European Journal of Accounting, Auditing and Finance Research, 14(6),1-15, 2026
Print ISSN: 2053-4086(Print),
Online ISSN: 2053-4094(Online)
Website: https://www.eajournals.org/
Publication of the European Centre for Research Training and Development-UK

Intellectual Capital and Financial Performance of Listed Manufacturing Companies in Nigeria: The Moderating Role of Board Financial Expertise

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doi: https://doi.org/10.37745/ejaafr.2013/vol14n6115 Published July 27, 2026

Citation: Akai N.D., Ibok N., Akpan D.C., Emenyi E.O., Monday U.M. (2026) Intellectual Capital and Financial Performance of Listed Manufacturing Companies in Nigeria: The Moderating Role of Board Financial Expertise, *European Journal of Accounting, Auditing and Finance Research*, 14(6),1-15

Abstract: *The main objective of this study was to ascertain the effect of intellectual capital on financial performance of listed manufacturing companies in Nigeria; while examining the moderating role of board financial expertise. The research design adopted for this study was expost facto and secondary data were employed. The sample size of 45 listed manufacturing companies were purposively selected from the population of 52. Panel regression anlaysis was used to analyse the data sets and the statistical package employed was STATA 17. The findings of the study revealed that human capital (coef. 0.056; p-value = 0.000) has significant and positive effect on earnings per share; relational capital (coef. 0.008; p-= 0.442) has nonsignificant effect on earnings per share; Structural capital (coef. 0.012; p-=0.709) has nonsignificant effect on earnings per share; board financial expertise significantly moderates the relationship between human capital and financial performance of listed manufacturing companies in Nigeria. Thus, it was concluded that intellectual capital significantly affects financial performance with board financial expertise strengthening this effect. Based on the findings of this study, it was recommended, amongst others, that management of listed manufacturing companies in Nigeria should adopt a more deliberate and strategic approach*

to human capital development. Also, these firms should streamline their internal processes, eliminate bureaucratic inefficiencies, and prioritize flexible, innovation-driven systems that would directly contribute to value creation.

Keywords: Intellectual capital, human capital, relational capital, structural capital, financial performance, earnings per share

INTRODUCTION

Globalization, technological advancement, digitalization, knowledge-based competition, and rapidly changing consumer preferences have fundamentally altered the sources of corporate value creation. Consequently, organizations are no longer able to rely solely on physical assets, financial capital, or natural resources to sustain superior performance. Instead, firms increasingly derive competitive advantage from intangible assets such as human capital (employee knowledge and skills), structural capital (organizational processes and technology), and relational capital (customer and supplier networks), collectively referred to as intellectual capital (Akpan & Otung, 2020). This paradigm shift has repositioned intellectual capital as one of the most strategic resources available to firms seeking sustainable financial performance in increasingly competitive markets.

The growing importance of intellectual capital is largely attributable to the emergence of the knowledge economy, where organizational success depends more on the efficient creation, utilization, and management of knowledge than on the possession of physical assets. Unlike traditional production factors that depreciate with use, intellectual capital has the unique characteristic of generating increasing returns through continuous learning, innovation, and knowledge sharing. According to Ahmed et al. (2022), organizations that effectively develop and exploit intellectual capital are better positioned to improve operational efficiency, stimulate innovation, reduce production costs, enhance product quality, strengthen customer loyalty, and ultimately improve financial performance. Consequently, intellectual capital has become an indispensable strategic asset for firms operating in dynamic and highly competitive business environments.

Financial performance remains one of the most important indicators used to evaluate the effectiveness of managerial decisions and organizational success. It reflects the extent to which firms efficiently utilize available resources to generate profits and maximize shareholders' wealth. As noted by Xu et al. (2023), investors, creditors, regulators, and other stakeholders rely on financial performance indicators to assess the financial health, profitability, growth prospects, and sustainability of business organizations. Among the numerous indicators of financial performance, earnings per share (EPS) occupies a central position because it directly measures the amount of profit attributable to each ordinary share outstanding. Earnings per share serves as a critical benchmark for investment decisions, dividend policy, market valuation, and corporate performance evaluation. Consequently, identifying organizational resources capable of improving earnings per share has become an important concern for managers, investors, and researchers alike.

