KASU Journal of Accounting Research and Practice (KAJARAP)

Volume 10, Number 2, December, 2025 ISSN: 2360-8889

https://journals.kasu.edu.ng/index.php/accounting

EFFECT OF HUMAN CAPITAL EFFICIENCY ON FINANCIAL PERFORMANCE OF LISTED CONSUMER GOODS COMPANIES IN NIGERIA

Nasiru Rabiu[1], Joshua Okpanachi[2], Onipe Adabenege Yahaya[3], Adzor Ibiamke[4]

[1,2,3,4] Department of Accounting, Faculty of Management Sciences, Nigerian Defence Academy, Kaduna

Corresponding Author(s) email/mobile:+2348131374737[1]

Abstract

This study investigates the effect of human capital efficiency on the financial performance of listed manufacturing companies in Nigeria. The strategic role of human capital remains underexplored in the empirical literature; hence, the need for this study. Using panel data from 17 consumer goods firms listed on the Nigerian Exchange Group between 2014 and 2023, the study employs descriptive statistics, correlation analysis, and robust random-effects regression to evaluate the effect of human capital efficiency on financial performance, with firm size as a controlling variable. The findings reveal a statistically significant positive effect of human capital efficiency on financial performance, implying that employee skills, knowledge, and experience lead to financial performance of listed manufacturing firms in Nigeria. These results offer practical implications for corporate executives and policymakers aiming to enhance human capital development as a lever for sustainable growth in Nigeria's manufacturing sector.

Keywords: human capital efficiency, financial performance, listed consumer goods companies, Nigeria

1. Introduction

The financial performance of the manufacturing firms in Nigeria has been volatile over the past three decades, with its contribution to GDP declining from about 10% in the 1980s to approximately 9% by 2022 (National Bureau of Statistics, 2023). Several factors are responsible, including heavy dependence on oil revenue, inconsistent policies, poor infrastructure, limited financing, and shortages of skilled labour (Eze & Okoye, 2021).

Beyond macroeconomic issues, micro-level inefficiencies such as weak internal controls, suboptimal operations, and poor corporate governance have further undermined firm growth and profitability (Eze & Okoye, 2021). Given these challenges, this paper examines whether human capital can improve the financial performance of Nigeria's listed manufacturing companies, using Return on Assets (ROA) as the key performance metric.

Human capital refers to the skills, knowledge, and experience employees possess, which are often expensed rather than capitalised despite their strategic importance (Minovski & Jancevska, 2018). Previous studies on intellectual capital in Nigeria have not isolated the human capital-specific impact, leaving a notable research gap. This study

addresses that gap by focusing on the effect of human capital on the financial performance of the manufacturing sector in Nigeria.

This inquiry underscores the strategic importance of skilled labour in driving corporate success. For example, global technology leaders (e.g. Apple) demonstrate that superior human capital is closely tied to superior performance. The findings from this study will provide insights for company executives (e.g. managing directors) and inform policymakers in crafting initiatives to strengthen human capital development in the manufacturing sector.

Despite the existence of various studies on intellectual capital in Nigeria, there remains a notable gap in empirical research focusing on the specific influence of human capital efficiency on the financial performance of listed manufacturing companies. Given this background, this study seeks to address this gap by examining the role of human capital in enhancing financial outcomes.

Accordingly, the study is guided by the following research question: (i) How does human capital affect the financial performance of listed manufacturing companies in Nigeria? The main objective of the study is to examine the effect of human capital efficiency on the financial performance of listed manufacturing firms in Nigeria. To achieve this objective, the study tests the following hypothesis, stated in its null form:

H_{01}: Human capital does not significantly affect the financial performance of listed manufacturing companies in Nigeria.

This research shows the importance of skilled labour in driving corporate success, drawing parallels with global technology leaders such as Apple, whose performance is closely tied to human capital excellence. The findings are expected to provide valuable insights for corporate executives, including managing directors, and inform policy decisions aimed at strengthening human capital development within the manufacturing sector.

The paper is structured into key sections that systematically examine the effect of human capital efficiency on the financial performance of listed consumer goods companies in Nigeria. It begins with the Abstract, which outlines the study's objectives, methods, and findings, followed by the Introduction, which establishes the research context, identifies the problem, and states the research question, objectives, and hypothesis.

The Literature Review discusses the conceptual and empirical foundations, supported by the Resource-Based Theory and Intellectual Capital Theory. The Methodology details the research design, data collection, variables, and analytical techniques used for testing the hypothesis.

The Results and Discussion section presents and interprets the statistical analyses, highlighting the significant impact of human capital efficiency on financial performance. The paper concludes with the Conclusion and Recommendations, summarising key insights and offering practical and policy suggestions, followed by References and Appendices that provide supporting evidence and data.

2. Literature Review

This study investigates the effect of human capital on the financial performance of listed manufacturing firms in Nigeria. To establish a robust theoretical foundation, a comprehensive review of existing literature has been conducted. This includes an exploration of the conceptual frameworks surrounding financial performance and human

capital. Additionally, an empirical review has been presented, highlighting previous studies that examine the relationship between human capital and financial performance. These reviews collectively provide the necessary context and justification for the current research.

