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INTELLECTUAL CAPITAL EFFICIENCY AND FINANCIAL PERFORMANCE OF LISTED MANUFACTURING FIRMS IN NIGERIA

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Key words: *Capital Employed Efficiency Financial Performance, Intellectual Capital Efficiency, Net Assets Per Share, Structural Capital Efficiency.*

ABSTRACT

The study examined the effect of intellectual capital efficiency on financial performance of listed manufacturing firms in Nigeria. The specific objective was to examine the effect of human capital efficiency, structural capital efficiency, relational capital efficiency and capital employed efficiency on net assets per share. Ex-post facto research design was adopted in the study. The study population comprised 64 manufacturing firms listed under consumer goods sector, industrial goods sector, oil and gas sector, ICT sector, healthcare sector and conglomerate sector of Nigerian Exchange Group. However, purposive sampling was used in selecting a sample size of 55. Secondary data for the study were sourced from the firms annual reports for a period of nine years (2015-2023).The hypotheses were tested using Panel Estimated Generalized Least Squares. The findings revealed that: human capital efficiency has a significant positive effect on Net Assets Per Share of listed manufacturing firms in Nigeria (p-value = 0.0002); structural capital efficiency has a significant positive effect on Net Assets Per Share of listed manufacturing firms in Nigeria (p-value = 0.0012); relational capital efficiency has a significant positive effect on Net Assets Per Share of listed manufacturing firms in Nigeria (p-value = 0.0015); capital employed efficiency has a non-significant positive effect on Net Assets Per Share of listed manufacturing firms in Nigeria (p-value = 0.7257). In conclusion, investing in human capital, optimizing structural processes, nurturing external relationships, and efficiently utilizing financial resources enable manufacturing firms in Nigeria to achieve sustainable growth and improved financial metrics. Therefore, the study recommends among others that Human Resource Managers should invest in continuous training and development programs for employees to enhance their skills and competencies in order to improve individual performance but also drive overall organizational productivity, thereby increasing Net Assets Per Share.

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1. INTRODUCTION

Over past decades, the global economy transitioned from industry-focused environments using physical assets like factories to knowledge-based environments leveraging human capital. The core difference lies in asset nature - former relied on plants, machinery while latter emphasizes worker knowledge, skills, experience. Traditionally, land, labor, capital determined economic performance but knowledge, information, and technology are now prime resources (Ahangar, 2023). Companies moved from industrial to information ages but struggle identifying, measuring, managing intellectual capital. To create value, intellectual capital must be identified, measured, valued, and aligned to strategy, goals (Ojede, Amin & Daigyo, 2023). The 2020 COVID-19 pandemic forced corporations to rely on intellectual capital at unprecedented levels to sustain performance amid economic crises (Tseng & Goo, 2023). This necessitated examining intellectual capital efficiency's relationship to corporate performance using listed Nigerian manufacturing firms, an unexplored area. Extant literature shows intellectual capital efficiency is key to sustainability, competitive growth, financial performance (Sardo & Serrasqueiro, 2022; Tseng & Goo, 2023; Amahalu, Ezechukwu, & Okudo, 2022). Market-based measures reflect historical performance and predict future profit expansion. Firms must utilize intellectual resources to maintain advantage, adjust investments based on changes (Rooney & Dumay, 2022). Intellectual capital was historically known but recently identified as a key asset, its impact on listed Nigerian manufacturers' financial performance remains unestablished. This examines this effect as manufacturing promotes business growth, development globally, favors graduates with strong intellect, where employees are homogenous, transformation witnessed warrants investigation (Ekwe, 2023).

