

INTELLECTUAL CAPITAL AND FINANCIAL PERFORMANCE OF QUOTED DEPOSIT MONEY BANKS IN NIGERIA

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Corresponding Author Adeleye Tope James	Abstract: The concept of intellectual capital has gained a lot of popularity over the last 15 years, and scholars are currently engaged in an ongoing debate on how intangible assets help
Department of Accounting, Faculty of	create corporate value. The study looked at how Nigerian quoted deposit money banks' financial
Management Sciences, Prince	performance was impacted by their intellectual capital. The study's goal is to evaluate how
Abubakar Audu University, Anyigba	human capital affects the return on assets of Nigerian quoted deposit money institutions. The
Article History	study used an ex-post facto research methodology, and the population consisted of all nine (9)
Received: 23 / 02/ 2025	deposit money banks listed on the Nigerian Exchange Group as of December 31, 2024. The sample size was determined using the census sampling technique. The nine (9) deposit money
Accepted: 07/03/2025	banks' annual reports and accounts provided the data that was used. The seven-year period from
Published: 09 / 03 / 2025	2018 to 2024 was covered by the data. Using STATA 13.0 software, the study employed both
	descriptive and inferential statistics as analysis methods. According to the study, physical
	capital (PC) significantly increases the return on assets of Nigerian deposit money banks, while
	human capital (HC) has a negligible positive impact. Structure capital (SC) also has a negligible
	positive impact on return on assets. According to the study, Nigerian deposit money banks
	should focus more on the physical asset side of intellectual capital rather than just on numerical
	evaluation and improvement. They should also implement policies that will enhance and
	improve their human skill and competence in the area of training and development.
	Keywords: Intellectual capital, Physical capital (PC) Human Capital, and Structural Capital.

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1.0 Introduction

Important discussions on the role of intellectual assets in company valuation and, consequently, financial reporting was sparked by globalization and the International Accounting Standards Board's (IASB) diligent efforts to acknowledge intangible assets as a crucial component of corporate assets. These actions, together with the global economic downturn, intensified the company's search for methods to guarantee a comprehensive business value model. Given the enormous obstacles presented by the aforementioned, corporate managers also looked for methods to maximize the firm's available tangible and intangible resources by promoting knowledge development that they believed may add value (Dina *et al.*, 2023). It has been suggested that these conditions contributed to the development of the knowledge economy, which is fueled by intellectual capital (Tarigan *et al.*, 2019).

"Brain Power" is the term Stewart (1997) uses to describe Intellectual Capital (IC). He defined it as the culmination of an organization's expertise that provides it with a competitive advantage in the marketplace. He acknowledged that IC had the © Copyright IRASS Publisher. All Rights Reserved potential to create value that will raise wealth. According to Edvinsson (2000), as cited by Milost (2023), intellectual capital is the knowledge gathered about head worth and future potential based on Human Capital, Structural Capital, and Physical Capital. It has also been argued that the emergence of knowledge and its preference for the production economy has caused a paradigm shift from a time when businesses were only assessed on their tangible assets—their physical assets—to an era of an all-encompassing platform that saw a firm's worth as an aggregate of both tangible and intangible assets (Maditinos et al., 2021). This is due to the fact that the "Knowledge Economy" considers a firm's "Intellectual Capital" to be a crucial component since it identifies a firm's capacity to establish a long-term competitive advantage in the marketplace (Amin *et al.*, 2018).

The International Accounting Standards Board (IASB) further affirms the need to incorporate intellectual capital into a firm's asset value, as previously stated in International Accounting Standard (IAS) 38 on Intangible Assets and the subsequent International Financial Reporting Standards 3 on Business Combinations. IAS 36 on Impairment of Assets, which is applied by nations that use IFRS, and the management of goodwill, R&D, and other identified intangible assets highlight the need to include intellectual capital in financial reporting (Ihyaul et al., 2020). The International Accounting Standards Board (IASB), which initially highlighted this point in International Accounting Standard (IAS) 38 on Intangible Assets and the subsequent International Financial Reporting Standards 3 on Business Combinations, further supports the need to include intellectual capital in a company's asset value. IAS 36 on Impairment of Assets, which is utilized by IFRS adopting countries and covers the management of goodwill, research and development, and other identifiable intangible assets, supports the need to incorporate intellectual capital into financial reporting, claim Ihyaul et al. (2020). Since it is an asset of the business and any rise in it may raise the company's worth, intellectual capital has been recognized as essential to the success of businesses (Amin et al., 2018; Masuluke & Ngwakwe, 2018; Naushad, 2019; Ofurum & Adeola, 2018).