Empirical evidence from developed and emerging economies generally supports the proposition that intellectual capital contributes significantly to corporate financial performance, although the magnitude and direction of its effects vary across countries, industries, and measurement approaches. For instance, Chinnasamy et al. (2025) reported that intellectual capital positively influences the financial performance of banks operating in India and the Gulf Cooperation Council countries, with human capital and customer-focused capabilities exerting the strongest influence on organizational performance. Similarly, Pusparini and Sujana (2025) found that intellectual capital significantly enhances corporate financial performance among transportation and logistics companies listed on the Indonesia Stock Exchange, although good corporate governance did not significantly strengthen this relationship. Ahmed et al. (2024) documented that human capital efficiency significantly improves the financial performance of Bangladeshi commercial banks, while Makki and Lodhi (2024) demonstrated that corporate governance contributes to financial performance primarily through the effective utilization of intellectual capital rather than through direct governance mechanisms. Likewise, Khurana and Sharma (2024) established that higher intellectual capital efficiency improves financial stability among Indian listed companies by reducing corporate default risk, suggesting that intellectual capital contributes not only to profitability but also to long-term organizational resilience.

However, the effectiveness of intellectual capital in generating superior financial returns is in doubt; it is a function of the firm's strategic environment and its internal control mechanisms. This brings the role of corporate governance to the forefront. Effective governance is essential for strategic resource allocation, monitoring management's utilization of intangible assets, and mitigating the agency problem associated with the long-term, hard-to-value nature of IC (Annisa & Haryono, 2024; Makki & Lodhi, 2024; Marbun & Ulpah, 2024)). Among the various governance mechanisms, board expertise is theorized to be particularly influential. When members of the board possess strong financial expertise, they are better equipped to understand, evaluate, and strategically utilize the firm’s intellectual resources. Board members with accounting, finance, or investment backgrounds can interpret complex financial data, assess the economic value of intangible assets, and ensure that investments in intellectual capital are aligned with the firm’s strategic and financial goals (Makki & Lodhi, 2024).

Despite the strategic importance of the manufacturing sector to Nigeria's economic development through industrialization, employment generation, export promotion, and value addition, the financial performance of many listed manufacturing companies has remained unsatisfactory over the years. The sector continues to face numerous challenges, including rising production costs, exchange rate volatility, inflationary pressures, unstable electricity supply, weak technological infrastructure, supply chain disruptions, increasing foreign competition, and high operating costs. These challenges have adversely affected firms' profitability and their ability to generate consistent returns for shareholders, as reflected in the fluctuating earnings reported by many listed manufacturing companies. The persistence of these challenges suggests that reliance on traditional physical and financial resources alone may no longer be sufficient to sustain improved financial performance in the increasingly knowledge-driven global economy (Gunawan et al., 2023). Consequently, attention has shifted towards intellectual capital as a strategic resource capable of improving organizational performance. Intellectual capital, comprising human capital, structural capital, and relational

capital, has increasingly been recognized as a critical driver of innovation, operational efficiency, knowledge creation, customer satisfaction, and competitive advantage.

Although previous empirical studies have examined the relationship between intellectual capital and financial performance, the evidence remains inconclusive. International studies by Ahmed et al. (2024), Makki and Lodhi (2024), Xu et al. (2023), Rehman (2023), Gunawan et al. (2023), and Ali et al. (2022) generally reported that intellectual capital enhances corporate financial performance. Similarly, Nigerian studies by Olayinka and Uwalomwa (2023), Ofor et al. (2022), Nkechi and Onyekachi (2022), and Aluwong (2022) documented positive relationships between intellectual capital and organizational performance. Conversely, other studies have reported insignificant or mixed effects of some dimensions of intellectual capital (Gunawan et al., 2023; Ukpong et al., 2024). These inconsistent findings make it difficult to draw definitive conclusions regarding the influence of intellectual capital on corporate financial performance. Moreover, although recent literature has recognized the importance of corporate governance, little empirical attention has been given to whether board financial expertise strengthens the relationship between intellectual capital and financial performance. Against this background, the present study investigated the moderating role of board financial expertise on the effect of intellectual capital on the financial performance of listed manufacturing companies in Nigeria.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Human capital and financial performance

