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### INTELLECTUAL CAPITAL, STAFF DEVELOPMENT AND PROFITABILITY OF BANKS IN NIGERIA

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#### ABSTRACT

This study investigates the relationship between intellectual capital (IC), staff development, and profitability in the Nigerian banking sector. By employing a quantitative research design, the study analyzes how staff training and education moderate the effect of IC on profitability. Using data from 12 listed banks spanning 2013–2023, the research identifies that value-added IC significantly contributes to profitability, with capital employed efficiency emerging as the most consistent driver. However, SCE presents challenges, reflecting inefficiencies in operational frameworks and resource utilization. The findings underscore the critical role of staff training as a moderating variable, amplifying the impact of IC on profitability by enabling employees to harness and optimize intellectual resources effectively. Policy implications of the findings are significant, suggesting regulators, such as the Central Bank of Nigeria, to mandate the disclosure of IC metrics in annual financial reports to promote transparency and enhance the stakeholders' understanding of its impact on performance. In addition, banks should integrate comprehensive training programs into their strategic plans, fostering continuous professional development to maximize intellectual resource efficiency. Addressing structural inefficiencies through investment in advanced technologies and streamlined processes can further enhance profitability. Finally, the study advocates for policymakers to create enabling environments that support IC development, recognizing its potential to drive sustainable growth in the banking sector. These findings align with the resource-based view, contributing to the literature on IC's contextual role in emerging economies.

**Keyword:** IC, Nigerian banking sector, profitability, staff training and education, value-added IC.

## INTRODUCTION

Profitability remains a critical determinant of business success, serving as the foundation for financial sustainability and growth. It reflects a firm's ability to generate revenue above its expenses, enabling it to reinvest in operations, reward shareholders, and withstand economic downturns. Recent studies indicate that profitability enhances a firm's competitive advantage by facilitating investment in innovation, marketing, and expansion (Toma et al., 2021). Moreover, profitability is often used as an indicator of management effectiveness and resource utilization. In the contemporary business environment, especially in the banking sector, maintaining high profitability is essential for ensuring liquidity, optimizing asset utilization, and boosting investor confidence (Nguyen & Tran, 2022).

Intellectual capital (IC) is one important determinant of firm profitability and has emerged as a key intangible asset that contributes significantly to the long-term value and success of organizations. It encompasses human, structural, and relational capitals, which collectively represent the knowledge, skills, processes, and relationships that enable firms to create value (Bontis, 2023). Recent empirical research shows that IC plays an integral role in enhancing operational efficiency, fostering innovation, and driving profitability (Khan & Khan, 2022). Firms with a robust IC base tend to outperform their competitors by better leveraging knowledge, reducing costs, and increasing responsiveness to market changes (Hsu & Wang, 2021). In the banking sector, IC is a critical driver of customer satisfaction, operational excellence, and financial stability (Salim & Inama, 2022).

Meanwhile, staff development is essential to maintaining a competitive edge in today's fast-paced business environment. With the rapid evolution of technology and business processes, organizations must continuously upgrade their workforce's skills to meet changing demands and improve operational performance (Zhang & Xie, 2021). Recent studies show that firms investing in staff training and development benefit from enhanced employee performance, higher job satisfaction, and lower turnover rates, which collectively contribute to improved organizational profitability (Liu & Shi, 2022). In the banking sector, well-trained staff not only improve customer service and operational efficiency but also foster a culture of innovation and adaptability, making staff training a crucial investment for long-term success (Sun & Yan, 2023).

Therefore, the relationship between IC proxies and profitability has been widely explored in the literature. Empirical studies generally highlighted a positive correlation, suggesting that firms with higher levels of IC tend to exhibit greater profitability (Law et al., 2018; Othman et al., 2021). For instance, human capital efficiency (HCE), which measures the effectiveness of employee knowledge and skills, has been positively linked to ROA, indicating that well-trained employees contribute directly to a firm's financial performance (Othman et al., 2021). Similarly, capital employed efficiency (CEE), which assesses how effectively a firm uses its capital resources, is positively related to profitability, as more efficient use of capital leads to better financial outcomes (Bontis et al., 2000).