In recent decades, a difficult academic conundrum has been how to justify the role of intellectual capital, often known as knowledge assets, in influencing a company's profitability and other corporate valuation indexes. The force of globalization has emerged so quickly in today's economy because knowledge and information and communication technology (ICT) have become the most valuable assets of businesses. The requirement to look for intellectual means in a company's financial reporting has become critical due to the transition to the current world of technology (Salman *et al.*, 2012). As a result, IC has been acknowledged as the cornerstone for achieving corporate objectives (Pulic, 1998). The widespread acceptance of IC as a competitive advantage led to the development of new monitoring techniques for the company's operations in order to maximize IC productivity (Salman *et al.*, 2012; Maditinos et al., 2011; Makki & Lodhi, 2008).

With the exception of Xu and Liu's (2022) research, which concluded in 2018, all of the empirical studies on intellectual capital and financial success that were reviewed concluded in or before 2017. Since a lot of actions have occurred, the results from these periods can be considered out of date. Therefore, a more recent study that takes into account the modifications is required. This study expands its research scope until 2024 in order to achieve this goal. Previous research on financial performance, such as Al-Sharafat (2017), Amin et al. (2018), Ardiansari et al. (2018), John and Iyidiobi (2024), Khalad (2020), Mawaheb (2020), Mohammad and Bujang (2019), Naushad (2019), Ofurum and Aliyu (2018), Tarigan et al. (2019), and Xu and Liu (2022) have examined the impact of intellectual capital, including human capital and structural capital. However, it has not been determined whether the studies of Xu and Liu (2022), Sardo et al. (2024), and John and Ividiobi (2024) may incorporate physical capital. Additionally, except from a small number of studies like John and Iyidiobi (2024) and Ofurum and Aliyu (2018) that focused on the banking sector of the economy, the majority of research on intellectual capital and financial performance in Nigeria has focused on other economic sectors. This study adds to the body of knowledge on the relationship between intellectual capital and the financial performance of quoted deposit money banks in Nigeria and aims to close the gaps that have been found.

The purpose of this study is to investigate the connection between intellectual capital and the financial performance of

quoted deposit money banks in Nigeria. Accordingly, the specific goals are to: (i) evaluate the effect of human capital on the return on assets of Nigerian quoted deposit money banks; (ii) ascertain the effect of structural capital on the return on assets of Nigerian quoted deposit money banks; and (iii) assess the effect of physical capital on the return on assets of Nigerian quoted deposit money banks.

The following hypotheses are developed in null form to direct the investigation in accordance with the particular goals of the study: Ho1: The return on assets of quoted deposit money banks in Nigeria is not significantly impacted by human capital; Ho2: The return on assets of quoted deposit money banks in Nigeria is not significantly impacted by structural capital; and Ho3: The return on assets of quoted deposit money banks in Nigeria is not significantly impacted by physical capital on Nigerian quoted deposit money banks' return on assets.

2.0 REVIEW OF RELATED LITERATURE 2.1 Conceptual Review

2.1.1Concept of Intellectual capital

One of the accounting categories that still lacks widely agreed-upon definitions is intellectual capital. This is because corporate institutions differ in their nature and composition. Because they had differing perspectives, academics, practitioners, and managers characterized it differently. According to Kavida and Sivakoumar (2008), economists, management specialists, and accountants, respectively, refer to it as knowledge asset, intellectual capital, and intangible/intellectual asset. They also defined it as a non-physical claim to future benefits. Conversely, Edvinsson (1997) provided a clearer definition of intellectual capital as the assets of professional abilities, applied experience, knowledge, organizational technology, and customer contacts that allow a business to hold a competitive position in the market.