Human capital constitutes one of the most valuable components of intellectual capital because it encompasses the knowledge, competencies, experience, skills, creativity, innovativeness, and problem-solving abilities possessed by employees within an organization. Unlike physical assets, human capital resides in individuals and represents the accumulated expertise that enables organizations to develop innovative products, improve operational efficiency, adapt to environmental changes, and sustain competitive advantage (Sonali & Kaushala, 2023). From the perspective of the Resource-Based View (RBV), human capital constitutes a strategic organizational resource because it is valuable, rare, difficult to imitate, and non-substitutable. According to Olayinka and Uwalomwa (2023), employees possessing specialized knowledge, technical expertise, innovative capabilities, and industry-specific experience enable firms to improve decision-making, enhance production efficiency, reduce operational costs, increase product quality, and respond effectively to changing market conditions. Consequently, firms with highly skilled employees are expected to achieve superior financial performance compared with firms that rely predominantly on physical assets. Human capital contributes to financial performance through several mechanisms. As noted by Ezejiofor and Ezekwesili (2022), skilled employees improve production efficiency by minimizing waste, reducing production errors, and enhancing product quality. Experienced managers make better strategic and financial decisions that optimize resource allocation and improve organizational profitability. Furthermore, knowledgeable employees facilitate innovation by developing new products, improving production processes, and identifying opportunities for operational improvements. These improvements ultimately translate into increased sales revenue, higher profitability, improved earnings per share, and greater shareholder wealth.

Empirical evidence largely supports the positive relationship between human capital and financial performance. Chinnasamy et al. (2025) reported that human capital significantly improved the performance of banks operating in India and the Gulf Cooperation Council countries. Similarly, Ahmed et al. (2024) found that human capital efficiency exerted a positive and significant effect on the return on assets of commercial banks in Bangladesh; Gunawan et al. (2023) equally established that human capital efficiency significantly improved the financial performance of manufacturing firms listed on the Indonesia Stock Exchange; Sonali and Kaushala (2023) concluded that human capital significantly enhances firm performance among consumer staples companies listed on the Colombo Stock Exchange. Olayinka and Uwalomwa (2023) established that intellectual capital, particularly human capital, significantly enhances the return on assets and return on equity of quoted Nigerian firms. Similarly, Ofor et al. (2022) and Nkechi and Onyekachi (2022) reported significant positive effects of human capital on the financial performance of consumer goods manufacturing companies in Nigeria. Conversely, Ezejiofor and Ezekwesili (2022) found that human capital investment did not significantly influence the earnings and return on equity of Nigerian deposit money banks. On this note, this study hypothesized that;

Ho_1: Human capital has no significant effect on earnings per share of listed manufacturing companies in Nigeria.

Structural Capital and Financial Performance

Structural capital represents the institutionalized knowledge embedded within an organization's systems, procedures, databases, organizational culture, technologies, intellectual property, patents, operational processes, and management philosophies. Unlike human capital, which leaves the organization when employees depart, structural capital remains within the organization and continues to support knowledge creation, innovation, and operational efficiency (Akpan & Otung, 2020). It provides the organizational infrastructure that enables employees to utilize their knowledge effectively while facilitating organizational learning and continuous improvement. Structural capital plays a critical role in improving financial performance because efficient organizational processes reduce production costs, eliminate operational redundancies, improve product quality, enhance decision-making, and facilitate innovation (Rehman, 2023). Well-developed organizational systems enable firms to standardize production processes, improve information flow, strengthen internal controls, and increase productivity. Investments in information technology, research and development, quality management systems, and organizational innovation therefore contribute significantly to improved operational efficiency and financial outcomes.

Empirical findings regarding the relationship between structural capital and financial performance remain mixed. Rehman (2023) found that structural capital efficiency significantly improved earnings per share, return on assets, and return on equity among ASEAN banks. Similarly, Xu et al. (2023) established that structural capital positively influences financial performance during the growth, maturity, and revival stages of manufacturing firms. Akpan and Otung (2020) investigated the effect of intellectual capital on economic value added of listed banks in Nigeria and found that human capital efficiency, structural capital efficiency and capital employed efficiency significantly influence economic value added of listed banks in Nigeria. Tangngisalu (2023) equally reported that structural

capital significantly enhances the financial performance of Indonesian property and real estate companies. However, Gunawan et al. (2023) found that structural capital does not significantly affect the financial performance of Indonesian manufacturing companies. Similarly, Ukpong et al. (2024) established that structural capital efficiency exerted no significant effect on the cost of equity of listed manufacturing companies in Nigeria. On this note, this study hypothesized that;

Ho_2: Structural capital has no significant effect on earnings per share of listed manufacturing companies in Nigeria.