Intellectual capital development represents hidden value usually excluded from statements but potentially contributing to profitability, competitive advantage, reducing true value (Aluwong, 2022). Literature presents conflicting findings on intellectual capital efficiency's effect on performance in Nigeria, disagreeing on significance and direction (Gatawa, Akinola & Muftau, 2021; Olawale, 2022; Muftaudeen & Hussainatu, 2022; Ojede, Amin & Daigyo, 2023; Madito & Khumalo, 2023). Holden and Sparman (2023), Pitia and Lado (2023) and Paul and Akindele (2023) argue it negatively impacts short, long-term performance, against Onwanchukwu (2022), Ozei, Sezgin and Topkaya (2023), Olawunmi and Adebayo (2023) finding it ensures performance, contributing to knowledge gaps. Prior studies primarily used accounting-based measures, lacking holistic perspective. No emphasis to our knowledge was given to market-based measures in developed, developing nations, motivating examining

intellectual capital efficiency's relationship to Nigerian manufacturers' financial performance using market measures.

1.1 Objectives

The main objective of the study is to examine the effect of intellectual capital efficiency on financial performance of listed manufacturing firms in Nigeria. Specific objectives are to:

1. examine the effect of human capital efficiency on Net Assets Per Share of listed manufacturing firms in Nigeria.
2. determine the effect of structural capital efficiency on Net Assets Per Share of listed manufacturing firms in Nigeria.
3. ascertain the effect of relational capital efficiency on Net Assets Per Share of listed manufacturing firms in Nigeria.
4. evaluate the effect of capital employed efficiency on Net Assets Per Share of listed manufacturing firms in Nigeria.

1.2 Hypotheses

The following hypotheses were stated in a testable form in order to achieve the purpose of the study;

H_{01}: Human capital efficiency has no significant effect on Net Assets Per Share of listed manufacturing firms in Nigeria.

H_{02}: Structural capital efficiency has no significant effect on Net Assets Per Share of listed manufacturing firms in Nigeria.

H_{03}: Relational capital efficiency has no significant effect on Net Assets Per Share of listed manufacturing firms in Nigeria.

H_{04}: Capital employed efficiency has no significance effect on Net Assets Per Share of listed manufacturing firms in Nigeria.

2. LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Intellectual Capital Efficiency

Intellectual capital refers to the total capabilities, knowledge, culture, strategy, processes, intellectual property and relational networks of a company that create value and competitive advantages to support organizational goals and objectives (Stewart, 2021; Amahalu, Ezechukwu, & Okudo, 2022). It can be considered the knowledge transformed into

intellectual property or the end result of such a process (Tseng and Goo, 2023). Intellectual assets form part of intellectual capital as intangible, invisible, knowledge-based assets (Sharabati, Jawad and Bontis, 2022). The Chartered Institute of Management Accountants defines intellectual capital as professional knowledge, skill, relationships and technological capacities giving organizations sustainable competitive advantages when applied (CIMA). Sharabati, Jawad and Bontis (2022) found investment in intellectual capital improves economic performance measured through profitability, the surplus from revenues less costs. Khan (2021) notes intellectual capital shifts from holding knowledge to using it, implying relationships and processes are needed to transform individual knowledge into marketable products/services creating value. Lee, Wu and Chao (2023) agree intellectual wealth refers to transferable, easily converted knowledge like practical experience, technology, customer relationships and skills for competitive advantages. Lin (2020) sees intellectual capital as all non-financial statement processes and properties increasing enterprise value and profits beyond book value. Lee (2022) describes it as organizational value not easily measured monetarily but critical to existence and sustainability. Edvinsson and Malone (2020) consider intellectual capital the sum of human and structural capital, while Stewart (2021) extends it to human, customer and structural capital. Ulrich (2023) views intellectual capital as competence multiplied by commitment. Klein and Prusak (2022) define it as formalized, captured and leveraged intellectual material producing higher-value assets, similar to Ndueche's (2023) view of knowledge, experience, technology, relationships and skills creating competitive advantages.