Human Capital

The whole worth of an organization's intellectual capital, or its competences, knowledge, and skills, is referred to as human capital. The organization's continuous, renewable supply of innovation and creativity is this capital, which is not shown in its financial accounts. The abilities, competencies, and skills of both individuals and groups are included in human capital (Stewart, 1997). Employees' knowledge, competencies, skills, experiences, abilities, and talents are what make them valuable to a company. The combined knowledge, expertise, experience, and inventiveness of a company's managers and staff are all included in human capital (Boujelbene & Affes, 2013; & Banimadh *et al.*, 2012).

Structural Capital

In contrast, structural capital refers to the process, structure, practice, and procedure of corporate organizations that are utilized by an organization's personnel (Boisot, 2022). Shafiu *et al.* (2017) cite Roos and Roos (1997) as saying that structural capital is "what is left in the organization when people go home in the evening." It can also be in the form of patents, policies, information systems, formulas, and competitive intelligence that comes from the systems or products that a specific company has developed over time (Maheran & Ismail, 2009). According to Ahangar (2011), structural capital is different from human capital because it supports the latter.

Physical Capital

The actual, man-made items that a business purchases or invests in and uses to create things are known as physical capital. Physical capital goods that are reusable and not used up during production, such manufacturing equipment, are also classified as fixed capital. For physical capital to improve financial condition, certain controls must be in place. According to the Control Theory (Snell, 2023), the development of control requires a precise and well-defined norm. Therefore, some level of management is necessary to guarantee that the physical resources are used to achieve organizational objectives. The idea states that the three components of a control system are input, behavioral, and output control.

2.2 Theoretical Review 2.2.1Stakeholder Theory

Stakeholder theory serves as the theoretical foundation for our investigation. Donalson and Preston created the stakeholder hypothesis in 1995. According to Donalson and Preston's (1995) research, the stakeholder theory explains why an organization or firm has stakeholders but no direct control over the administrative structure. Stakeholders were first introduced by Freeman (1983) in two models: (a) the planning and policy models, and (b) a model of corporate social responsibility of the management stakeholders. Developing and assessing the company's strategic decision approval with groups whose support is essential to the company's sustainability is the main goal of the first model, which is the stakeholder idea. According to this approach, stakeholder theory concentrates on the strategies that businesses might employ to manage their relationships with their stakeholders. In contrast, the second model expands corporate planning and analysis by taking into account potential external influences on the business.

2.2.2Resource Based View Theory

In her groundbreaking 1959 book "The Theory of the Growth of the Firm," Edith Penrose first proposed the Resource-Based View (RBV) paradigm of strategic management. Since then, a number of academics in the fields of economics and strategic management have developed and built upon this theory.

A paradigm in organizational theory and strategic management, the Resource-Based View (RBV) hypothesis emphasizes how a company's distinct assets and competencies can result in sustainable success and a competitive edge. It implies that not all resources are created equal and that in order to obtain a long-term competitive edge, businesses should recognize and capitalize on their uncommon, valuable, unique, and nonreplaceable resources.

2.2.3Theory relevant to the Study

It has been determined that the resource-based theory is the most suitable to serve as the foundation for this investigation. According to the resource-based paradigm, performance is determined by resources, which can be either material or immaterial. To put it another way, banks are resource-based businesses that utilize both material and immaterial resources to accomplish their goals.

2.3 Empirical Review

Mawaheb (2024) examined the impact of intellectual property on the financial performance and firm value of businesses © Copyright IRASS Publisher. All Rights Reserved listed on the Egyptian Stock Exchange. A sample of companies listed between 2000 and 2014 on the Egyptian Stock Exchange was used in the study. For the analysis, multiple OLS regression was used. They discovered that the firm's value as determined by Tobin's Q is positively impacted by the amount of intellectual capital. A firm's level of intellectual capital has no discernible impact on its liquidity. Furthermore, the overall activity of the organization is significantly influenced by the level of intellectual capital. The study made the recommendation that the way intellectual assets are treated in accounting be changed to take into account their unique qualities.