Relational Capital and Financial Performance

Relational capital refers to the value embedded in an organization's relationships with external stakeholders, including customers, suppliers, investors, creditors, regulators, strategic partners, distributors, and the wider community (Chinnasamy et al., 2025). It reflects the ability of firms to establish, maintain, and leverage strong external relationships that facilitate knowledge exchange, customer loyalty, market expansion, innovation, and sustainable competitive advantage. Strong relational capital enhances organizational reputation, improves customer satisfaction, strengthens supplier collaboration, and creates opportunities for strategic alliances that contribute to long-term organizational success (Tangngisalu, 2023; Tangngisalu, 2023). Relational capital influences financial performance through improved customer retention, increased market share, stronger brand reputation, and enhanced access to external knowledge and resources. Organizations with loyal customers' experience more stable revenues and lower marketing costs, while effective supplier relationships improve production efficiency through timely delivery of quality raw materials and reduced transaction costs. Furthermore, positive relationships with investors and regulators enhance corporate credibility, facilitate access to finance, and reduce regulatory uncertainties. Collectively, these advantages contribute to improved profitability, increased earnings per share, and sustainable shareholder value.

Empirical evidence regarding relational capital remains relatively limited compared to human and structural capital. Chinnasamy et al. (2025) found that customer-focused capabilities significantly improve the financial performance of banks operating in India and GCC countries, highlighting the importance of external stakeholder relationships. Gupta and Raman (2023) equally reported that relational capital significantly enhances the efficiency of Indian financial institutions. Tangngisalu (2023) also demonstrated that customer-related intellectual capital contributes significantly to corporate financial performance. Ukpong et al. (2024) reported that relational capital efficiency had no significant effect on the cost of equity of listed manufacturing companies in Nigeria. Thus, it was hypothesized that;

Ho_3: Relational capital has no significant effect on earnings per share of listed manufacturing companies in Nigeria.

Moderating role of board financial expertise on intellectual capital and financial performance

Board financial expertise plays an important moderating role in strengthening the relationship between intellectual capital and financial performance. Intellectual capital which comprises human capital, structural capital, and relational capital represents the intangible resources that

enable a firm to generate superior value and achieve competitive advantage. However, the extent to which intellectual capital translates into improved financial outcomes often depends on the quality of oversight and decision-making at the board level. According to Annisa and Haryono (2024) intellectual capital, along with good corporate governance, is a key to business growth and can better explain disparities in the financial performance of the firm. When members of the board possess strong financial expertise, they are better equipped to understand, evaluate, and strategically utilize the firm's intellectual resources. Board members with accounting, finance, or investment backgrounds can interpret complex financial data, assess the economic value of intangible assets, and ensure that investments in intellectual capital are aligned with the firm's strategic and financial goals (Makki & Lodhi, 2024). Their expertise enhances monitoring efficiency and resource allocation decisions, thereby maximizing the returns derived from intellectual capital.Specifically, financial experts on the board can provide guidance on how to effectively capitalize on human capital through proper training, retention, and incentive policies. They can also help ensure that structural capital, such as information systems and organizational processes, supports productivity and cost efficiency (Makki & Lodhi, 2024).

Therefore, the moderating effect of board financial expertise lies in its ability to enhance governance quality, ensure effective utilization of intellectual resources, and translate knowledge-based assets into sustainable financial performance. Annisa and Haryono (2024) found that the relationship between intellectual capital and financial performance can be moderated by good corporate governance for competitive advantage. Also, Makki and Lodhi (2024) found that the relationship between intellectual capital and financial performance can be significantly moderated by corporate governance. Similarly, Marbun and Ulpah' (2024) asserted found that board function strengthens the impact of intellectual capital on return on assets as a moderating variable. On this note, this study hypothesized that;

Ho_4: Board financial expertise significantly moderate the relationship between intellectual capital and financial performance of listed manufacturing companies in Nigeria.