Financial Performance

Financial performance (FP) is a critical accounting and economic metric used to evaluate a company's overall health and operational success within a specific reporting period (Fatihudin & Mochklas, 2018). It reflects the extent to which a firm effectively utilises its resources to generate income and create value for its stakeholders (Abdirahman & Tarique, 2020).

In this study, financial performance is proxied by Return on Assets (ROA), a widely accepted indicator in empirical research for assessing corporate efficiency and profitability. ROA is defined as net income divided by total assets (typically average assets). It captures both profitability and asset utilisation efficiency. A higher ROA indicates that a company is more effectively converting its asset base into earnings. For context, Chen et al. (2005) note that ROA reflects the benefits of operations and the efficiency of asset use. Strong financial performance (high ROA) often enhances organisational capabilities, innovation, and productivity, yielding a competitive advantage.

Conversely, deteriorating performance signals potential issues that may demand management intervention to ensure sustainability. Har and Ghafar (2015) emphasise that market-based factors, such as share price, are essential in defining financial performance position and economic health. In summary, financial performance provides a comprehensive overview of a firm's health in monetary terms, allowing for benchmarking against peers to inform decision-making.

ROA measures the net income generated relative to the total assets employed, thereby indicating how effectively a company converts its asset base into earnings. A higher ROA signifies superior asset management and profitability. Mathematically, ROA is expressed as the ratio of net income to average total assets, where net income is derived by subtracting the cost of goods sold and operating expenses from total revenue. Average total assets are calculated by averaging the total assets at the beginning and end of the fiscal year (Sausan et al., 2020; Daniswara & Daryanto, 2020; Sunaryo, 2020).

From this perspective, financial performance can be conceptualised as a comprehensive reflection of financial and operational activities over a defined period. It provides insights into the efficiency of resource management, which can be derived from financial statements and other reports (Castro et al., 2021). It should be noted that a robust financial performance is often associated with enhanced organisational capabilities, increased innovation among employees, improved productivity, and ultimately, a sustainable competitive advantage (Al-Omoush et al., 2022). This, therefore, involves assessing operational efficiency through generating revenue while minimising costs over time.

Equally, Laghari et al. (2023) further emphasise that financial performance entails evaluating how effectively a company transforms its assets into profits. Thus, the efficiency of the asset's utilisation is paramount in defining the financial performance of manufacturing firms in this context. As the study uses ROA, it serves as a key metric in this evaluation, offering stakeholders a clear view of profitability and managerial

effectiveness. A consistently high ROA indicates sound financial management and strategic resource allocation, contributing to long-term financial stability.

Financial institutions typically assess performance using a suite of financial metrics, including gross profit margin, net profit margin, return on assets (ROA), return on equity (ROE), and operating margin (Helin et al., 2018). Similarly, Hamidah (2015) describes financial performance as a comparative assessment of financial operations relative to its industry peers. This comparative approach underscores the internal control mechanism in monitoring, evaluating, and enhancing a financial standing. A downward trend in these indicators may prompt executive interventions aimed at ensuring sustainability and delivering shareholder value.

Greuning (2005, as cited in Saleh, 2015) offers an institutional perspective grounded in the International Financial Reporting Standards (IFRS), suggesting that financial performance encompasses a broad analytical framework. This includes cost efficiency, liquidity, profitability, dividend payout ratios, and other financial indices that collectively inform the economic well-being of an enterprise.

Zorn et al. (2018) categorise financial ratios into five key classes: profitability, liquidity, efficiency, capital structure, and investment ratios, each contributing to a holistic understanding of financial performance. This study adopts the view of Fatihudin and Mochklas (2018), financial performance reflects a firm's ability to generate profits in a given period.

Human Capital

Human capital refers to the collective skills, knowledge, experience, and personal attributes possessed by individuals within an organisation, which contribute to its productivity, innovation, and long-term success. In the contemporary knowledge-driven economy, human capital is increasingly recognised as a strategic asset that underpins organisational growth and competitive advantage. Companies invest significantly in human resource development practices such as training, workshops, and continuous learning initiatives to enhance employee capabilities and foster sustainable business performance.

Samad (2012) emphasises that human capital is the most critical resource for driving profitability, asserting that the intellectual contributions of employees are indispensable to financial growth. Lubatkin et al. (2006) and Khalique & Pablos (2015) further argue that the knowledge embedded in employees represents a unique and interconnected set of competencies, whether acquired internally or externally, that are directed toward achieving organisational sustainability and profitability.

Wuttaphan (2017) highlights that effective human capital management—particularly empowering managers and fostering inter-organisational collaboration—enables firms to acquire new knowledge, develop innovative technologies, and institutionalise learning processes. These practices not only enhance operational efficiency but also position firms ahead of their competitors across various industries.

Nuraini (2018) expands the definition of human capital to include emotional well-being, experiential learning, business acumen, and intrinsic motivation. This holistic view positions human capital as the central link between organisational resources and strategic growth. To harness this potential, firms implement policies aimed at attracting and retaining talent through structured development programs and knowledge-sharing platforms.