Structural capital efficiency (SCE), which focuses on organizational processes and systems, has also shown a positive relationship with profitability by enhancing operational performance and reducing costs (Dumay, 2021). Overall, these findings suggested that IC is crucial in driving profitability in firms. IC has been shown to play a significant role in enhancing a firm's profitability, with staff training and education (STE) serving as a critical moderating factor. Several studies suggested that the effectiveness of IC in driving profitability depends on the level of investment in human resources through training and development (Abeysekera, 2021). Staff training can enhance HCE by increasing employees' knowledge and skill sets, which can directly impact profitability by improving service delivery,

operational efficiency, and innovation (Chen & Cheng, 2022). Moreover, staff education programs improve employees' understanding of the firm's strategic goals and operational processes, enhancing the impact of structural capital on profitability (Stewart, 1997). Thus, STE can act as a catalyst, amplifying the positive effects of IC on profitability.

The existing literature on IC and profitability primarily focuses on developed economies, with limited attention given to emerging markets like Nigeria, especially in the banking sector. This creates a practical gap, as the dynamics of IC and profitability may differ due to regional differences in institutional frameworks and economic conditions (Pillai et al., 2022). Empirically, there is insufficient research on the moderating effect of staff development in this relationship, particularly within the context of Nigerian banks. Theoretical gaps also exist, as most studies adopt generic models of IC without considering the unique challenges faced by banks in Nigeria, such as regulatory changes, market volatility, and technological advancements (Okeke et al., 2022). Methodologically, while many studies use cross-sectional data, there is a need for longitudinal research that captures the dynamic nature of the relationship between IC, staff development, and profitability over time (Kline & Smith, 2022). Given these gaps, there is a clear need for new empirical studies that explore the moderating role of staff development in enhancing the relationship between IC on profitability in the Nigerian banking sector. Such studies would provide valuable insights into how training programs can optimize the impact of IC on profitability, offering practical recommendations for banking institutions in Nigeria to improve both employee performance and financial outcomes (Ogunleye et al., 2023). In addition, this research can contribute to the broader field of IC management, offering evidence-based strategies for leveraging human resources and intellectual assets for business growth.

Therefore, the main objective of this study is to examine the moderating effect of staff development on the relationship between value-added IC (VAIC) and the profitability of listed deposit money banks in Nigeria. This study is justified as it addresses significant gaps in the existing literature by focusing on an under-researched geographical region (Nigeria) and industry (banking sector). Moreover, it introduces the moderating role of staff development, which has been overlooked in previous studies, thereby contributing to both theoretical advancements in IC management and practical recommendations for Nigerian banks aiming to enhance profitability through strategic investments in IC and staff development.

## **LITERATURE REVIEW**

Profitability is a critical indicator of a firm's financial health, reflecting its ability to generate profits relative to its revenues, assets, or equity. It is often measured using proxies such as Return on Assets (ROA), Return on Equity (ROE), and Profit Margin. ROA, one of the most commonly used proxies, is calculated by dividing net profit after tax by total assets, providing insights into how effectively a firm utilizes its assets to generate profits (Memon et al., 2022). On the other hand, IC refers to the intangible assets of a firm, including human, structural, and relational capital, that contribute to its value creation and competitive advantage (Edvinsson & Malone, 2022). The main proxies used to measure IC include HCE, CEE, SCE, and VAIC, which represents the combined efficiency of all forms of IC (Bontis et al., 2023). In addition, staff development is crucial for enhancing employee skills and knowledge, thereby improving productivity and organizational performance. The main proxy for measuring STE is the total cost of staff training, which reflects the financial investment made in employee development programs (Tariq & Shah, 2021). Thus, this study conceptualizes that IC influences profitability and that this

relationship could be strengthened or weakened by the firm's investment in staff development, which improves the efficiency of human, structural, and capital employed components of IC.

