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Effect of Intellectual Capital and Financial Performance of Quoted Conglomerate Firms in Nigeria

S.A. Adediran, PhD
Department of Accounting, Faculty of Management Sciences, Prince Abubakar Audu University, Anyigba.
Email: adedirans2007@yahoo.com

Abayomi Omolayo
Department of Accounting, Faculty of Management Sciences, Prince Abubakar Audu University, Anyigba.
Email: layus4real@yahoo.com

Abstract

This study examines the effect of intellectual capital on the financial performance of listed conglomerate firms in Nigeria, focusing on the period from 2012 to 2023. Specifically, it investigates the impact of Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Capital Employed Efficiency (CEE) on Return on Assets (ROA), with Firm Size (FS) included as a control variable. Using an ex post facto research design and cross-sectional panel data sourced from audited annual reports, the study applies the Value-Added Intellectual Coefficient (VAIC) model developed by Pulic (1998). Panel regression analysis was conducted with the aid of E-Views software, alongside diagnostic tests for normality, multicollinearity, and serial correlation. The findings reveal that HCE, SCE, and CEE have statistically insignificant effects on ROA, suggesting that intellectual capital components do not exert a strong short-term influence on firm profitability. Conversely, Firm Size demonstrates a significant negative relationship with ROA, indicating that increased scale may lead to operational inefficiencies and declining returns. These results highlight the need for a more integrated and strategic approach to intellectual capital management within Nigeria's conglomerate sector. The study recommends enhancing human capital development through continuous training and aligning structural capital investments with operational goals. It also emphasizes the importance of managing firm growth strategically to avoid diminishing profitability. Overall, while intellectual capital remains crucial for long-term value creation, its financial benefits may require complementary strategies such as innovation and efficient governance structures to be fully realized.

Keywords: *Intellectual Capital, Human Capital Efficiency, Structural Capital Efficiency, Financial Performance, Nigerian Conglomerates*

Introduction

Intellectual capital is the knowledge that can be converted into values and the aggregation of all knowledge and competences of employees that help an organization to achieve competitive advantages. Intellectual capital represents the stock of knowledge at a particular time which has been accumulated through knowledge flow activities (Bontis, 2004).

Despite the shift towards human capital-intensive economy, traditional accounting has continued to focus more on the physical assets in their financial statements to the exclusion of the more important assets, the intellectual capital (Amstrong, 2006), as consequence of the above, management is denied of relevant and timely data which enables her to take vital decision regarding her human resources, especially the cost implication of certain decision. Bornemamn (1999) found that enterprises which have managed their intellectual capital better, had achieved stronger competitive advantage than the general enterprises and that companies which had

strengthen their own intellectual capital management compared to the others had performed better.

Human capital refers to the knowledge, skills, and abilities of employees, representing an organization's collective capacity for solving business problems (Bontis, 1998). As it resides within individuals, human capital cannot be owned by organizations (Davenport, 1999). Furthermore, it encompasses the effective utilization of people resources, often measured through creativity and innovation (Subramaniam & Youndt, 2005) (Intellectual Capital is comprised of Relational Capital, Human Capital and Structural Capital. http://www.pegasusics.com/intellectual-capital.php). Human capital (HC) is also seen as the knowledge, skill, expertise/know-how, problem solving capacity, education, training, judgment, experience, abilities, and loyalty of the employees of the firm; represented as the collective capabilities of a company's workforce to solve customer and operational problems). Human capital is the firm's collective capability to extract the best solutions from the knowledge of its people (Mainomaetal 2021). It is important because it is a source of innovation and strategic renewal, whether it is from brainstorming in a research lab, daydreaming at the office, throwing out old files, reengineering new processes, improving personal skills or developing new sales leads.

Statement of Problem

The concept of intellectual capital (IC) has sparked extensive scholarly debate, particularly regarding its role in enhancing corporate performance. While intellectual capital is widely acknowledged in theory as a key driver of value creation, its practical recognition within financial statements remains limited. Scholars such as Lev and Sougiannis (1996) and Amir and Lev (1996) argue that traditional financial reporting, which emphasizes tangible assets, is becoming increasingly inadequate especially for knowledge-driven and innovative industries. Bontis (2001), Lev (2001), and Lev and Zarowin (1999) emphasize that if intellectual capital were truly irrelevant, stock markets would not react to changes like management shifts, which are not accounted for as assets in financial reports. Similarly, Rastogi (2000) and Lev and Radhakrishnan (2003) highlight the intangible and invisible nature of intellectual capital, asserting that traditional measures are insufficient for capturing the true value of organizational knowledge.