In manufacturing sectors, such systems have been shown to improve profitability and competitiveness. The strategic importance of human capital is further underscored by Acuña-Opazo and González (2021), who found that American firms increasingly invest in human capital due to its superior contribution to wealth creation compared to other organisational resources. Attia et al. (2022) similarly note that financial performance is closely tied to employee development, suggesting that the effective application of employee skills is a key indicator of organisational success.

Hidayat and Widodo (2022) reinforce this perspective by asserting that financial growth is largely dependent on employee competence. Organisations that cultivate environments conducive to idea generation, research and development, and continuous learning are more likely to achieve sustained profitability. Drawing from these insights, this study conceptualises human capital as the unique and valuable attributes of employees, which include their knowledge, skills, expertise, health, education, and creativity that directly contribute to organisational performance.

In alignment with Nuraini (2018), human capital is viewed as a repository of specialised skills and innovative capacities that are applied to solve business challenges and achieve strategic objectives. As such, human capital represents an intangible asset that enables firms to generate economic value through the effective utilisation of human potential. This perspective is consistent with the view of Ngoc and Duc (2020), who attribute the economic success of many technology firms to human innovation and the continuous enhancement of products and services to meet evolving customer needs.

Empirical Studies

Dimitrios et al. (2011) examined the effect of human and structural capital on the financial performance of Greek firms. The study collected data from 96 Greek companies across four separate economic sectors listed on the Athens Stock Exchange (ASE) over three years from 2006 to 2008. The regression models demonstrated a significant impact of human capital on the financial performance of Greek firms. This study effectively represented the population, but its three-year timeframe may limit the accuracy of findings. A short duration can obscure longer-term patterns and effects in the variables, potentially leading to different outcomes over a more extended period. Future research should aim for at least five years of data collection for a more comprehensive analysis.

Shohreh and Geert (2015) investigated the impact of human capital on the financial performance of 33 Dutch manufacturing companies over six years, from 2007 to 2012. The study aimed to determine the economic value contributed by human capital. It compared the effectiveness of human capital with various organisational performance metrics, including Return on Total Assets (ROTA), Return on Equity (ROE), and Earnings per Share (EPS). Utilising multiple linear regression models and the VAIC method, the research revealed a significant connection between human capital and the corporate performance metrics of ROTA, ROE, and EPS. However, the study highlights some areas of concern; for instance, the results may not apply to industries outside Dutch manufacturing, which limits the generalisation of the findings. Moreover, variations in employee uniqueness and skills can lead to differing individual performance levels, ultimately affecting the organisation's overall success in various ways.

Neha and Niladri (2018) investigated how intellectual capital affects the financial performance of Indian companies listed on the Centre for Monitoring Indian Economy

Overall Share Price Index between 2001 and 2016. Using the Value-Added Intellectual Coefficient (VAIC) along with a Dynamic System Generalised Method of Moments (SGMM) estimator, their findings demonstrated that human capital plays a vital role in driving sales growth and market value. Similarly, Filipe et al. (2018) explored how intellectual capital affects the financial performance of small and medium-sized hotels between 2007 and 2015. They employed the Generalised Method of Moments (GMM system) estimator (1998) to analyse panel data from a sample of 934 Portuguese small and medium-sized hotels. The analysis revealed that human capital positively influences hotel financial performance.

From these studies, we can infer that human capital has a positive effect on driving the sales growth and financial performance of Portuguese hotel businesses. However, the hotel industry might not rely heavily on new ideas but instead requires strong technological skills and customer relationships. It suggests that having good connections and a solid organisational structure could be more important than skills and innovation, as is often the case in manufacturing firms.

Ngoc and Duc (in 2020) looked at how employee skills affected the financial performance of different types of businesses in Vietnam from 2011 to 2018. They used a special statistical method called GMM to analyse their data. What they found using this method was that employee skills had a big impact on how well businesses did financially in Vietnam.

Larysa and others (2021) studied the effect of employee skills on the financial performance of digital companies in Ukraine. They surveyed businesses through the administration of a 500-questionnaire to get their information. The study found that employee skills had a big and important effect on the financial performances of digital companies in Ukraine. The study used a large sample, which made it commendable for generalisation. But the study did not state the target population, which limits the understanding of the population. For example, if they were trying to understand all digital businesses in the whole of Ukraine, then surveying 500 people might not be enough to make general statements. Additionally, it is essential to note that the various political situations and economic conditions in different parts of Ukraine may also evolve and alter the results.

Aidin et al. (2023) investigated the role of employee competencies in shaping the financial success of emerging digital firms in Iran. Their study further emphasised the mediating influence of intra-organisational knowledge sharing in enhancing financial outcomes. From a population of 160 digital firms affiliated with a university in Tehran, a random sample of 113 companies was selected. Data were analysed using SmartPLS 3, a structural equation modelling (SEM) tool designed for testing complex causal relationships. The findings indicated that employee skills positively and significantly impacted financial performance. Additionally, knowledge sharing enhanced this relationship, highlighting the vital role of intellectual capital in digitally-driven business models.