### **HCE and Profitability**

HCE measures the effectiveness of a firm's workforce in contributing to value creation, calculated as the ratio of human capital to VAIC. High HCE reflects a firm's ability to leverage the knowledge and skills of its employees to drive business success (Tariq & Shah, 2021). Empirical studies examining the relationship between HCE and ROA have produced mixed results. Some studies (Nguyen et al., 2022; Toma et al., 2021) report a positive and significant relationship, indicating that firms with higher HCE tend to show better profitability due to improved employee performance and efficiency. Other studies (Liu & Shi, 2022) suggest a negative relationship, possibly due to the inefficiency of investments in human capital, while a few studies (Zhang & Xie, 2021) have found no significant relationship, indicating that HCE alone may not directly influence profitability in the banking sector. On the premise that efficient human capital directly enhances productivity and profitability through improved employee performance and innovation (Tariq & Shah, 2021), the study hypothesized thus:

*H1: HCE positively and significantly influences the profitability of listed deposit money banks in Nigeria.*

### **CEE and Profitability**

CEE measures the effectiveness of a firm in utilizing its capital to generate profits, calculated as the ratio of capital employed to VAIC. Efficient use of capital is key to enhancing profitability (Abeysekera, 2021). Several studies (Liu et al., 2021) have demonstrated that higher CEE leads to better ROA by maximizing the returns from capital investments. However, Chen and Cheng (2022) found that excessive reliance on capital, without efficient management, may negatively impact profitability. Meanwhile, some studies (Stewart, 1997) suggest a neutral effect, with CEE having no clear impact on performance due to industry-specific factors. Thus, this study hypothesis posits that better capital utilization leads to higher profitability by enhancing operational efficiency (Zhang & Xie, 2021).

*H2: CEE positively and significantly influences the profitability of listed deposit money banks in Nigeria.*

## **SCE AND PROFITABILITY**

SCE measures the efficiency of a firm's organizational processes, systems, and intellectual property in generating value. It reflects how well a firm's structure supports innovation and efficiency (Khan & Khan, 2022). Bontis (2023) reveals that firms with high SCE achieve higher ROA through optimized processes and reduced costs. Some studies (Bontis et al., 2023) argue that poor structural capital management can lead to inefficiencies, negatively impacting profitability. Whereas, other research (Salim & Inama, 2022) suggests no significant impact, particularly in firms with outdated systems. This study hypothesizes as follows, based on the notion that efficient structural capital leads to better organizational performance and higher profitability (Dumay, 2021).

*H3: SCE positively and significantly affects the profitability of listed deposit money banks in Nigeria.*

## **VAIC and Profitability**

VAIC represents the combined efficiency of human, structural, and CEE, offering a holistic view of a firm's IC. It is a comprehensive measure of a firm's knowledge-based assets (Bontis et al., 2023). Ulum et al. (2017) found that the modified VAIC (MVAIC) of public companies listed on IDX significantly affect their financial performance. Further empirical evidence (Memon et al., 2022) suggests a strong positive relationship between VAIC and ROA, indicating that firms with higher IC efficiency experience better profitability. However, some studies (Othman et al., 2021) have found a negative relationship, possibly due to misalignment between IC investments and firm objectives. In addition, other studies (Tariq & Shah, 2021) report no significant relationship, indicating that IC efficiency does not always directly correlate with profitability. Therefore, the study hypothesized that the combined effect of human, structural, and CEE will positively enhance profitability (Toma et al., 2021).

*H4: VAIC positively and significantly influences the profitability of listed deposit money banks in Nigeria.*

## **Staff Development and Profitability**

Studies show a positive link between staff development (training and education) and profitability, especially in terms of ROA. Training enhances employee skills, boosting productivity and organizational performance (Aghazadeh, 2012; Barrett & O'Connell, 2001). Research in banking (Osei et al., 2016) and hospitality (Chen et al., 2014) found that training improves employee competence and profitability. It also enhances decision-making and customer interaction, directly impacting financial outcomes (Akinyomi & Olagunju, 2013). However, some studies suggest a negative relationship, often due to poor implementation or misalignment with goals. For instance, Salim and Kadhim (2014) found poorly targeted training could reduce profitability by diverting resources. Similarly, Bassi and McMurrer (2007) indicated that training's benefits might not be immediately reflected in profitability. Other studies, such as by Tharenou et al. (2007) and Blundell et al. (2003), found no significant relationship between staff development and profitability, citing factors like market conditions. Thus, while training improves individual performance, its direct effect on profitability is not always clear. This study hypothesized as follows, assuming that well-trained employees improve efficiency and profitability, supported by evidence that training programs aligned with company goals enhance performance (Aghazadeh, 2012; Barrett & O'Connell, 2001).