Theoretical framework

Intellectual capital theory by Edvinsson and Malone (1997)

Intellectual capital theory, rooted in the seminal work of Leif Edvinsson and Michael Malone in 1997, represents a fundamental shift in how organizations perceive and manage their assets. At its core, the theory posits that traditional financial measures fail to capture the full value of a company, as they overlook intangible assets such as knowledge, skills, and relationships (Edvinsson 1997). The intellectual capital theory is a new outstanding theory which is based on the principle that, in the contemporary circumstances, intangible assets which are not disclosed in the financial statements of a given firm are vita for firms' operation for success, since they can significantly increase the value of assets and competitive advantage (Makadok, 2021). This theory challenges the conventional wisdom that tangible assets alone determine a firm's worth and competitive advantage.

This theory postulates that IC fits the description of strategic assets because it is valuable, rare, poorly imitable and lacking tactically alike substitute. Especially the human component can

generate better outputs because knowledge and skills can be enhanced through value added investigation and improvement activates that promote creativity and innovation (Jafaridehkordi et al., 2023). Intellectual capital has been acknowledged as key resource for a company to enhance its competitive advantage and at the same time to improve its corporate image in the global market (Salehi et al., 2023). In a contemporary business environment, intellectual capital recognized as a life blood of knowledge concentrated companies including the industrial goods sector (Akpan & Otung, 2020).

From strategic perspective, intellectual capital theory highlights the importance of managing and leveraging intangible assets to enhance organizational performance and shareholder value (Bontis, 1998). Organizations that invest in developing their human capital, nurturing a supportive organizational culture, and cultivating strong relationships with stakeholders are better positioned to succeed in the knowledge-based economy (Edvinsson, 1997). By adopting a holistic approach to intellectual capital management, organizations can optimize their resources and differentiate themselves in the marketplace. In practice, intellectual capital theory has spurred the development of various measurement models and metrics to assess the value creation potential of intangible assets (Bontis, 2024). These models enable organizations to evaluate their intellectual capital efficiency, identify areas for improvement, and make informed strategic decisions. Moreover, intellectual capital theory underscores the importance of continuous learning, knowledge sharing, and innovation as drivers of long-term success in today's rapidly changing business landscape.

This theory is relevant to this study because it represents a paradigm shift in how organizations perceive and manage their resources. By recognizing the strategic significance of intangible assets and embracing a holistic approach to value creation, organizations can enhance their competitiveness and sustainability in the knowledge-based economy.

METHODOLOGY

Ex-post facto research design was used in this study. The adoption of the ex post facto research design was appropriate because the core variables of the study, intellectual capital, board financial expertise, and financial performance, were historical in nature. The population of the study consisted of all the listed manufacturing firms in the Nigerian Exchange Group from 2015 to 2024. As at the end of 2024, there were 52 manufacturing firms listed on the floor of the Nigerian Exchange Group (NGX). The sample size of 46 companies was obtained using Taro Yamane (Yamane, 1973) formula at 95% confidence level. The formula was suitable for this study because the population used was finite and known population. The technique of data analysis employed in this study was the panel regression analysis. The data were analyzed using STATA 17 statistical package, and the outcome was used to test the hypotheses formulated for the study after conducting necessary tests.

Model specification

In line with the previous researches, the researcher adapted and modified the model of Akpan and Otung (2020) in determining the effect of intellectual capital on financial performance of listed manufacturing companies in Nigeria. This is given below:
Financial performance = f(Intellectual capital)

Earnings per share = f(human capital, structural capital and relational capital) (i)

Unmoderated model

$EPS_{it} = \beta_0 + \beta_1 HUMC_{it} + \beta_2 STUC_{it} + \beta_3 RELC_{it} + \mu_{it}$ *(ii)*

Moderated model

$EPS_{it} = \beta_0 + \beta_1 HUMC_{it} * BODE_{it} + \beta_2 STUC_{it} * BODE_{it} + \beta_3 RELC_{it} * BODE_{it} + \mu_{it}$ (iii)

Where*:*

EPS	=	Earnings per share
HUMC	=	Human capital
STUC	=	Relational capital
RELC	=	structural capital
BODE	=	Board financial expertise
"{i}"	=	Cross section (Sample companies)
''t''	=	Time frame (2015-2024)
u	=	Stochastic error Term
β_0	=	Intercept estimate
$\beta_1, \beta_2, \beta_3,$	=	Regression coefficients to be estimated in the study.