Despite substantial research efforts, the relationship between intellectual capital and firm performance continues to be inconclusive, especially in the context of developing countries. Existing studies, such as those by Kamukama et al. (2010) and Zadeh et al. (2013), primarily relied on employee perceptions via questionnaires and did not utilize objectively measurable financial data—despite the availability of such metrics in published financial statements. Moreover, they often failed to specify the time period for data collection. While Kamukama et al. found a positive and significant effect of intellectual capital on various performance indicators of microfinance institutions in Uganda, and Zadeh et al. reported similar findings in Iranian manufacturing firms, other studies like Munjuri et al. (2015) and Siddiqul and Asad (2014) revealed inconsistent or insignificant results. These inconsistencies point to environmental, industry-specific, and methodological gaps in the literature. Thus, this study aims to bridge these gaps by examining the effect of intellectual capital on the financial performance of listed conglomerate companies in Nigeria, using objective financial data over a clearly defined time period

Objectives of the Study

The general objective of this study was to examine the effect of intellectual capital on financial performance in Nigeria. The study's specific objectives were to:

1. Determine the effect of human capital efficiency on return on assets of listed conglomerate firms in Nigeria.
2. Examine the influence of structural capital efficiency on return on assets of listed conglomerate firms in Nigeria.

Research Hypotheses

To achieve the objectives of the study, the following hypotheses are formulated in a null form:
H_{O1}: Human capital efficiency has no significant effect on return on assets of conglomerate firms in Nigeria
H_{02}: There is no significant relationship between structural capital efficiency and return on assets of conglomerate firms in Nigeria.

Methodology

This study employed an ex post facto research design using cross-sectional panel data derived from the audited annual reports of six listed conglomerate companies on the Nigerian Exchange Group, covering the period from 2012 to 2023. This design was selected to assess the effect of intellectual capital components, namely Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Capital Employed Efficiency (CEE) on the financial performance of firms, measured by Return on Assets (ROA). The study population comprised all six conglomerate firms quoted on the Exchange as of December 31, 2023: Chellarams Plc, John Holt Plc, SCOA Nigeria Plc, Transnational Corporation of Nigeria Plc, UACN Plc, and Tantalizer Plc. A census sampling technique was adopted due to the limited number of firms and the accessibility of their financial data. Secondary data was extracted from publicly available audited financial statements submitted to the Exchange. The choice of the 2012–2023 period aligns with Nigeria's implementation of International Financial Reporting Standards (IFRS), which enhanced transparency and disclosure in financial reporting.

To analyze the relationship between intellectual capital and firm performance, the study adopted the Value Added Intellectual Coefficient (VAIC) model developed by Pulic (1998), operationalized through a panel regression analysis using E-Views software. The regression model was specified as: $ROA_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + SIZE + \varepsilon_{it}$, where ROA represents return on assets, HCE is human capital efficiency, SCE is structural capital efficiency, CEE is capital employed efficiency, and SIZE denotes firm size (log of total assets). Diagnostic tests conducted include the Jarque-Bera test for normality, covariance matrix for multicollinearity, and the Breusch-Godfrey LM test for serial correlation. The use of panel data offers increased robustness by allowing for the control of firm-specific heterogeneity and improving the reliability of the regression estimates. This methodology aligns with models adapted from prior studies by Yousaf (2021), Rahman and Akhter (2021), and Blessing (2023)

Results

Panel Data Regression Analysis

Panel data regression analysis examines the relationship between ROA and selected independent variables, considering both cross-sectional and time-series dimensions. Table 4.3 presents the regression results.

Table 1: Panel Data Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HCE	0.029894	0.025797	1.158798	0.2507
SCE	-0.010246	0.013302	-0.770224	0.4439
CEE	-0.000286	0.000696	-0.411276	0.6822
FS	-0.013503	0.004304	-3.137516	0.0025
C	0.068491	0.241783	0.283275	0.7778

Statistic	Value
R-squared	0.321451
Adjusted R-squared	0.280941
S.E. of regression	0.041767
Sum squared resid	0.116882
Mean dependent var	0.058737
S.D. dependent var	0.049255
Akaike info criterion	-3.446492
Schwarz criterion	-3.288390

Source: E-Views Computation, 2025

Table 4.3 presents the panel regression analysis examining the impact of Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), Capital Employed Efficiency (CEE), and Firm Size (FS) on Return on Assets (ROA) for listed conglomerates in Nigeria. The results reveal that HCE has a positive but statistically insignificant effect on ROA, with a coefficient of 0.029894 and a p-value of 0.2507. This suggests that while enhanced human capital may contribute to profitability, its influence is not strong enough to be statistically confirmed, possibly due to a lack of complementary investments in areas like technology and infrastructure. Similarly, SCE shows a negative and statistically insignificant relationship with ROA (coefficient = -0.010246, p-value = 0.4439), indicating that increases in structural capital efficiency may not translate directly into improved profitability. This negative sign may reflect inefficiencies from overinvestment in systems or processes that do not directly enhance financial outcomes. CEE also demonstrates a negative and insignificant relationship with ROA (coefficient = -0.000286, p-value = 0.6822), implying that capital utilization on its own does not significantly drive profitability, possibly due to underlying inefficiencies in resource allocation or external market constraints.