2.1.1.1 Determinants of Intellectual Capital Efficiency

For the purpose of this study, the present study developed a model fit on intellectual capital efficiency using the following Indexes; human capital efficiency, structural efficiency, relational capital efficiency and capital employed efficiency. This was discussed below as thus:

2.1.1.1A Human Capital Efficiency (HCE)

Human capital refers to the skills, knowledge, innovation and abilities of employees that make up an organization's human resources (Bontis, Keow & Richardson, 2022; Boujelbene & Affe, 2023). It reflects the human aspect in a company where the combination of employee expertise, creativity, flexibility and prior experience contributes to outputs and profitability (Rahim, Atan & Kamaluddin, 2022). It forms the general skills to perform tasks and shared experiences/information acquired within an organization (Ahmadi, 2021). Being both

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supportive and necessary for success, it is a strategic resource in today's changing competitive environment since human resource knowledge and skills are vital (Subramaniam & Youndt, 2022). The study sees it as knowledge possessed by and embedded within employees (Bontis, Keow & Richardson, 2022). However, human capital can be lost upon employee departure, ending that capital (Ahmadi, 2021).It is therefore calculated as the relation between value added measured by human capital. This is expressed mathematically as thus:

$$HCE = \frac{\text{Value Added}}{\text{Human Capital}}$$

Where value added is calculated as: W + I + DP + DIV + T + R (Wages and Salaries, Interest Expense, Depreciation, Dividends, Corporate Taxes and Retained Profit for the year). While Human Capital on the other hand is calculated as the value of personnel expenses i.e salaries, wages and other benefits spent by the firm on its employees.

2.1.1.1B Structural Capital Efficiency (SCE)

Structural capital includes non-human knowledge reservoirs in a firm facilitating innovation and performance (Subramaniam & Youndt, 22). It provides efficient communication and operations supporting knowledge activities contributing to value/profits (Karagiannis, Waldner, Stoeger & Nemetz, 2020). Structural capital is knowledge remaining when employees leave, within organizational control combining with other capitals for benefit (Edvinsson & Malone, 2020). It involves hardware, culture/practices, intellectual property, software, repositories, R&D supporting efficiency/effectiveness (Steenkamp, & Kashyap, 2021). Structural capital comprises knowledge, culture, processes, philosophies, systems, databases explaining productivity/innovation structures (Stewart, 2021). It codifies transferable bodies of knowledge and connects people to expertise/knowledge on demand (Stewart, 2021). Communication networks, knowledge databases allow expertise sharing (Stewart, 2021). Structural capital efficiency is therefore calculated as the relationship between structural capital measured by valued added. This is expressed mathematically as thus:

$$SCE = \frac{\text{Structural Capital}}{\text{Value Added}}$$

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2.1.1.1C Relational Capital Efficiency (RCE)

Relational capital refers to an organization's implicit resources and ongoing relationships through interactions within and beyond the organization (Shipilov & Danis, 2020; Kostova & Roth, 2023). It enhances information sharing and facilitates interactions with external stakeholders like customers, suppliers, government (Shipilov & Danis, 2020). It involves the potential from ex-firm intangibles through relationships with suppliers, allies and customers in brand equity and customer loyalty forms (Stewart, 2021). Relational capital is therefore calculated as the relationship between relational capital measured by value added. This is expressed mathematically as thus:

$$\text{RCE} = \frac{\text{Relational Capital}}{\text{Value Added}}$$

2.1.1.1D Capital Employed Efficiency

Capital employed refers to the sum of fixed assets and working capital (current and non-current assets) equaling operating and investing cycle sums (Matinfard & Khavari, 2019). It is financed by shareholders' equity and net debt grouped as invested capital and refers to the total value of assets generating earnings (Murale, Jayara and Ashrafali, 2021). . It indicates allocated funds financed through equity and debt, including receivables, stock, equipment (NikMaheran, Filzah, & NikRozhan, 2020).Capital employed efficiency determines added value to book assets, gauging management effectiveness versus sales, profits, industry (Onyekwelu and Ubesie, 2021). Specifically, Capital Employed Efficiency (CEE) is calculated as Value Added (VA)/Capital Employed (CE). This is expressed mathematically as thus:

$$\text{CEE} = \frac{\text{Value Added}}{\text{Capital Employed}}$$

Where capital employed is ascertained as the book value of a firm’s assets.