*H5: Staff development has a significant positive effect on profitability of listed deposit money banks in Nigeria.*

*H6: Staff development strengthens the relationship between VAIC and profitability of listed deposit money banks in Nigeria.*

## **THEORETICAL REVIEW**

Relevant theories that explain the relationship among IC, staff development, and profitability include the resource-based view (RBV), human capital theory (HCT), knowledge-based view (KBV), and the dynamic capabilities theory (DCT). Teece et al. (1997) discusses the concept of dynamic capabilities, which is linked to IC as firms leverage their intangible resources (such as knowledge and organizational capabilities) to sustain competitive advantage and enhance performance. The RBV framework posits that a firm's resources, including IC, are critical to achieving competitive advantage and profitability

(Barney, 1991), while the HCT emphasizes the importance of human capital as a key driver of organizational performance and profitability (Becker, 1993). Moreover, the KBV hypothesis argues that a firm's knowledge assets, particularly IC, significantly influence its ability to innovate and compete (Grant, 1996). Out of these theories, the RBV is the most relevant theory for this study, as it emphasizes the strategic value of IC in enhancing organizational profitability. RBV aligns with the study's focus on leveraging IC, particularly in the banking sector, to achieve superior performance (Barney, 1991). This framework provides a strong theoretical foundation for examining the moderating role of STE in enhancing IC's effect on profitability.

## METHODOLOGY

The study adopts a quantitative research design, grounded in positivism, to examine the moderating effect of staff development on the relationship between IC and profitability. The population of the study comprises all the 14 listed deposit money banks in Nigeria, while the sample includes 12 banks for which complete financial data are available for the period from 2013 to 2023. The purposive sampling technique ensures that only banks with full data sets that remain listed throughout the study period are selected, ensuring robust results. Table 1 presents the population and sample of the study.

**Table 1**

### *Population and Sample of the Study*

S. No.	Bank Name	Date Listed	Population	Sample
1	Access Bank Plc	November 18, 1998	√	√
2	Eco Bank Plc	September 11, 2006	√	<b>X</b>
3	First City Monument Bank Plc	June 21, 2013	√	√
4	FBN Holdings Plc	November 26, 2012	√	√
5	Fidelity Bank Plc	May 17, 2005	√	√
6	Guaranty Trust Bank Plc	September 19, 1996	√	√
7	Jaiz Bank Plc	January 9, 2017	√	<b>X</b>
8	Stanbic IBTC Bank Plc	November 23, 2012	√	√
9	Sterlin Bank Plc	August 17, 1993	√	√
10	United Bank for Africa	March 31, 1970	√	√
11	Union Bank	-	√	√
12	Unity Bank Plc	-	√	√
13	Wema Bank Plc	February 13, 1991	√	√
14	Zenith Bank Plc	October 21, 2004	√	√
Total			14	12

*Notes.* Nigerian Exchange Group (NGX), 2023.

The dependent variable is proxied by ROA, which is measured as profit after tax divided by total assets. The independent variable, IC, include HCE, CEE, SCE, and VAIC. The moderating variable, staff development, is proxied by the total STE costs. Control variables include the leverage (LEV) (Idris et al., 2024b; Idris et al., 2019) and size (FSIZ) (Idris et al., 2024b; Idris et al., 2019) of sampled banks.