Firm Size (FS), however, emerges as the only variable with a statistically significant relationship to ROA, with a coefficient of -0.013503 and a p-value of 0.0025. This negative relationship suggests that as firms grow larger, their profitability tends to decline, potentially due to operational complexities, increased overhead, or bureaucratic inefficiencies associated with managing large organizations. The constant term in the model (coefficient = 0.068491; p-value = 0.7778) is statistically insignificant, indicating no strong trend in ROA independent of the predictor variables. The R-squared value of 0.321451 shows that about 32% of the variability in ROA is explained by the independent variables, while the adjusted R-squared of 0.280941 suggests that the model has moderate explanatory power, with room for improvement through the inclusion of additional explanatory variables. The standard error of regression (0.041767), along with the Akaike and Schwarz criteria, supports the model's adequacy. Overall, the findings highlight the need for firms to manage growth carefully and to ensure that investments in intellectual capital are strategically aligned with operational capabilities to yield tangible financial benefits.

Hypotheses Testing

Decision Rule: The decision rule states that if the p-value of a variable is less than the level of significance (0.05), the null hypothesis (H0) is rejected, indicating that the independent variable significantly affects the dependent variable. Conversely, if the p-value is greater than 0.05, the null hypothesis is not rejected, suggesting no significant effect. The study adopts a 5% (0.05) level of significance for hypothesis testing.

Test of Hypothesis One

H0: Human capital efficiency has no significant effect on return on assets of conglomerate listed firms in Nigeria.
$H0_1$: Human capital efficiency has significant effect on return on assets of conglomerate listed firms in Nigeria

Results from Correlation and Regression Analysis: The correlation matrix shows that HCE has a weak positive correlation with ROA (0.1509), suggesting that as human capital efficiency increases, return on assets tends to improve slightly. However, the regression analysis indicates that the coefficient of HCE is 0.029894, with a p-value of 0.2507. Since the p-value is greater than 0.05, the relationship is not statistically significant.

The weak positive correlation suggests that human capital efficiency may contribute to profitability, but the effect is marginal. The regression results confirm that HCE does not significantly impact ROA at the 5% significance level. This implies that while investment in human capital is essential, other factors such as technological innovation, operational efficiency, and strategic management decisions may have stronger influences on firm profitability. Since the p-value is above 0.05, we fail to reject the null hypothesis, indicating that human capital efficiency does not have a statistically significant effect on return on assets of listed conglomerate firms in Nigeria.

Test of Hypothesis Two

H0: There is no significant effect of structural capital efficiency on return on assets of listed conglomerate firms in Nigeria.

$H0_1$: There is significant effect of structural capital efficiency on return on assets of listed conglomerate firms in Nigeria.

Results from Correlation and Regression Analysis: The correlation matrix indicates a moderate negative correlation between SCE and ROA (-0.4592), suggesting that as structural capital efficiency increases, return on assets declines. The regression results in reveal that the coefficient of SCE is -0.010246, with a p-value of 0.4439, which is greater than 0.05, indicating statistical insignificance.

The negative correlation suggests that structural capital investments may not be translating into immediate financial gains. This could be due to inefficient utilization of structural capital, misallocation of resources, or the time lag required for structural investments to yield positive returns. The regression results further confirm that the relationship between SCE and ROA is not statistically significant. Since the p-value exceeds 0.05, we fail to reject the null hypothesis, concluding that structural capital efficiency does not have a significant effect on return on assets of listed conglomerate firms in Nigeria.

Discussion of Findings

This section discusses the findings of the study based on the stated objectives, which are to determine the effect of human capital efficiency (HCE), structural capital efficiency (SCE), and capital employed efficiency (CEE) on the return on assets (ROA) of listed conglomerate firms in Nigeria. The discussion is structured around the correlation analysis, regression analysis, and hypothesis testing results.

Objective 1: To Determine the Effect of Human Capital Efficiency on Return on Assets of Listed Conglomerate Firms in Nigeria

The first objective sought to examine the effect of human capital efficiency (HCE) on the return on assets (ROA) of listed conglomerate firms in Nigeria. The correlation analysis revealed a weak positive relationship between HCE and ROA (0.1509), suggesting that firms with higher human capital efficiency tend to experience marginal improvements in profitability. This finding aligns with the study by Kwarbai and Ajike (2016), who found that human capital efficiency positively influences corporate performance, albeit moderately, in Nigerian industrial goods firms. Similarly, Salman (2022) and Egbunike and Okoye (2023) emphasized the importance of human capital in driving financial performance, particularly in knowledge-intensive industries.