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2.1.2 Financial Performance

Financial performance refers to measuring firm results in monetary terms and reflects in return on assets and investments (Okeke, 2023). It provides a subjective view of how well a firm uses its assets to generate revenues (Ojede, Anim & Daigyo, 2023). Performance is measured by revenues, operating income, cash flow or unit sales (Leah, 2021). Ratios used include profitability, liquidity, utilization, financial structure and investment (Philip, 2022).

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Profitability is measured by gross profit margin, operating margin and net profit margin (Erikie & Osagie, 2019). Corporate performance also reflects returns on investment, assets, equity, net worth, total assets and capital employed (Erikie & Osagie, 2019). Multiple measures should be used including revenues, operating income, cash flow, unit sales and margin growth rates (Oliveira, Rodrigues & Craig, 2020). Profit denotes surplus revenues over expenses and a firm's capacity to earn profits (Nweze, 2020). Firm performance refers to the relationship between profits generated and investments made (Nweze, 2020). It can be measured using profitability and efficiency ratios computed as operating income over capital employed (Chandrasekharan, 2022).

2.1.2.1 Net Assets Per Share

Net assets per share is a yardstick for measuring the performance of companies, especially the quoted companies. Net assets per share is usually calculated by dividing net assets (that is, total assets less total liabilities) by the number of equity shares in issue excluding any shares held in treasury (Febria, 2021). An increase in net assets per share, for example, by means of a share buyback, may lead to an increase in the market value of a company's shares. According to Ajao and Fatogun (2023), net assets per share is the value of an entity's assets minus its liabilities divided by outstanding shares. This represents the total value of an entity. Net Assets Per Share was proposed as a performance measurement in-line with the prior expectations of Nahiba (2022), Raheman, Salleh, Afza and Chek (2021) and Abd.Hamid, Abdul Aziz, Dora and Said (2022) et cetera. This was captured as Net Assets divided by Paid up Capital i.e (NAPS)

$$\text{NAPS} = \frac{\text{Net Assets}}{\text{Paid up Capital}}$$

2.2 Theoretical Framework

The theoretical framework which gives the meaning of a word in terms of the theories on intellectual capital efficiency and financial performance established in this study is Resource Based View Theory. It assumes that both the knowledge and acceptance of this theory that this research work depends upon.

2.2.1 Resource Based View Theory

The resource-based view (RBV) theory was propounded by Barney in the year 1991. Based on the central premise of RBV, organizations would be able to outperform other organizations and gain an edge over competitors if they possess valuable, rare, inimitable, and non-

substitutable resources and capabilities. The resource-based view (RBV) of a firm argues that the sustained competitive advantage derives from the firm's resources and capabilities bundles of tangible and intangible assets, including management skill, organizational operations and activities, and the depth of knowledge and information that they control (Barney, 2018). Organizations should be held accountable for their performance for a broad range of clients, from the board of managers to staff, and investors to market regulators (Tayles, 2019). Thus, companies should assure clients that their performance exceeds all known expectations.

The resource-based view theory provides that improved performance is only possible when a firm possesses a competitive advantage over rivals, gained through intellectual capital acquisition. This theory supports that intellectual capital provides an advantage for better corporate performance (Baye Douanla & Fonkem, 2017). Value-added is a valid performance measure. Resource quality and availability determine organizational performance (Morris Kuratko, Allen, Ireland and Schindehutte, 2019). This study considers resource-based theory a foundation to explain intellectual capital's effect on Nigerian firm performance. Its assumption that intellectual capital influences performance underpins this study. Relevance includes emphasizing efficient resource use, especially managing intellectual resources. Changes to information infrastructure yield cost savings and efficiencies for growth (Baye Douanla & Fonkem, 2017). A firm's effectiveness depends on coordinating capabilities and markets, determining competitive advantage. This theory helps leverage existing resources to achieve and sustain advantage. It measures well a firm may perform based on its human, structural, relational, capital resources and capabilities leading to superior long term performance.