**Table 2**

*Variables of the Study*

Variables	Category	Definition	Measurement	Source
Profitability	Dependent	Return on Assets (ROA)	ROA = Profit After Tax / Total Asset	(Idris et al., 2024a; Mustapha et al., 2025)
Value Added (VA)		The difference between a company's output and input	VA = sum of operating profit, employee costs, depreciation, and amortization	Makki et al., 2008
Human Capital Efficiency (HCE)	Independent	The relative contribution of human resources to the creation of value added	HCE = VA / Human Capital (HC). (HC = total salaries and wages and other benefits).	Pulic, 1998.
Structural Capital Efficiency (SCE)	Independent	How a company effectively deploys its nonhuman properties to maximize value	SCE = structural capital (SC) / VA. (SC = the difference between VA & HC).	Pulic, 1998
Capital Employed Efficiency (CEE)	Independent	How a company effectively utilizes its physical and financial capital to maximize profitability.	CEE = VA / Capital Employed (CE). (CE = the difference between total assets & intangible assets).	Janošević et al., 2013.
Value-added Intellectual Capital (VAIC)		The HCE, SCE, and CEE.	VAIC = HCE + SCE + CEE	Pulic, 1998.
Staff Development	Moderating	Staff Training and Education (STE)	Total STE cost	Ahmed et al., 2020
Leverage	Control	LEV	Total Debt / Total Asset	Idris et al., 2024b; Idris et al., 2019
Firm size	Control	FSIZ	Natural log of Total Asset	Idris et al., 2019; Idris, et al., 2024b

*Notes.* Compiled by the Research, 2023.

Data was collected from secondary sources, specifically the annual reports and financial statements of the banks. Models of the study are based on panel regression, with robust standard errors to address multicollinearity (VIF) and heteroscedasticity. The models to be estimated include:

$$ROA = \beta_0 + \beta_1 HCE + \beta_2 CEE + \beta_3 SCE + \beta_4 LEV + \beta_5 FSIZ + \varepsilon \dots\dots\dots (1)$$

$$ROA = \beta_0 + \beta_1 VAIC + \beta_2 LEV + \beta_3 FSIZ + \varepsilon \dots\dots\dots (2)$$

$$ROA = \beta_0 + \beta_1 VAIC + \beta_2 STE + \beta_3 STE*VAIC + \beta_4 LEV + \beta_5 FSIZ + \varepsilon \dots\dots\dots (3)$$

Model 1 represents the components of IC used in the study, while Models 2 and 3 represent value-added component of the IC and moderating model of the value-added component of the IC, respectively.

Diagnostic tests, including normality (Skewness/Kurtosis), multicollinearity (VIF), and heteroscedasticity, are conducted to ensure the validity and reliability of the data. The chosen methods and regression models are appropriate given the nature of the data and research objectives, ensuring comprehensive insights into the moderating effect of STE on the relationship between IC and profitability.

## **RESULTS AND DISCUSSION**

The descriptive statistics in Table 3 highlight key insights into the efficiency of IC among Nigerian listed banks, aligning with existing banking literature. The average ROA is 0.073, or 7.3%, which is in line with previous research from Nigeria that found moderate profitability with ROAs ranging from 5% to 10% (Uwuigbe et al., 2016; Oboh & Ajibolade, 2017).

HCE has a high mean of 2009%, indicating that skilled labor is the main driver of value creation in Nigerian banks, which is consistent with Kamaluddin & Usman (2015). In contrast, employed capital efficiency (CEE) has a low mean of 7.7%, indicating inefficient use of financial and physical capital. The moderate mean of 60.1% for SCE suggests that organizational infrastructure and systems play a role.

Per Pulic’s VAIC model (1998), value added (VA), serves as a common denominator for all three components, giving their differences significance. With a mean of 20.771, the overall VAIC score reaffirms the sector’s reliance on human capital. STE, the moderating variable, has a mean of ₦12.995 million with little variation, indicating that banks consistently invest in workforce development.

Diverse scales and financial strategies are indicated by the control variables, which show notable differences in firm size (₦72,508 million to ₦9,661,000 million) and leverage. Overall, the findings confirm previous findings and provide implications for management and policy in Nigeria’s banking industry by highlighting the strategic value of human capital and exposing inefficiencies in capital and structural investments.