Similarly, Jedsada and Jutamard (2023) examined the impact of human capital on the financial performance of small and medium-sized enterprises (SMEs) in the retail and wholesale sectors in eastern Thailand. Their study covered 260 SMEs within a designated economic corridor, employing quantitative methods to assess how robust human resource management (HRM) systems contribute to firm performance. Results revealed a

statistically significant positive effect of human capital on financial performance, suggesting that strategic investment in employee training, development, and retention enhances competitiveness and profitability.

Firm Age

Firm age, typically measured as the number of years from the date of incorporation, it is often associated with accumulated experience, market knowledge, and operational maturity (Nafiah & Setiawati, 2023; Ismail et al., 2023). Empirical evidence suggests that older firms tend to exhibit more stable financial performance due to established customer bases, refined processes, and stronger reputations. For instance, Nafiah and Setiawati (2023) found that firm age positively influenced firm value among manufacturing companies listed on the Indonesia Stock Exchange between 2019 and 2021. Their study concluded that older firms benefit from accumulated knowledge and operational resilience, which enhance profitability and investor confidence.

Similarly, Ismail et al. (2023) examined 13 listed industrial goods firms in Nigeria from 2013 to 2022 and reported a significant positive relationship between firm age and profitability. The authors attributed this to the ability of older firms to leverage historical data, maintain long-term supplier relationships, and navigate regulatory environments more effectively. However, some studies caution that the benefits of age may plateau or even decline if firms become complacent or resistant to innovation.

Firm Size

Firm size, often proxied by total assets or revenue, is another critical determinant of financial performance. Larger firms typically enjoy economies of scale, better access to capital markets, and stronger bargaining power. Ernest and Monday (2024) conducted a study on selected Nigerian manufacturing firms and found a robust positive correlation between firm size and financial performance. Their findings suggest that larger firms are better positioned to absorb economic shocks and invest in productivity-enhancing technologies.

In the Indonesian context, Nafiah and Setiawati (2023) also observed that firm size significantly influenced firm value, with larger firms demonstrating superior performance metrics. This was attributed to their ability to diversify operations and attract skilled human capital. However, the relationship is not universally linear. In some cases, excessively large firms may suffer from bureaucratic inefficiencies and slower decision-making processes, which can dampen agility and innovation.

Theoretical Review

This study is grounded in two complementary theories: the Resource-Based Theory (RBT) and the Intellectual Capital Theory (ICT). The RBT, introduced by Barney (1991), explains how firms achieve competitive advantage by effectively utilising internal resources and capabilities. For a resource to confer sustained advantage, it must be valuable, rare, inimitable, and non-substitutable (VRIN). Human capital often meets these criteria because skilled and creative employees can be a valuable, rare resource that competitors struggle to imitate.

Under RBT, firms with talented people and competent resource management can attain enduring growth and superior financial results. Investments in R&D, patents, and branding (which rely on human ingenuity) create advantages that competitors cannot easily

erode, thus boosting profitability. Essentially, RBT suggests a firm outperforms rivals by leveraging unique internal strengths.

On the other hand, Intellectual Capital Theory (ICT) complements RBT by focusing specifically on intangible assets. While ICT was not formally invented by a single scholar, Leif Edvinsson and Michael Malone (1997) are generally recognised as the originators of the theory's modern framework, emphasising that organisational value is derived from intangible assets such as human, structural, and relational capital rather than physical or financial capital. The knowledge, ideas, and experiences of employees are key drivers of firm value. ICT posits that effective use of intellectual capital (human, structural, and relational capital) improves a company's financial position.

Both RBT and ICT revolve around the idea that superior organisational capabilities yield economic rents (above-normal profits) and a company is seen as a bundle of abilities and knowledge assets. Thus, the hypothesis in this study that employee skills (human capital) significantly influence manufacturing firms' performance can be understood through the lenses of RBT and ICT. Human capital is an internal resource that, if effectively developed and deployed, should provide a competitive edge and better financial outcomes.

In summary, RBT highlights that sustainable advantage comes from unique internal resources and competencies that rivals cannot easily duplicate. On the other side, ICT emphasises leveraging intangible knowledge assets to enhance financial performance. Together, these theories imply that manufacturing firms in Nigeria can improve results by strengthening and exploiting their human capital. Skilled employees and know-how represent a core competence that, when combined with supportive structures and systems, drives profitability and growth. This theoretical framing supports our expectation that human capital efficiency will have a positive effect on ROA for the firms studied.

3. Methodology

This study focuses on consumer goods companies listed on the Nigerian Exchange Group as of 2023, comprising a total population of 21 companies. A case study research design is used to examine the effect of human capital efficiency on the financial performance using panel data from 2014 to 2023. The data were collected from secondary sources, mainly from publicly available information on the Nigerian Exchange Group's website and the respective company websites.

A filtering criterion was applied to select a sample of seventeen firms, excluding those that were irrelevant to the study, such as listed very recently, delisted or suspended during the study period. As a result, the sampling was determined by the availability of relevant data from the listed consumer goods companies in Nigeria. The population and sample size are shown in Table 1 below.