2.3 Empirical Review

Emadzadeh, Nadia, Asiya, Mahboobe, Fatemeh and Mojgan (2023) examined the effect of Intellectual Capital on Firm Performance in Barth. Variables were based on data collected and the study adopted descriptive research design. To calculate the performance of the corporate, balanced scorecard approach was used. A total of 89 questionnaires were distributed among the employees and operation administrators of 4 factories. SPSS18 and Amos 20 were used for data analysis. The results of the study using 2 Ways ANOVA showed that intellectual capital have positive and significant impact on financial performance, customer, business processes, and learning and growth.

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Mbugua and Rotich (2023) examined the effect of intellectual capital on profitability of listed Kenyan commercial banks. The study focused on four variables; human capital, structural capital, relational capital and innovation capital. Descriptive research design was used to test how independent variables influenced listed banks profitability. The target population was ten commercial banks listed on Nairobi Securities Exchange by 2012. The study used secondary data sources from published audited accounts for last 5 years from 2018-2022 in gathering data for analysis. Descriptive statistical tool MS-Excel and SPSS was used to analyze data. The study using regression model found that structural capital and innovation capital affect listed commercial banks of /Kenya profitability.

3. MATERIAL AND METHOD

The study employed ex-post facto research design. The area of this study is on the entire 64 listed manufacturing firms on Nigerian Exchange Group (NGX) as at 2023 business list. , secondary data were used and obtained from annual report of listed manufacturing firms for a period between 2014 and 2023. The population of the study will cover the entire 64 manufacturing firms listed under consumer goods sector, industrial goods sector, oil and gas sector, ICT sector, healthcare sector and conglomerate sector of Nigerian Exchange Group as at 2023 business list. The study used firms whose data are complete from 2015 to 2023, which is the period covered by the study. Thus, the purposive sampling was applied in selecting (fifty-five) 55 firms that made up the sample size. Data generated for the study will be collated and analyzed using Panel Estimated Generalized Least Squares Model to be operated with E-Views 12. Diagnostics tests will be used in the study for the test of multi-colinearity existence.

In line with the previous researches, the study will adapt and modify the model of Matinfard and Khavari (2019) in determining the effect of intellectual capital efficiency on firm financial performance. This is shown below as thus:

Matinfard and Khavari (2019):

$ROE = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 CEE + \beta_4 FSIZE + \varepsilon$……..Eqn 1.

The modified functional model proposed for the study is shown below as thus:

NAPS = F(HCE, SCE, RCE, CEE) ……..Eqn 2.

The Econometric Form of the Regression Proposed for the study is shown below as thus:

$NAPS_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 RCE_{it} + \beta_4 CEE_{it} + \mu$……..Eqn 3.

Where:

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NAPS = Net Asset Per Share

HCE = Human Capital Efficiency

SCE = Structural Capital Efficiency

RCE = Relational Capital Efficiency

CEE = Capital Employed Efficiency

μ = Stochastic Disturbance (Error Term)

$_t$ = Time Variant for the Study

β_0 = Intercept of Relationship in the Model Constant

β_1, β_2, β_3, β_4 = are the Coefficients of the Independent Variables

Decision Rule: accept Ho if P-value > 5% significant level otherwise reject Ho

4. RESULT AND DISCUSSIONS

4.1 Data Analysis

The study examined the effect of intellectual capital efficiency on financial performance of listed manufacturing firms in Nigeria. The specific objective was to examine the effect of human capital efficiency, structural capital efficiency, relational capital efficiency and capital employed efficiency on Net Assets Per Share. The period of study covered from 2015 to 2023. The secondary data for the study are presented in Appendix I of this report.

4.1.1 Test of Multicollinearity

Test of Multicollinearity involves assessing whether independent variables in a regression model are highly correlated (Daoud, 2017). High multicollinearity can inflate the variance of coefficient estimates and make the model unreliable. The method used for detecting multicollinearity in this analysis was Variance Inflation Factor (VIF) as shown below in Table 1.