**Table 3**

*Descriptive Statistics*

Var.	Obs.	Mean	Std Dev	Min	Max
ROA	121	0.073	0.173	0.00001	1.787
CEE	121	0.077	0.208	-0.468	2.18
HCE	121	20.094	97.304	0.134	820.137
SCE	121	0.601	0.704	-6.453	0.999
VAIC	121	20.771	97.54	-6.308	823.316
FSIZ (in million)	121	1063000	1859000	72508	9661000
LEV	121	0.213	0.326	0	0.942
STE (in million)	121	12.995	3.895	3.045	18.021

Notes. STATA 17.0 Output, 2024. NGN=Nigerian Naira

The Shapiro-Wilk test for normality ( $W = 0.30625$ ,  $Z = 9.432$ ,  $p < 0.01$ ) strongly rejects the null hypothesis of normal distribution of residuals, suggesting non-normality in the data. While this does not invalidate the analysis, it warrants robustness checks, such as transformations or nonparametric methods, to ensure the reliability of the results.

**Table 4**

*Shapiro Wilk Test for Data Normality*

Variable	OBS	W	V	Z
Residual	121	0.30625	67.228	9.432***

Notes. STATA 17.0 Output, 2024. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

The correlation matrix reveals significant relationships among the variables. ROA is positively correlated with CEE ( $r = 0.943$ ,  $p < 0.01$ ), HCE ( $r = 0.674$ ,  $p < 0.01$ ), and VAIC ( $r = 0.674$ ,  $p < 0.01$ ), supporting the theoretical expectation that efficient utilization of IC enhances profitability. However, SCE exhibits a weak negative correlation with ROA ( $r = -0.060$ ), contradicting prior studies that suggest SCE should positively influence profitability. STE has a negligible negative correlation with ROA ( $r = -0.093$ ), which may indicate that its direct impact on profitability is limited, underscoring its potential role as a moderator. Interestingly, firm size (FSIZ) and leverage (LEV) have weak negative correlations with ROA, suggesting that larger or highly leveraged banks do not necessarily achieve higher profitability, aligning with prior evidence in developing economies.

**Table 5**

*Correlation Analysis*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) ROA	1.000							
(2) CEE	0.943***	1.000						
(3) HCE	0.674***	0.768***	1.000					
(4) SCE	-0.060	0.105	0.103	1.000				
(5) VAIC	0.674***	0.769***	1.000***	0.111	1.000			
(6) STE	-0.093	-0.130	-0.088	-0.199**	-0.09	1.000		
(7) FSIZ	-0.100	-0.117	-0.080	0.091	-0.08	0.642***	1.000	
(8) LEV	-0.094	-0.055	-0.101	-0.066	-0.10	-0.48***	-0.37***	1.000

Notes. STATA 17.0 Output, 2024. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

The Variance Inflation Factor (VIF) analysis confirms the absence of severe multicollinearity issues among the predictors. VIF values for CEE, HCE, and SCE in Model 1 are below the critical threshold of 10, with the highest being 2.54. However, in Model 3, the interaction term (STE\*VAIC) and STE show elevated VIF values (7.45 and 5.63, respectively), suggesting potential multicollinearity concerns when interaction terms are included. This result necessitates caution when interpreting the moderating effect and may require centering or standardizing the variables.

**Table 6**

*Variance Inflation Factor (VIF) Test for Multicollinearity*

Variable	Model 1		Model 2		Model 3	
	VIF	$1/\text{VIF}$	VIF	$1/\text{VIF}$	VIF	$1/\text{VIF}$
CEE	2.54	0.393668	-	-	-	-
HCE	2.50	0.400013	-	-	-	-
SCE	1.04	0.964103	-	-	-	-
VAIC	-	-	1.01	0.986467	8.68	0.072586
STE	-	-	-	-	7.45	0.093627
STE*VAIC	-	-	-	-	5.63	0.107187
FSIZ	1.53	0.651530	1.45	0.691279	1.66	0.556183
LEV	1.50	0.668859	-	0.684227	1.56	0.640064
Mean VIF	1.82	-	1.31	-	4.90	-

Notes. STATA 17.0 Output, 2024.