Table 1

Population of the study and sample size

S/N	COMPANIES	Year of Incorp.	Sample
1	BUA Foods Plc	2005	Listed Jan 5, 2022
2	Cadbury Nigeria Plc	1965	Sampled ✓
3	Champion Breweries Plc	1974	Sampled ✓
4	Dangote Sugar Refinery Plc	2005	Sampled ✓
5	DN Tyre & Rubber Plc	1961	Delisted by NSE in 2019
6	Flour Mills of Nigeria Plc	1960	Sampled ✓
7	Golden Guinea Breweries Plc	1962	Sampled ✓
8	Guinness Nigeria Plc	1950	Sampled ✓
9	Honeywell Flour Mills Plc	1985	Sampled ✓
10	International Breweries Plc	1971	Sampled ✓
11	McNichols Plc	2004	Sampled ✓
12	Multi-Trex Integrated Foods Plc	1999	Suspended since 2016
13	Nascon Allied Industries Plc	1973	Sampled ✓
14	Nestlé Nigeria Plc	1969	Sampled ✓
15	Nigerian Breweries Plc	1946	Sampled ✓
16	Nigerian Enamelware Plc	1960	Sampled ✓
17	Northern Nigeria Flour Mills Plc	1971	Sampled ✓
18	PZ Cussons Nigeria Plc	1957	Sampled ✓
19	Unilever Nigeria Plc	1923	Sampled ✓
20	Union Dicon Salt Plc	1991	Delisted before 2020
21	Vitafoam Nigeria Plc	1962	Sampled ✓

Source: Field survey, 2025

The study incorporated firm age as another independent variable, while the firm size was a control variable to account for additional factors that may impact Return on Assets (ROA). Utilising this control variable enhances the validity and reliability of the findings by isolating the true effects of the independent variables on the dependent variable (Sekaran & Bougie, 2016).

Control variable plays a crucial role in isolating the effects of the primary variables by holding these additional factors constant (Hair et al., 2019). Given that firm size data often exhibits a wide range and significant skewness between small and large firms, applying the natural logarithm compresses the distribution of the inequality, thus resulting in a more normally distributed dataset for statistical analysis.

The study employed several analytical methods, including descriptive statistics, the Shapiro-Wilk test, pairwise correlation, regression analysis, and the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity. Additionally, it utilised fixed effects and random

effects GLS regression for model specification, along with robust random-effects GLS regression, all conducted using STATA 11.2.

A simple linear regression analysis was used to analyse the stated hypothesis. Therefore, to express the model, a simple linear regression equation is stated as follows: $Y = \alpha + bx$; Where y = Dependent variable; α = alpha (α) is the intercept, indicating where the regression line intersects the y-axis when x=0; b = slope A, the regression line (it is the rate of change in Y with respect to x); a - change in Y with respect to x; x = independent variable.

This study adapts the Mohammad et al. (2018) model, which is stated as follows:

$ROAit = \alpha it + \beta 0\ HCEit + \beta 1\ SCEit + \beta 2\ CEE + \varepsilon it$ ……1

To achieve the objective earlier stated for this study, the model is modified as follows:

$ROAit = \alpha it + \beta_1 HCE_{it} + \beta_2 FA_{it} + \beta_3 FZ_{it} + \varepsilon i$……2

Where: ROA = Return on Assets as a proxy for Financial Performance (Dependent variable); αit = alpha (α), is the intercept of the regression line, indicating where the regression line intersects the y-axis when x=0, HCE_{it} = Human Capital Efficiency (Independent Variable); FA_{it} = Firm Age (Independent Variable), FZ = Firm Size (Control Variable), β1.....β3 = Beta (β) represents the slope of the regression line, indicating how much the y-value changes for each unit increase in x, I = firm; t = time and εi= Residual or error term. The variables and how they are measured are provided in Table 2 below.

Table 2

Variable Definition, Measurements and Sources

Variable	Acronym	Measurement	Sources
Dependent Variable			
The return on Assets	ROA	Net Income / Assets	Bello (2022)
Independent variable			
Human Capital Efficiency.	HCE	The ratio of the value added to human cost (VA/HC)	Nuraini (2018)
Control Variables			
Firm Age	FA	Current year of study minus year of incorporation (CY–YI)	Akorede (2023)
Firm size	FZ	Ln (Total Assets)	Hermuningsih et al. (2020)

Source: Field Survey, 2025

4. Results and Discussion

This section presents and discusses the analysis results. All test results are shown in tabular format, accompanied by discussions. Table 3 displays the descriptive statistics, outlining the characteristics of the variables used in the study.

Table 3

Descriptive Statistics

Variable	Obs	Mean	Std. Dev	Min	Max
Hce	170	84.3	48.9256	1	168
Fa	170	8.7059	3.8885	1	15
Fz	170	0.8442	0.0431	0.6841	0.9206
Roa	170	0.0349	0.13	-1.1337	0.4238

Source: STATA Output, 2025

Table 3 shows a mean Return on Assets (ROA) of 0.0349, indicating that, on average, the firms generate a 3.49% return on assets for every ₦1 invested in human capital. The ROA ranges from a minimum of -1.1337 (−113%) to a maximum of 0.4238 (42%). The standard deviation of 13% suggests substantial variation in income among the consumer goods companies.