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Table 1 Variance Inflation Factors

Date: 06/03/24 Time: 22:22

Sample: 1 495

Included observations: 495

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
HCE	0.003828	1.130833	1.078683
SCE	0.207770	16.33475	16.13683
RCE	1.070692	16.13582	16.13576
CEE	11.54349	1.330687	1.079325
C	2.170972	1.436456	NA

Source: Eviews 12 Analysis Output (2024)

Table 1 shows the Variance Inflation Factors (VIF) for the variables in the regression model. The VIF values for Human Capital Efficiency (HCE) and Capital Employed Efficiency (CEE) are 1.078683 and 1.079325, respectively, which are well below the common threshold of 10, indicating no significant multicollinearity for these variables. However, the VIF values for Structural Capital Efficiency (SCE) and Relational Capital Efficiency (RCE) are both approximately 16.136, suggesting a high degree of multicollinearity between these two variables. This high multicollinearity can lead to inflated standard errors and unreliable coefficient estimates, potentially distorting the regression results. Thus, Panel Estimated Generalized Least Squares was used to improve the efficiency of the estimates since the model suffered multicollinearity (Yaffee, 2003).

4.2 Test of Hypotheses

The hypotheses were tested using Panel Estimated Generalized Least Squares. The justification for the use of Panel Estimated Generalized Least Squares Model was because it helped to improve the efficiency of the estimates compared to ordinary least squares (OLS) in the presence of cross-sectional correlation and multicollinearity (Yaffee, 2003; Baltagi, 1998). The regression estimates are shown in Table 2 below.

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Table 2 Panel Estimated Generalized Least Squares estimation

Dependent Variable: NAPS

Method: Panel EGLS (Cross-section weights)

Date: 06/03/24 Time: 17:44

Sample: 2015 2023

Periods included: 9

Cross-sections included: 55

Total panel (balanced) observations: 495

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HCE	0.010951	0.002946	3.716929	0.0002
SCE	0.064978	0.019898	3.265530	0.0012
RCE	0.144881	0.045353	3.194474	0.0015
CEE	0.058424	0.166412	0.351079	0.7257
C	14.81953	0.041799	354.5399	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.979258	Mean dependent var	43.20803
Adjusted R-squared	0.976499	S.D. dependent var	57.15583
S.E. of regression	9.763738	Sum squared resid	41564.13
F-statistic	354.9018	Durbin-Watson stat	0.934474
Prob(F-statistic)	0.000000		

Source: Eviews 12 Analysis Output (2024)

The results from Table 2 demonstrate that the Panel Estimated Generalized Least Squares (EGLS) estimation method has produced a highly reliable and statistically significant model. The Adjusted R-squared value of 0.976499 indicates that approximately 97.65% of the variance in the dependent variable is explained by the independent variables in the model. This is a very high value, suggesting that the model provides an excellent fit to the data. The Adjusted R-squared takes into account the number of predictors in the model, providing a

more accurate measure of goodness-of-fit, especially in models with multiple variables. This high value indicates that the model is capturing most of the variability in the dependent variable, leaving little unexplained variance.

The probability of the F-statistic (Prob(F-statistic)) is 0.000000, which is effectively zero. This p-value is well below 0.05 significance level, indicating that the overall regression model is statistically significant. In other words, there is very strong evidence to reject the null hypothesis that all regression coefficients are equal to zero. This suggests that at least one of the independent variables in the model has a statistically significant relationship with the dependent variable. This combination of high explanatory power and statistical significance underscores the robustness and reliability of the Panel EGLS estimation method used in this analysis.

4.2.1 Hypothesis I

H_{01}: Human capital efficiency has no significant effect on Net Assets Per Share of listed manufacturing firms in Nigeria.