Xu and Liu (2022) investigated revised and expanded VAIC model of the relationship between intellectual capital and corporate performance. From 2013 to 2018, secondary data was gathered from Korean industrial companies. Firm performance was systematically and thoroughly examined in three different parameters: profitability, productivity, and market value. The modified and extended Value Added Intellectual Coefficient (VAIC) model was used to measure IC more correctly. OLS regression was used to help with the analysis. They discovered that the most important component influencing a firm's performance was its physical capital, that human capital was seen as a way to improve performance, that structural capital had no discernible effect on performance, and that both physical capital and innovation capital reduced a firm's profitability. In order to compare them with the manufacturing sector, the study suggested that other industries be added.

2.4 Gap in Literature

Empirical studies such as Ardiansari et al. (2018), Mawaheb (2024), Naushad (2019), Ofurum and Adeola (2018), Ofurum and Aliyu (2018), Oyedokun and Saidu (2018), Sardoet al. (2018), Soewarno and Tjahjadi (2020), and Xu and Liu (2022) have demonstrated that some of the studies employed the incorrect methodological approach of analysis for their panel data instead of the panel regression technique Hausman (1978) postulated. In a related development, the empirical research conducted most recently by Xu and Liu (2022) on the relationship between intellectual capital and the financial performance of businesses in Nigeria and other nations was not up to date because the majority of the data used for the analysis was from 2017 and earlier.

Additionally, while the majority of the research was done in other countries, a small number of studies, such as those by Al-Sharafat (2017), Khafid and Alifia (2018), Masuluke and Ngwakwe (2018), Ofurum and Aliyu (2018), Oyedokun and Saidu (2018), Sardo *et al.* (2024), and Shafi'u *et al.* (2017), were carried out in Nigeria. The inadequacies in the literature mentioned above demand more research in this field, which is why this study of intellectual capital and financial performance was necessary to update the data until 2024 using the panel regression technique and contribute to the limited body of knowledge in Nigeria.

3.0 METHODOLOGY

Because this study examined the financial performance and intellectual capital of Nigerian deposit money institutions, an ex post facto research design was employed. The nine (9) deposit money banks that were listed on the Nigerian Exchange Group (NGX Group) as of December 31, 2024, make up the study's population. Nonetheless, for this investigation, all nine (9) deposit money banks have been chosen. Because of the small research population and the availability of bank data, the census sampling technique was used. Secondary sources were employed to gather data for this investigation. Using STATA as a data analysis tool, the regression was performed using generalized least square regression. Both descriptive and inferential statistics were used to analyze the data.

Model Specification

Return on asset was used as the dependent variable in the study, and it was regressed against the explanatory factors of physical capital, structural capital, and human capital. The following is how the regression model is displayed: ROA= f (HC + SC+ PC)

 $ROA_{it} = \beta_0 + \beta_1 HC_{it} + \beta_2 SC_{it} + \beta_3 PC_{it} + \epsilon_{it}$

Where: ROA = Return on asset HC= Human capital SC= Structural capital PC= Physical capital ϵ = Error term β_0 = intercept i = period t = time $\beta_1 - \beta_3$ = the various slope coefficients of the explanatory variables.

Variables Measurement and Justification

The measurement of the variables are presented in Table 1

Table 1: Measurement of the Variables			
Variable Name	Туре	Variable Measurement and Justification	
Return on asset (ROA)	Dependent	Measured as Net income divide by total asset. Thus, ROA= Net income/	
		Total Assets. Alrafadi (2020); Khaghaany et al. (2019)	
Human capital (HC)	Independent	The ratio of added value (VA) to human capital (HC) is used to calculate	
		human capital efficiency (HCE). Thus, HCE=VA/HC, Amin et al. (2018);	
		Ardiansari et al. (2018)	
Structural capital (SC)	Independent	The calculation of Structural Capital Efficiency (SCE) involves dividing	
		Structural Capital (SC) by Value Added (VA). Accordingly, SCE=VA/SC.	
		Chun, D. (2016); Okoro et al. (2017).	
Physical capital (PC)	Independent	Physical Capital Efficiency (PCE) is measured by dividing VA (added	
		value) with PC (Physical Capital). Thus, PCE=VA/PC. Pascareno &	
		Siringoringo (2016) and Ranjbar et al. (2017)	

Source: Researcher's Compilation (2025)

4.0 DATA ANALYSIS AND DISCUSSIONS

Descriptive Statistics

Table 2 summaries of the descriptive statistics of the entire data set.