ANALYSIS AND DISCUSSIONS

Data were analysed in this study using descriptive statistics, correlation analysis, and regression analysis. Also, some regression assumptions were tested in this study.

Descriptive statistics

The study examined the descriptive statistics for both the explanatory and dependent variables in terms of the mean, standard deviation, maximum and minimum values.

Table 4.1: Descriptive statistics of the effect of intellectual capital on financial performance

Variable	Obs	Mean	Std. Dev.	Min	Max
Eps	450	1.688	14.148	-207.65	77.793
Mtbv	450	16.31	103.654	-13.905	1419.465
Humc	447	3.312	8.418	-83.345	41.262
Stuc	450	-.032	1.711	-30.114	3.903
Relc	450	-.116	5.202	-101.611	5.062
Bode	450	.055	.072	0	.364

Source: Author's computation using STATA 17 (2026)

Table 4.1 showed the descriptive statistics of all variables under study. It was observed that the average firm had about 1.688 naira earnings per share (EPS). The highest EPS recorded was about 77.793 naira, while the lowest was -207.65 naira, indicating that some firms experienced significant losses during the period under review. The standard deviation of 14.148 was considerably higher than the mean, suggesting a high level of variability in earnings performance across firms. This implies that earnings per share among the firms were highly

dispersed and heterogeneous. In the case of human capital (HUMC), the results show a mean value of 3.312, with a maximum of 41.262 and a minimum of -83.345. The standard deviation of 8.418, which exceeds the mean, indicates a high level of dispersion in human capital efficiency among firms. For structural capital (STUC), the average value was -0.032, indicating that, on average, structural capital contribution among firms was slightly negative. The maximum and minimum values of 3.903 and -30.114 respectively show a wide range of outcomes across firms. The standard deviation of 1.711 further confirms moderate variability in structural capital, although the negative mean suggests that many firms may not be effectively leveraging their internal processes and systems. Similarly, relational capital (RELC) recorded an average value of -0.116, with a maximum of 5.062 and a minimum of -101.611. The standard deviation of 5.202, which is significantly higher than the mean, indicates a high level of variability in relational capital across firms. Lastly, board financial expertise (BODE) showed a mean value of 0.055, implying that, on average, about 5.5% of board members possess financial expertise.

Correlation analysis

Table 4.2: Spearman's rank correlation coefficients for the association between intellectual capita and earnings per share

Variables	EPS	HUMC	STUC	RELC	BODE
EPS	1.0000				
HUMC	0.6086 (0.0000)***	1.0000			
STUC	0.2109 (0.0000)***	0.1983 (0.0000)***	1.0000		
RELC	0.0810 (0.0870)	0.0147 (0.756 9)	0.3449 (0.0000)***	1.0000	
BODE	0.2431 (0.0000)***	0.2232 (0.0000)***	0.2814 (0.0000)***	0.1135 (0.0164)**	1.0000

Source: Author's computation using STATA 17 (2026)

The correlation analysis shows that human capital (HUMC) is strongly and positively associated with earnings per share (EPS) (coeff. = 0.6086, p = 0.0000), indicating that firms with higher human capital tend to have higher EPS. Similarly, structural capital (STUC) is positively associated with EPS (coeff. = 0.2109, p = 0.0000), suggesting a moderate positive relationship between structural capital and earnings per share. In contrast, relational capital (RELC) shows a positive but weak association with EPS (coeff. = 0.0810, p = 0.0870), which is not statistically significant at the 5% level, indicating no meaningful association between relational capital and EPS in the sample. Furthermore, board financial expertise (BODE) is positively and significantly associated with EPS (coeff. = 0.2431, p = 0.0000), implying that firms with more financially knowledgeable board members tend to be associated with higher EPS. Examining the inter-variable relationships, HUMC is positively and significantly associated with STUC (coeff. = 0.1983, p = 0.0000) and BODE (coeff. = 0.2232, p = 0.0000). STUC is positively and significantly associated with RELC (coeff. = 0.3449, p = 0.0000) and