The data further reveal that Human Capital Efficiency (HCE) ranges from a minimum contribution of ₦1 to a maximum of ₦168, with a mean value of ₦84.30 across the firms. This infers that, on average, ₦84.30k in human capital efficiency was utilised to generate ₦0.03 in returns on assets. The standard deviation of 49% shows considerable variability in the application of human capital efficiency across firms, reflecting divergent levels of human capital utilisation among listed consumer goods companies in Nigeria. The following Table 4 presents the results of the pairwise correlation, explaining the relationships among the variables.

Table 4

Pairwise Correlations

	Roa	hce	Fa	fz
Roa	1.0000			
hce	0.5952*	1.0000		
	0.0000			
fa	-0.0757	-0.1286	1.0000	
	0.3267	0.0950		
fz	0.0303	-0.0042	-0.0283	1.0000
	0.6945	0.9506	0.7141	

Source: STATA, 2025

The pairwise correlation results revealed a correlation coefficient of 0.5952 with a p-value of 0.0000, indicating a strong positive and statistically significant relationship between human capital efficiency (HCE) and return on assets (ROA). This suggests that as HCE increases, ROA tends to rise as well. Thus, the findings support the hypothesis that human capital efficiency significantly affects the financial performance of consumer goods companies in Nigeria.

Conversely, the relationship between ROA and firm age (FA) is weak, negative, and not statistically significant. Additionally, firm size does not seem to have a meaningful impact on ROA in this study; the correlation coefficient for firm size is -0.0757, with a p-value of 0.3267. This indicates a very weak positive relationship between firm size and ROA, which is also not statistically significant. The results of the normality test can be found in Table 5 below.

Table 5

Shapiro-Wilk test for normal data

variable	obs	w	V	z	prob>z
roa	170	0.7017	38.648	8.339	0.0000
hce	170	0.9539	5.965	4.075	0.0000
fa	170	0.9809	2.471	2.064	0.0195
fz	170	0.9692	3.981	3.152	0.0008

Source: STATA, 2025

The Shapiro-Wilk test, as presented in Table 5, assesses whether a variable conforms to a normal distribution curve. This test is typically performed before conducting parametric analyses, such as regression or t-tests, which depend on the assumption of normality. The W value acts as the test statistic, while the z values represent a transformation of the W statistic, accompanied by the corresponding Prob > z (p-value).

When $p < 0.05$, it indicates that the data significantly deviates from normality. According to Table 5, all four variables (ROA, HCE, FA, and FZ) have p-values below 0.05, confirming that none follow a normal distribution at the 5% significance level. The test for multicollinearity is detailed in Table 6 below.

Table 6

Test for multicollinearity

Variable		VIF	1/VIF
Hce		1.02	0.982668
Fa		1.02	0.983438
Fz		1.0	0.999137
mean VIF		1.01	
hettest Chi2 (1)	55.21		
Breusch-Pagan (Prob>Chi 2	0.00000		

Source: STATA Output, 2025

Table 6 presents the results of multicollinearity. The Variance Inflation Factor (VIF) provides regression analysis with the ability to measure multicollinearity by evaluating how independent variable correlations affect coefficient variance inflation. Low multicollinearity exists in the model according to the mean VIF value of 1.01, which falls below 10 (James et al., 2017). Since the mean VIF is under 10, multicollinearity between HCE and firm age does not affect the results.

Strong evidence of heteroscedasticity is indicated when a Hettest reports a p-value of 0.0000 in the regression model. Heteroscedasticity occurs within the data because the variance of the residuals changes unpredictably across observations. However, homoscedasticity is required for the appropriate implementation of standard ordinary least squares (OLS) regression.

This issue of inconsistent error variance (heteroscedasticity) can render our regression analysis less accurate and reliable. It also impacts important metrics such as the F-test and R-squared, which indicate the overall significance of our model and how well it explains the data. Consequently, if heteroscedasticity is present, it becomes more difficult to trust these crucial measures.

To address the problem of heteroscedasticity and ensure that our statistical results are accurate, generalised least squares (GLS) regression is a better estimator than OLS. Also, when conducting GLS, we must choose between fixed effects regression and random effects GLS regression. The decision on which method to use will depend on the results of the Hausman test.

Table 7

Hausman Test

ROA	Fixed (b)	Random (B)	Difference (b-B)	Std. Err.
Hcel	0.0015092	0.0015503	-0.0000411	0.0001
Fal	-0.0121238	-0.0005697	-0.0115541	0.0076
Fz	0.3838301	0.1722676	0.2115625	0.1574
chi2(3)	3.85			
Prob > chi2	0.278			

Source: STATA Output, 2025

The null hypothesis of the Hausman Test is that the preferred model is random effects, and the alternative hypothesis is that the model is fixed effects. If the p-value is less than 0.05, reject the null hypothesis. In Table 7 above, the Hausman test results ($p <$ 0.278 is greater than 0.05) indicate that we accept the null hypothesis that the model is a random effect. This is further explained in the Lagrangian test results in Table 8 below.