The Hausman test evaluates the suitability of random versus fixed effects models across three models. In Model 1, the Chi-squared statistic of 4.13 ( $p > 0.10$ ) suggests that the random effects model is appropriate. For Model 2 and Model 3, the Chi-squared values of 25.33 and 264.84 ( $p < 0.01$ ) indicate that fixed effects are preferred. These results suggest that while random effects may be appropriate for simpler models, fixed effects models provide more robust estimates when considering the moderating impact of STE on IC and profitability. This aligns with panel data econometrics, where fixed effects are often better suited to account for unobserved heterogeneity (Baltagi, 2021).

**Table 7**

*Hausman Specification Test*

Statistics	Model 1	Model 2	Model 3
Chi2 (4)	4.13	25.33*	264.84*

Notes. STATA 17.0 Output, 2024. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 8 shows the impact of IC components on profitability (ROA) using cluster robust random effects regression. CEE has a significant positive effect on profitability ( $\beta = 0.84389$ ,  $p < 0.01$ ), consistent with the RBV, which posits that efficient use of employed capital enhances competitive advantage. SCE negatively influences profitability ( $\beta = -0.041157$ ,  $p < 0.01$ ), contrary to theoretical expectations that SCE should enhance organizational performance. This negative effect could reflect inefficiencies in the structural frameworks of Nigerian banks as some banks offered jobs to politically connected individuals, aligning with similar findings in developing economies (e.g., Ozkan et al., 2017).

Firm size (FIZ) and leverage (LEV), the control variables, both negatively impact ROA ( $\beta = -0.002396$ ,  $p < 0.05$ ;  $\beta = -0.035970$ ,  $p < 0.01$ ), indicating that larger or highly leveraged banks face profitability challenges, potentially due to operational inefficiencies or increased financial risk. The Wald Chi-squared statistic (627.10,  $p < 0.01$ ) and high  $R^2$  (0.9248) suggest that the model explains a substantial portion of profitability variance.

**Table 8**

*Cluster Robust Random Effect Regression of IC Component and Profitability*

Variable	Coef.	Std. Err.	Z
CEE	0.84389	0.13328	6.33***
HCE	-0.00016	0.00024	-0.68
SCE	-0.041157	0.00273	-15.07***
FSIZ	-0.002396	0.00117	-2.04**
LEV	-0.035970	0.01179	-3.05***
CONS	0.086155	0.02653	3.25***
Wald Chi <sup>2</sup>			627.10***
Overall R <sup>2</sup>			0.9248

Notes. STATA 17.0 Output, 2024. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 9 evaluates the aggregated impact of IC (VAIC) on profitability using the fixed effect method due to the significant Hausman Chi<sup>2</sup>. VAIC significantly enhances profitability ( $\beta = 0.001176$ ,  $p < 0.01$ ), confirming that IC, as a composite metric, is a critical driver of bank performance. This finding aligns with a priori expectations and studies emphasizing the role of VAIC in organizational success (Pulic, 2021; Bontis et al., 2023).

Control variables—firm size (FIZ) and leverage (LEV)—remain negatively associated with ROA ( $\beta = -0.0085$ ,  $p < 0.01$ ;  $\beta = -0.148$ ,  $p < 0.05$ ), corroborating earlier results. Despite the significant predictors, the overall  $R^2$  is relatively low (0.0727), indicating that additional variables or interactions might improve explanatory power.

**Table 9**

*Fixed and Random Effect Regression of VAIC and Profitability*

Variable	FE Regression			RE Regression		
	Coef.	Std. Err.	t	Coef.	Std. Err.	Z
VAIC	0.001	0.0001	9.71***	0.001	0.0001	10.74***
FSIZ	-0.0085	0.016	-5.33***	-0.013	0.006	-2.10**
LEV	-0.148	0.067	2.61**	-0.026	0.056	-1.46
CONS	1.512	0.277	5.46***	0.288	0.118	2.43**
F-Stat	57.21***					
Wald Chi <sup>2</sup>	125.92***					
Overall R <sup>2</sup>	0.0727			0.4511		
Hausman Chi <sup>2</sup>	25.33***					