BODE (coeff. = 0.2814, p = 0.0000). RELC and BODE show a weak but statistically significant association (coeff. = 0.1135, p = 0.0164), while RELC and HUMC exhibit a weak and insignificant association (coeff. = 0.0147, p = 0.7569). Overall, the results indicate that most variables are positively related, and there is no evidence of multicollinearity, as none of the correlation coefficients exceed the commonly accepted threshold of 0.8.

Regression estimation

Table 4.3: Regression results for the effect of intellectual capital on earnings per share

	Before moderation			**Moderated**		
	(1) Pooled ols	(2) Random effects	(3) Iterated robust least squares	(1) Pooled ols	(2) Random effects	(3) Iterated robust least squares
	Eps	Eps	eps	eps	eps	eps
humc	0.147*	0.147*	0.056***			
	(0.067)	(0.066)	(0.000)			
stuc	0.121	0.121	0.012			
	(0.759)	(0.758)	(0.709)			
relc	0.028	0.028	0.008			
	(0.828)	(0.828)	(0.442)			
Constant	1.221*	1.221*	0.216***	1.280*	1.280*	0.224***
	(0.091)	(0.091)	(0.000)	(0.088)	(0.087)	(0.000)
humc_bode				1.681	1.681	1.319***
				(0.180)	(0.179)	(0.000)
stuc_bode				1.162	1.162	0.027
				(0.812)	(0.812)	(0.940)
relc_bode				0.296	0.296	-1.037
				(0.943)	(0.943)	(0.203)
r^2	0.008	0.008	0.138	0.005	0.005	0.319
N	447.000	447.000	447.000	447.000	447.000	446.000
F/W	1.196	3.592	23.658	0.699	2.101	69.072
P	0.311	0.309	0.000	0.553	0.553	0.000
hettest	24.070					
	(0.000)					
vif	1.01					
lm test		0.000			0.000	
		(1.000)			(1.000)	

p-values in parentheses
$^{*}p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$
Source: Author's computation using STATA 17 (2026)

Table 4.4 presents the regression output examining the relationship between human, structural, and relational capital and earnings per share (EPS), both before and after incorporating the moderating variable (board financial expertise). In the unmoderated IRLS model, the F-statistic of 23.658 with a corresponding p-value of 0.000 indicated that the regression model was

statistically significant and appropriate for inference. The R-squared value of 0.138 suggests that approximately 13.8% of the systematic variations in EPS of listed consumer goods firms in Nigeria are explained by the proxies of intellectual capital included in the model. The remaining 86.2% of the variation was accounted for by other factors captured in the model's error term.

In the moderated IRLS model, which incorporates the interaction terms between board financial expertise and intellectual capital proxies, the R-squared value increased to 0.319. This indicates that 31.9% of the systematic variations in EPS are explained by the combined influence of intellectual capital and the moderating role of board financial expertise, with the residual 68.1% absorbed by the error term. The F-statistic of 69.072 with a p-value of 0.000 confirmed that the moderated IRLS model is statistically significant and suitable for inference.

Diagnostics

Homoscedasticity
From Table 4.6, the results showed that the homoscedasticity assumption was not violated. Specifically, the unmoderated model yielded Hettest = 24.07 (p-value = 0.000), and the moderated model produced Hettest values consistent with robust regression adjustments. Although the initial Hettest suggested potential heteroscedasticity, the use of iterated robust least squares (IRLS) addressed this concern by producing robust standard errors that account for variability and potential outliers.

Multicollinearity
The results from table 4.4 showed that the mean VIF for the independent variables was 1.01, indicating that the assumption of multicollinearity was not violated. This confirms that the independent variables do not exhibit problematic linear relationships and can be reliably used in the regression analyses. Since multicollinearity was not a concern for any of the models, the researcher proceeded to focus on other diagnostic tests and to select the most appropriate regression model for inference.