Table 8

Breusch and Pagan Lagrangian Multiplier test results for random effects

	Var	sd = sqr(Var)
Roa	0.0168905	0.1299636
E	0.0102945	0.101462
U	0.000883	0.0297148
chibar2(01)	1.64	
Prob > chibar²	0.1	

Source: STATA Output, 2025

Table 8 presents the results of the Lagrange Multiplier test for random effects, which helps us to decide whether random effects are needed at all. The u component (0.000883) is much smaller than the e component (0.0102945), meaning that most of the variation in ROA occurs within firms over time, not between firms. Since the p-value (0.10) is greater than 0.05, the difference between the fixed-effects and random-effects estimates is not statistically significant. This means the Random Effects model is preferred, as it provides efficient and consistent estimates under these conditions. Most variation in ROA is due to differences within firms over time (not across firms).

Table 9

Fixed-effects (within) regression

Roa	coef.	std. Err	t	p>|t|	[95% conf.]	Interval
Hce	0.0015092	0.00021	7.04	0.0000	0.0010854	0.001933
Fa	-0.0121238	0.00807	-1.5	0.135	-0.0280615	0.003814
Fz	0.3838301	0.26053	1.47	0.143	-0.1390454	0.8986055
_cons	-0.3108438	0.22545	-1.38	0.17	-0.756139	0.1346262
sigma_u	0.0661944		R-sq:	within=0.2641	F (3,150) 17.94	
sigma_e	0.10146204			between=0.3503	prob> F=0.0000	
Rho	0.2985719			overall=0.2598		
F test that all u_i=0, F(16,150) =1.80, Prob > F (u_i=0) .0364						

Source: STATA Output, 2025

Table 9 shows the results of the fixed-effects regression. The test reveals that the HCE coefficient is 0.0015092 with p=0.0000; therefore, firms with higher human capital efficiency significantly achieve better financial performance (ROA).

The effects of firm age and size are not statistically significant, indicating that internal capabilities (as reflected by HCE) are more important than structural attributes in influencing profitability within firms over time. HCE is the only statistically significant predictor of ROA. The overall model fits reasonably well, explaining about 26% of the variation within firms. The results of the Random-effects GLS regression are provided in Table 10 below.

Table 10

Random-effects GLS Regression

ROA	Coef.	Std. Err.	z	P>|z|	95% Conf. Interval (lower)	95% Conf. Interval (upper)
Hcel	0.0015503	0.00018	8.61	0.000	0.0011975	0.0019032
Fal	-0.0005697	0.00264	-0.21	0.832	-0.0058295	0.0046901
Fz	0.1722676	0.20758	0.83	0.407	-0.2345782	0.5791135
_cons	-0.2362956	0.17799	-1.33	0.184	-0.5851429	0.1125517
sigma_u	0.0291476		R-q:	within=0.2514	Wald chi2 =76.15	
sigma_e	0.10146204			between=0.6422	prob> chi2=0.0000	
Rho	0.0789942			overall=0.3544		

Source: STATA Output, 2025

The random-effects regression in Table 10 shows that Human Capital Efficiency (HCE) has a strong and significant positive effect on Return on Assets (ROA), meaning that firms that effectively use their employees' skills and knowledge tend to perform better financially, with the coefficient value of 0.0015503 (p=0.000)

Firm Age and Firm Size, however, have no significant influence on profitability. The model is statistically significant overall, explaining about 35% of the total variation in ROA. Since the variation due to firm-specific effects (rho = 0.08) is relatively small, the random-effects assumption appears reasonable, but a formal test will be conducted using

robustness auto correction of the error terms. Table 11 presents the results of the Robust Random Effects GLS Regression.

Table 11

*Robust Random Effects GLS Regressio*n

Roa	Coefficient	Robust Std. Error	z-value	P>|z|	[95% Conf.	Interval
Hcel	0.001503	0.0002234	6.94	0	0.001124	0.0019882
Fal	-0.0005697	0.0025768	-0.22	0.825	-0.0056201	0.0044807
Fz	-0.1722676	0.2111116	0.82	0.414	-0.2415035	0.5860388
_cons	-0.2362956	0.1909924	-1.24	0.216	-0.6106339	0.1380427
Parameter	Value	Description		Wald chi2 =61.60		
sigma_u	0.2971476	Standard deviation of u_i		Prob>Chi2= 0.0000		
sigma_e	0.10146204	Standard deviation of e_i				
Rho	0.8789942	Fraction of variance due to u_i				

Source: STATA Output, 2025

The Wald chi² = 61.60, Prob > chi² = 0.0000, which shows the model is highly significant and thus, the model as a whole fit well to explain the effect of HCE on ROA. The rho values = 0.8789942, highlighting that about 88% of the total variance in ROA is due to firm-specific effects (unobserved heterogeneity). This supports the use of the Random Effects model. The sigma_u and sigma_e represent standard deviations of firm-level and idiosyncratic errors, respectively. The sigma_u (0.297) > sigma_e (0.101) means firm-specific differences explain more variation than random shocks.

The Human Capital Efficiency (HCE) has a coefficient value of 0.001503, with a p-value of 0.000, indicating that a one-unit increase in human capital efficiency (HCE) leads to a 0.0015 increase in ROA, holding other variables constant. The p-value = 0.000 (< 0.05) shows that this effect is statistically significant. In other words, firms that utilise their human capital more effectively tend to experience better financial performance.