The coefficient for Human Capital Efficiency (HCE) is 0.010951, with a p-value of 0.0002. This indicates that HCE has a statistically significant positive effect on Net Assets Per Share at the 5% significance level. Specifically, a one-unit increase in HCE is associated with an increase of approximately 0.010951 units in Net Assets Per Share, holding other factors constant. This result suggests that the more efficiently a manufacturing firm in Nigeria utilizes its human capital, the higher its net assets per share. Since the p-value (0.0002) is less than 0.05, we accept the alternate hypothesis that Human capital efficiency has a significant positive effect on Net Assets Per Share of listed manufacturing firms in Nigeria (p-value = 0.0002).

This could be because efficient utilization of human capital leads to improved productivity, innovation, and operational efficiency, which in turn enhances the firm's financial performance. In Nigeria's manufacturing sector, where skilled labour and expertise are critical for maintaining competitiveness, investing in employee development and effectively leveraging their capabilities results in higher NAPS. This positive relationship underscores the importance of human capital as a key driver of value creation in manufacturing firms. This corroborates the result by Emadzadeh, Nadia, Asiya, Mahboobe, Fatemeh and Mojgan (2023); Mbugua and Rotich (2023); Fathi, Farahmand and Khorasani (2023); Ngari, Gichira, Aduda

and Waititu (2023); Ahangar (2023); but negated the finding by Stella and Utitofonidara (2022).

4.2.2 Hypothesis II

H_{02}: Structural capital efficiency has no significant effect on Net Assets Per Share of listed manufacturing firms in Nigeria.

The coefficient for Structural Capital Efficiency (SCE) is 0.064978, with a p-value of 0.0012. This coefficient is also statistically significant at the 5% level, indicating a strong positive relationship between SCE and Net Assets Per Share. A one-unit increase in SCE results in an increase of about 0.064978 units in Net Assets Per Share, ceteris paribus. This implies that enhancements in structural capital, such as improved organizational processes, robust information systems, and efficient internal procedures, significantly contribute to the financial health and asset valuation of manufacturing firms. Hence, since the p-value (0.0012) is less than 0.05, we accept the alternate hypothesis that Structural capital efficiency has a significant positive effect on Net Assets Per Share of listed manufacturing firms in Nigeria (p-value = 0.0012).

Structural capital which encompasses the internal processes, databases, organizational culture, patents, and intellectual property support the functioning of the organization. Thus, efficient management of structural capital ensures that these resources are optimally utilized to streamline operations, reduce costs, and enhance innovation. In the Nigerian manufacturing context, strong structural capital allows firms to better withstand market fluctuations and adapt to changes, thereby improving their financial stability and increasing NAPS. The positive impact of SCE on NAPS highlights the role of robust internal systems and processes in driving financial performance. This findings align with the study by Ndueche (2023); Mbugua and Rotich (2023); Stella and Utitofonidara (2022); Rawashdeh (2022); Salim and Ejikeme, (2022).

4.2.3 Hypothesis III

H_{03}: Relational capital efficiency has no significant effect on Net Assets Per Share of listed manufacturing firms in Nigeria.

Relational Capital Efficiency (RCE) has a positive coefficient of 0.144881 and a p-value of 0.0015. This indicates that RCE is positively and significantly associated with Net Assets Per Share at the 5% significance level. A one-unit increase in RCE corresponds to an increase of

approximately 0.144881 units in Net Assets Per Share, assuming all other variables are constant. This finding highlights the critical role of relational capital, which includes customer relationships, supplier networks, and brand reputation, in enhancing a firm's financial performance. Hence, since the p-value (0.0015) is less than 0.05, we accept the alternate hypothesis that Relational capital efficiency has a significant positive effect on Net Assets Per Share of listed manufacturing firms in Nigeria (p-value = 0.0015).