Lagrange multiplier (LM) Test
From table 4.3 the LM test produced a test statistic of 0.000 with a corresponding p-value of 1.000. This indicates that the null hypothesis of no random effects is accepted, confirming that the pooled OLS model is appropriate and sufficient for analyzing the data. Summarily, the LM test results suggest that the variation across firms in the dataset does not require a random-effects specification, supporting the use of pooled OLS and robust regression methods for inference.

DISCUSSION OF FINDINGS

Results from Table 4.3 indicated that human capital (HUMC) had a coefficient of 0.056 with a p-value of 0.000 in the iterated robust least squares (IRLS) model. This shows that human capital had a significant positive effect on earnings per share (EPS) of listed manufacturing companies in Nigeria. This implies that increases in human capital, measured through employees' skills, knowledge, and competencies are associated with higher EPS for the firms

in the study. This finding is supported by the work of Chinnasamy et al. (2025); Ahmed et al. (2024); Gunawan et al. (2023); Olayinka and Uwalomwa (2023), and Sonali and Kaushala (2023), who established that human capital efficiency significantly improved the financial performance

Results from Table 4.3 also indicated that relational capital (RELC) had a coefficient of 0.008 with a p-value of 0.442 in the iterated robust least squares (IRLS) model. This implies that relational capital had a positive but statistically insignificant effect on earnings per share (EPS) of listed manufacturing companies in Nigeria. This implies, while strong relationships with customers, suppliers, regulators, and other stakeholders may theoretically contribute to EPS, the effect was not strong enough to be statistically meaningful in the context of this study.The findings of this study contradict those of Rehman (2023); Xu et al. (2023);Tangngisalu (2023); Akpan and Otung (2020) who found that structural capital significant improve firms' financial performance.

Similarly, results from Table 4.3 indicated that structural capital (STUC) has a coefficient of 0.012 with a p-value of 0.709 in the iterated robust least squares (IRLS) model. This shows that structural capital has a positive but statistically insignificant effect on earnings per share (EPS) of listed manufacturing companies in Nigeria. Empirical studies have highlighted the importance of structural capital for earnings performance. Pulic (2000) through the Value Added Intellectual Coefficient (VAIC) framework, emphasized that structural capital efficiency improves profitability by converting resources into value-added outputs. Liu et al. (2022) and Chen et al. (2023) found that investments in organizational systems and processes facilitate innovation, scalability, and consistent earnings streams, which are expected to enhance EPS. However, this finding contradicts those of Chinnasamy et al. (2025); Gupta and Raman (2023) and Tangngisalu (2023) who reported that relational capital significantly contributes significantly to corporate financial performance. Finally, the results from the regression analysis in table 4.3 indicated that for board financial expertise significantly moderates the effect of intellectual capital on financial performance.

CONCLUSION

This study concluded that intellectual capital contributes to the financial performance of listed manufacturing companies in Nigeria, although its dimensions exert varying levels of influence. Specifically, human capital significantly enhances earnings per share, underscoring the critical role of employees' knowledge, skills, competencies, and experience in driving organizational productivity and creating shareholder value. Conversely, while structural capital and relational capital exhibited positive relationships with earnings per share, their effects were not statistically significant, suggesting that investments in organizational systems, processes, and stakeholder relationships alone may be insufficient to improve financial performance without the effective utilization of human capabilities. The study further establishes that board financial expertise significantly strengthens the relationship between intellectual capital and financial performance, indicating that financially knowledgeable directors improve the strategic deployment and governance of intellectual resources. These findings lend empirical support to the human capital theory, which posits that investment in employees' knowledge and skills enhances organizational productivity and performance. Overall, the study concluded that

sustainable improvements in the earnings per share of listed manufacturing companies in Nigeria are more likely to be achieved through continuous investment in human capital, complemented by financially competent boards capable of maximizing the value derived from intellectual capital. This study therefore recommended that the management of listed manufacturing companies in Nigeria should adopt a more deliberate and strategic approach to human capital development. This involves embedding continuous training, upskilling, and knowledge development into the core of organizational strategy, rather than treating them as peripheral activities. Also, the management of these firms should ensure that their boards are composed of individuals with strong financial knowledge and experience, capable of providing informed oversight and strategic direction. Financially literate board members are better positioned to guide resource allocation decisions, evaluate investment opportunities, and monitor performance outcomes.

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