Variable	Obs	Mean	Std. Dev.	Min.	Max.
ROA	90	.7430826	.0316799	.5480459	.8413357
HC	90	20.57245	54.55561	.2688013	355.1454
SC	90	6.811079	.4512526	5.11059	8.084847
PC	90	9.163947	.4144663	8.194532	9.8541

Source: Researcher's Computation using STATA 15 software

According to Table 2, the returns on assets (ROA) have a mean of.7430826 and a minimum of.5480459, a maximum of.8413357, and a mean of.5480459, all of which are within the range of the study period. Additionally, the table indicates that ROA experienced modest growth throughout the period under study, with a standard deviation of.0316799 below the mean. Additionally, Table 2 demonstrates that Human Capital (HC) has a mean value of 20.57245, a minimum value of.2688013, a maximum value of 355.1454, and a mean value of 20.57245, all of which are within the range of the study period. Additionally, the data shows that HC had a standard deviation of 54.55561, which is higher than the mean and suggests that it experienced rapid growth throughout the reviewed period.

Table 2 similarly demonstrates that the Structure Capital (SC) has a mean value of 6.811079, a minimum value of 5.11059, and a maximum value of 8.084847, all of which are within the range of the minimum and maximum values, suggesting a good spread during the study period. Additionally, the table shows that SC's standard deviation is less than the mean (.4512526), suggesting that its growth was slow during the period under consideration. Additionally, Table 2 demonstrates that Physical Capital (PC) has a mean value of 9.163947, a maximum value of 9.8541, and a lowest value of 8.194532, all of which fall within the range of the study period. Additionally, the table indicates that PC had modest growth during the time under consideration, with a standard deviation of 4.144663 below the mean.

Pearson Correlation

The data set's Pearson correlation matrix, which displays the degree of associations between the variables, is shown in Table 3 below.

_	Variable	ROA	HC	SC	PC
	ROA	1.0000			

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HC	0.1428	1.0000		
SC	0.7355	0.1429	1.0000	
PC	0.1168	0.0741	0.7586	1.0000

Source: Researcher's Computation using STATA 15 software

The degree of relationships between an independent variable's proxies and the dependent variable is ascertained via the correlation matrix. In order to determine whether the model has a multicollinearity issue, it is also utilized to demonstrate whether there is a relationship between the proxies of the independent variable itself. The correlation coefficient of 0.1428, which is significant at the 1% level of significance, indicates that there is a 14% positive and weak association between the Human Capital (HC) and Returns on Assets (ROA) of Nigerian deposit money institutions, according to Table 3. The correlation coefficient of 0.7355, which is significant at the 1% level of significance, indicates that there is a 74% positive and strong association

between Structure Capital (SC) and return on asset (ROA) of deposit money banks in Nigeria, according to the table.

Additionally, the correlation coefficient of 0.1168, which is significant at the 1% level of significance, indicates that there are 12% positive and weak correlations between the physical capital (PC) and return on asset (ROA) of deposit money institutions in Nigeria. Lastly, as all of the coefficients fall below the 0.80 criterion proposed by Gujarati (2003), the correlations between the proxies of the independent variable itself appear to be moderate. This suggests that the model does not have a multicolinearity issue, which satisfies one of the linear regression assumptions.

The Results of Robust Random Effect Regression Model

Variable	Coefficients	z-value	Prob.
Cons.	0.4500796	9.39	0.000
HC	.0000205	0.83	0.406
SC	.0070073	1.20	0.231
PC	.0437291	4.91	0.000
R-sq overall	0.6832		
Wald chi2	182.46		
Prob. >chi2	0.000		

The robust random effect regression model used for this model's estimation is shown in Table 4 below.

Source: Researcher's Computation using STATA 15 software

With an overall R-sq of 0.6832, Table 4 above demonstrates that the combined impact of human capital (HC), structure capital (SC), and physical capital (PC) predicts a 68% variation in return on asset (ROA). This shows that the study's model fits well and that the independent variables are employed and mixed appropriately. With a Wald chi2 value of 182.46 and a P-value of 0.000, the model was found to be appropriate for the research.