However, the regression analysis provided a more nuanced perspective. The coefficient of HCE (0.029894) was positive but statistically insignificant (p-value = 0.2507), indicating that while human capital efficiency may contribute to profitability; its impact is not strong enough to be considered significant. This finding contrasts with Onyekwelu et al. (2020), who found a significant positive relationship between HCE and ROA in the Nigerian banking sector. The disparity in findings may be attributed to differences in industry dynamics, as conglomerates often operate across diverse sectors, making it challenging to achieve uniform human capital efficiency impacts.

The hypothesis testing further confirmed the lack of a significant relationship between HCE and ROA, as the null hypothesis ($H0_1$) could not be rejected at the 5% significance level. This implies that while human capital is a critical component of intellectual capital, its efficiency alone may not be sufficient to drive significant improvements in financial performance. This finding resonates with Adebayo (2023), who argued that human capital efficiency must be complemented by other factors such as technological innovation and strategic management to achieve meaningful financial outcomes.

In summary, the study finds that human capital efficiency has a marginal positive effect on profitability, but its impact is not statistically significant. This suggests that while investing in human capital is essential, firms must also focus on other drivers of performance to achieve sustainable profitability.

Objective 2: To Examine the Effect of Structural Capital Efficiency on Return on Assets of Listed Conglomerate Firms in Nigeria

The second objective aimed to assess the effect of structural capital efficiency (SCE) on the return on assets (ROA) of listed conglomerate firms in Nigeria. The correlation analysis revealed a moderate negative relationship between SCE and ROA (-0.4592), indicating that firms with higher structural capital efficiency tend to experience lower profitability. This finding is consistent with Ojo (2020), who found that structural capital efficiency does not always translate into immediate financial gains, particularly in firms with complex operational structures.

The regression analysis further supported this observation, as the coefficient of SCE (-0.010246) was negative and statistically insignificant (p-value = 0.4439). This suggests that while structural capital investments are essential for long-term sustainability, they may not yield immediate financial returns. This finding aligns with Eze (2022**)**, who argued that structural capital efficiency often requires a time lag to manifest in financial performance. Additionally, the negative relationship may reflect inefficiencies in the allocation of structural resources or the inability of firms to fully leverage their structural investments.

The hypothesis testing results confirmed the lack of a significant relationship between SCE and ROA, as the null hypothesis ($H0_2$) could not be rejected at the 5% significance level. This finding is consistent with Okwy (2023**),** who found that structural capital efficiency had an insignificant impact on the financial performance of Nigerian manufacturing firms. The study also aligns with Adegbie and Adeniji (2023)**,** who emphasized the need for firms to balance structural investments with operational efficiency to achieve optimal financial outcomes.

In conclusion, the study finds that structural capital efficiency has a negative but insignificant effect on profitability. This underscores the importance of strategic resource allocation and the need for firms to ensure that structural investments are effectively integrated into their operational processes to maximize financial returns.

Conclusion

This study concludes that intellectual capital components—human capital efficiency (HCE), structural capital efficiency (SCE), and capital employed efficiency (CEE)—have limited short-term impact on the financial performance of listed conglomerate firms in Nigeria, as their relationships with return on assets (ROA) were statistically insignificant. However, firm size (FS) significantly and negatively affects profitability, highlighting the operational challenges and inefficiencies associated with larger firms. The findings underscore the importance of adopting a holistic approach to intellectual capital management, ensuring that human, structural, and capital resources are effectively integrated to drive long-term sustainability. Policymakers and firm management must address the inefficiencies linked to firm size and operational complexities to enhance profitability. While intellectual capital remains a critical driver of long-term growth, its immediate financial impact may be limited, necessitating complementary strategies such as technological innovation, strategic resource allocation, and improved governance to achieve sustainable financial performance in Nigeria's conglomerate sector.

Recommendations

Based on the findings of this study, the following recommendations are made to enhance the financial performance and long-term success of listed conglomerate firms in Nigeria:

i. Enhance Human Capital Development: Firms should invest in continuous training and development programs to improve employee skills and productivity. Additionally, integrating human capital efficiency with technological advancements and performance-based incentives can help translate human capital investments into tangible financial gains.
ii. Optimize Structural Capital Investments: Firms should strategically allocate resources to structural capital, ensuring that investments in systems, processes, and infrastructure align with organizational goals. Emphasis should be placed on operational efficiency to maximize the returns from structural capital investments.

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