the influence of BIG4 auditors and group affiliation. J Account Bus Res. 2024;27(2):113–30. https://doi.org/10.1108/JABR-10-2023-0047
30. Nahapiet J, Ghoshal S. Social capital, intellectual capital, and the organizational advantage. Acad Manag Rev. 1998;23(2):242–66. https://doi.org/10.5465/amr.1998.533225
31. Rahman S, Liu Z. Intellectual capital and firm performance: The moderating role of auditor characteristics. Account Financ. 2023;64(2):456–74. https://doi.org/10.1108/AF-03-2023-0056
32. Sardo F, Serrasqueiro Z. Intellectual capital, growth opportunities, and financial performance in European firms. J Intellect Cap. 2018;19(4):741–59. https://doi.org/10.1108/JIC-07-2017-0099
33. Secundo G, Dumay J, Schiuma G, Passiante G. Managing intellectual capital through a collective intelligence approach: An integrated framework for universities. J Intellect Cap. 2020;21(2):281–306. https://doi.org/10.1108/JIC-10-2019-0238
34. Shihab RA, Al-Najjar B, Bontis N. The relationship between intellectual capital, innovation, and firm performance in emerging markets. J Knowl Manag. 2019;23(3):1–19. https://doi.org/10.1108/JKM-12-2018-0758
35. Suharman D. Value chain in the relationship of intellectual capital and firm performance. Int J Prod Econ. 2023;256(2):105–20. https://doi.org/10.1016/j.ijpe.2023.106451
36. Villalonga B, Amit R. Family ownership and firm performance: Evidence from U.S. companies. Strat Manag J. 2020;41(3):401–20. https://doi.org/10.1002/smj.3133aw
37. Wu J, Chen C, Huang L. Intellectual capital and firm value: The role of corporate governance. Asia Pac J Account Econ. 2020;28(2):234.
38. Xu J, Ren H, Wang L. The effect of intellectual capital efficiency and firms' financial performance based on business life cycle. J Bus Econ. 2023;52(1).