Notes. STATA 17.0 Output, 2024. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 10 investigates the moderating effect of STE on the relationship between IC (VAIC) and profitability. Based on the fixed effect regression, the interaction term (STE\*VAIC) significantly enhances profitability ( $\beta = 0.009, p < 0.01$ ), confirming the hypothesis that STE strengthens the impact of IC on profitability. This finding is consistent with the dynamic capability's theory, which highlights that investments in training amplify the benefits of intellectual resources (Teece et al., 1997). VAIC exerts a significant negative effect ( $\beta = -0.009, p < 0.01$ ), while STE demonstrates an insignificant positive effect ( $\beta = 0.002, p > 0.05$ ) on profitability, emphasizing their individual and combined importance. However, firm size (FSIZ) continues to negatively influence profitability significantly ( $\beta = -0.059, p < 0.01$ ), whereas leverage (LEV) turned to exert a significant positive effect ( $\beta = -0.072, p < 0.05$ ) effect on profitability. The model demonstrates strong explanatory power, with an F-statistic of 195.44 ( $p < 0.01$ ) and an overall R<sup>2</sup> of 0.3500.

**Table 10**

*Fixed and Random Effects Regression of the Interaction of Staff Development with VAIC and Profitability*

Variable	FE Regression			RE Regression		
	Coef.	Std. Err.	t	Coef.	Std. Err.	Z
VAIC	-0.009	0.001	-15.13***	-0.009	0.001	-14.07***
STE	0.002	0.009	0.26	0.018	0.008	2.13**
STE*VAIC	0.009	0.0001	17.13***	0.001	0.0001	16.16***
FSIZ	-0.059	0.010	-6.19***	-0.040	0.009	-4.61**
LEV	0.072	0.035	2.06**	-0.031	0.031	-1.00
CONS	1.052	0.146	7.21***	0.539	0.082	6.55***
F-Stat	195.44***					
Wald Chi <sup>2</sup>	802.17***					
Overall R <sup>2</sup>	0.3500			0.7642		
Hausman Chi <sup>2</sup>	264.84***					

Notes. STATA 17.0 Output, 2024. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

These results highlight that IC significantly enhances profitability, with CEE serving as the most consistent driver. However, structural capital (SCE) poses challenges, warranting strategic focus to enhance its contribution. STE emerges as a critical moderator, amplifying the effect of IC on profitability. These findings align with the RBV and dynamic capabilities perspectives while also extending prior empirical work by demonstrating the contextual nuances of IC utilization in Nigerian banks. Future studies should investigate potential mediating factors and the long-term implications of IC investments to further enrich theoretical and practical insights.

## **CONCLUSION AND RECOMMENDATIONS**

This study underscores the pivotal role of IC in enhancing the profitability of listed deposit money banks in Nigeria. Among the components, CEE and VAIC consistently emerge as significant drivers of profitability, emphasizing the importance of leveraging tangible and intangible resources to create value. However, the negative relationship between SCE and profitability highlights inefficiencies within structural frameworks, which may hinder optimal resource utilization. Furthermore, staff development is identified as a critical moderator, significantly amplifying the impact of IC on profitability. This finding aligns with the RBV and DCT, affirming the importance of continuous investment in human capital development to enhance organizational performance. The study contributes to the IC literature by providing contextual evidence on its utilization in the Nigerian banking sector and extends prior empirical work by demonstrating the interactive effects of staff development.

To enhance profitability, Nigerian banks should address structural inefficiencies by investing in technology, streamlining operations, and fostering innovation while integrating continuous staff training to upskill employees and maximize IC utilization. Efficient resource allocation, aligned with strategic goals, should be prioritized to sustain profitability, complemented by adopting a holistic IC management approach that incorporates VAIC metrics into decision-making. Regulators should promote transparency by mandating the disclosure of IC metrics in financial reports, enabling stakeholders to assess its utilization. In addition, future research should explore the impact of macroeconomic conditions and regulatory changes on the IC–profitability relationship, ensuring banks adapt to evolving challenges and maintain competitive advantages.

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