Test of Hypotheses

Ho₁: Human capital has no significant impact on return on asset of quoted deposit money banks in Nigeria.

According to the findings in Table 4 above, human capital had a negligible positive impact on the return on assets of deposit money banks in Nigeria over the reviewed period, as indicated by the z-value of 0.83 and the accompanying p-value of 0.406. This supports the null hypothesis, which states that human capital has no discernible impact on the financial performance of Nigerian quoted deposit money institutions.

Ho₂: Structural capital has no significant impact on return on asset of quoted deposit money banks in Nigeria.

According to Table 4, structural capital had a negligible positive impact on the return on assets of deposit money banks in Nigeria over the reviewed period, as indicated by the z-value of 1.20 and the associated p-value of 0.231. This supports the null hypothesis, which states that structure capital has no discernible impact on the financial performance of Nigerian quoted deposit money institutions.

Ho₃: Physical capital has no significant impact on return on asset of quoted deposit money banks in Nigeria.

Physical capital has a considerable positive impact on the return on assets of deposit money banks in Nigeria for the period under study, as indicated by Table 4's z-value of 4.91 and matching p-value of 0.000. This leads to the rejection of the null hypothesis, which states that physical capital has no discernible impact on the financial performance of Nigerian quoted deposit money institutions.

5.0 Discussion of Findings

Human Capital and Return on asset

Human capital (HC) has a negligible beneficial impact on the return on assets of Nigerian deposit money banks, according to this study. This indicates that a rise in human capital will result in a.0000205 improvement in the quality of return on assets for Nigerian deposit money institutions. The results are also consistent with the stakeholders theory, which highlighted how voluntary intellectual capital disclosure can strengthen relationships between businesses and different stakeholders by reducing information asymmetry. In Nigerian deposit money institutions, human capital (HC) has a negligible positive impact on the quality of return on assets. The results, however, do not concur with those of Mohammad and Bujang (2019), Khafid and Alifia (2018), Mawaheb (2024), and Naushad (2019).

Structure Capital and Return on asset

Additionally, the study shows that structure capital (SC) has a negligible positive impact on Nigerian deposit money banks' return on assets. This indicates that a rise in structural capital will result in a.0070073 increase in the return on assets of Nigerian deposit money institutions. The results are also consistent with the stakeholders theory, which highlighted how voluntary intellectual capital disclosure can strengthen relationships between businesses and different stakeholders by reducing information asymmetry. The return on assets of Nigerian deposit money banks would rise as a result of the increase in structure capital. This result is consistent with what Xu and Liu (2022) found. The results, however, do not concur with those of Tarigan *et al.* (2019), Mawaheb (2024), Mohammad and Bujang (2019), and Naushad (2019).

Physical Capital and Return on asset

According to this study, physical capital (PC) significantly improves the return on assets of Nigerian deposit money institutions. This indicates that a rise in physical capital will result in a.0437291 increase in the return on assets of Nigerian deposit money institutions. The results are also consistent with the stakeholders theory, which highlighted how voluntary intellectual capital disclosure can strengthen relationships between businesses and different stakeholders by reducing information asymmetry. The return on assets of Nigerian deposit money banks would rise as the amount of physical capital increases. Additionally, this result is consistent with the findings of Naushad (2019) and Mawaheb (2024).

6.0 CONCLUSION AND RECOMMENDATIONS

Only physical capital significantly affects financial performance, according to the findings of data analysis and discussion. This suggests that a solid indicator of financial performance could be physical capital. The positive correlation also indicates that banks' creative use of tangible assets has a beneficial impact on the company's financial performance. The physical asset component of intellectual capital should receive more attention, and the examination and enhancement of numerical data should not be the exclusive focus.

Recommendations

Given the aforementioned, this analysis suggests the following:

- Nigerian deposit money banks ought to focus more on the tangible component of intellectual capital rather than solely on its numerical assessment and enhancement.
- By putting policies in place that will enhance and upgrade their human ability and competency in the field of training and development, deposit money banks may demonstrate that they are paying enough attention to their intellectual capital.
- In order to improve their return on assets, deposit money institutions should work to increase the value of their intellectual capital.

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