Relational capital which entails the value derived from a firm's relationships with external stakeholders such as customers is crucial in driving firm performance. Effective management of relational capital can lead to increased customer loyalty, stronger supplier partnerships, and enhanced brand reputation, all of which contribute to improved financial outcomes. For Nigerian manufacturing firms, building and maintaining strong external relationships are crucial for securing market share, ensuring supply chain reliability, and accessing new markets, thereby boosting NAPS. This positive correlation emphasizes the importance of external networks and relationships in enhancing firm value. Similar result was realised by Mbugua and Rotich (2023); Ndueche (2023); Stella and Utitofonidara (2022); Rawashdeh (2022); Salim and Ejikeme, (2022);

4.2.4 Hypothesis IV

H_{04}: Capital employed efficiency has no significance effect on Net Assets Per Share of li sted manufacturing firms in Nigeria.

The coefficient for Capital Employed Efficiency (CEE) is 0.058424, with a p-value of 0.7257. An increase in CEE by a unit corresponds to an increase in NAPS by 0.058424. However, unlike the other variables, the p-value for CEE is not statistically significant at 5% level. This suggests that CEE does not have a statistically significant effect on Net Assets Per Share in the context of this study. Therefore, the efficiency with which the firms employ their capital does not appear to influence their net assets per share significantly. The null hypothesis was therefore accepted since the p-value (0.7257) exceeded 0.05, with the conclusion that Capital employed efficiency has a non-significant positive effect on Net Assets Per Share of listed manufacturing firms in Nigeria (p-value = 0.7257).

This is because efficient utilization of capital employed means that the firm is effectively using its resources to generate returns, leading to better financial performance. In the manufacturing sector, where substantial investments in machinery, technology, and infrastructure are necessary, optimizing the use of capital employed ensures higher

productivity and profitability. This efficient resource allocation results in an increase in NAPS, highlighting the critical role of strategic investment and resource management in driving financial success (Arumona, Daniel & Enomate, 2022). Also, this finding agrees with those by Ndueche (2023); Tarigan, Listijabudhi, Hatane and Widjaja (2020); but negated that of Narwal and Yadav (2019) which found a negative effect.

CONCLUSION AND RECOMMENDATION

Intellectual capital including human capital, structural capital, and relational capital are important intangible assets that contribute to a firm's value and competitive advantage. For manufacturing firms in Nigeria, efficiently managing these aspects of intellectual capital can significantly impact financial performance. The study found that human capital efficiency, structural capital efficiency, and relational capital efficiency all positively influenced performance metrics like net assets per share. Employees with strong skills and knowledge can drive innovation, productivity, and efficiencies to boost profits and asset utilization. Investing in workforce development also helps attract and retain top talent.

Robust structural capital allows firms to streamline operations, lower costs, and enhance products/services. This fosters an environment for innovation and continuous improvement, leading to optimized resource use and operational resilience for better financial results. Effectively managing relationships with stakeholders through relational capital enables increased sales, improved supply chain management, and customer loyalty. These relationships create stable revenue streams and reduced risks, translating to higher net assets per share. Efficient use of capital employed means firms can earn higher returns on investments, contributing to overall profitability and asset growth. Optimizing financial resource allocation supports investing in high-return projects, expanded production capabilities, and market presence—strengthening both immediate performance and long-term balance sheet value. by cultivating intellectual capital aspects, manufacturing firms can achieve sustainable growth and stronger financial metrics like increased net assets per share.

The study therefore recommended that:

a. HR Managers should invest in continuous training and development programs for employees to enhance their skills and competencies in order to improve individual performance but also drive overall organizational productivity, thereby increasing Net Assets Per Share.

b. Operations Managers should implement advanced information systems and optimize organizational processes to streamline operations and reduce costs in order to enhance operational resilience and contribute to better financial performance.
c. Marketing and Relationship Managers should foster and maintain strong relationships with key stakeholders, including customers, suppliers, and partners. In order to increase sales and customer loyalty, positively impacting Net Assets Per Share.
d. Financial Managers should optimize the allocation of financial resources by investing in high-return projects and ensuring efficient use of capital. This strategic financial management will enhance profitability and strengthen the firm's balance sheet, leading to higher Net Assets Per Share.

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