The firm Age has a coefficient value of -0.0005697 with a p-value of 0.825, showing no significant effect. Since the coefficient is very small and negative, it suggests that firm age has no meaningful effect on ROA. Older firms do not necessarily perform better or worse than younger ones. Also, the Firm Size coefficient is -0.1722676 with a p-value of 0.414, indicating not significant. Although negative, the effect is statistically insignificant. This means firm size does not have a clear relationship with ROA in this dataset.

The findings lead to the rejection of the null hypothesis and a conclusion that human capital efficiency has a significant effect on the financial performance of listed consumer goods in Nigeria. The research findings align with Shohreh and Geert (2015) and Aidin et al. (2023), who revealed a significant connection between human capital efficiency and corporate financial performance.

The findings are consistent with the Resource-Based Theory (RBT) and Intellectual Capital Theory (ICT), both of which highlight human resources as a crucial intangible asset that enhances firm performance. Skilled and knowledgeable employees foster innovation, improve operational efficiency, and create value, ultimately leading to increased

profitability. This conclusion aligns with empirical studies conducted by Pulic (2004), Joshi et al. (2013), and Mehralian et al. (2012), all of which demonstrate that Human

Capital Efficiency (HCE) has a significant effect on financial performance across various sectors. Our findings reinforce Resource-Based Theory, which states that the unique internal resources (in this case, talented human resources) are driving performance differences. It is essential to highlight that the age and size of a firm were found to be insignificant factors in determining performance. This suggests that even newer or smaller businesses can have higher ROA than older or larger companies, provided they skillfully harness their human capital.

This phenomenon may reflect the unique landscape of Nigeria, where numerous manufacturing enterprises regardless of their historical backgrounds, grapple with a range of common external challenges, such as inadequate infrastructure and complex policy environments. In this context, effective internal human capital management emerges as a crucial differentiator, enabling firms to navigate these obstacles and thrive in a competitive market.

These findings are in line with Intellectual Capital Theory and prior empirical research. Studies in other emerging markets (e.g. Joshi et al., 2013 for Australia's finance sector; Mehralian et al., 2012 for Iran's pharma industry) have similarly found that the human intellectual capital is a significant predictor of organisational performance and therefore, this study adds Nigerian evidence to this global narrative.

5. Conclusion and Recommendations

The results of the regression analysis highlight the critical role of human capital for manufacturing firms in Nigeria. The finding revealed that the HCE has a significant effect on financial performance of listed manufacturing firms in Nigeria. This therefore suggests that skilled workers can streamline operations, reduce waste, and drive innovation, all of which boost ROA.

The results show that there is strong empirical evidence that human capital efficiency has a positive and significant effect on the financial performance of listed consumer goods companies in Nigeria. In practical terms, a one-unit improvement in human capital efficiency led to about a 0.15% increase in ROA.

In conclusion, human capital is a pivotal factor for manufacturing success in Nigeria. Despite infrastructure and market challenges, firms that promote good human resource practices are likely to achieve better financial outcomes. Human capital efficiency was the only significant predictor of ROA in our analysis, highlighting that "people efficiency" is just as important as, if not more than, traditional factors like firm age or size. These results are consistent with resource-based arguments that intangible assets (knowledge, skills, etc) are key to sustained competitive advantage.

Consequently, this study recommends the following:

Firms should prioritise the allocation of resources to training programs and continuous education for employees. By focusing on upskilling in areas such as modern manufacturing techniques and quality control, companies can reduce errors, increase output, and ultimately improve return on assets (ROA).

Managers should maximise the potential of existing human resources through performance incentives, team collaboration, and employee empowerment, treating human capital as a vital strategic asset. Furthermore, aligning human resource management

practices with strategic goals, including recruitment, training, and performance appraisal, will engage employees in activities that bolster financial performance.

Policymakers and industry associations are encouraged to support this by promoting vocational training initiatives and partnerships with educational institutions, as a skilled manufacturing workforce will drive productivity and enhance the competitiveness of firms, yielding broader economic benefits.

Future research could extend this work by examining the specific components of human capital (e.g. education level, training hours, employee engagement metrics) to identify which aspects contribute most to performance. Overall, the evidence indicates that boosting human capital is a viable path for Nigerian manufacturers to improve profitability. Managers should thus view expenditures on workforce development not as a cost to be minimised, but as an investment that yields measurable returns. In a competitive and dynamic market, the companies that learn faster and adapt through their people will be the ones that thrive financially.

REFERENCES

Abeysekera, I. (2003). Accounting for intellectual capital and its impact on organisational performance. *Managerial Auditing Journal, 18*(4), 366–383.

Acuña-Opazo, C., & González, L. (2021). Human capital investment and wealth creation: Evidence from the US. *Journal of Economics and Finance, 45*(2), 205–223.

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120.

Bello, I. D. (2022). Intellectual capital and performance of non-financial companies quoted in Nigeria. *Journal of Finance and Accounting, 10*(1), 60–68.

Chen, M. C., Cheng, S. J., & Hwang, Y. (2005). An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance. *Journal of Intellectual Capital, 6*(2), 159–176.

Daniswara, H. P., & Daryanto, W. M. (2020). Earnings per share, price-to-book value, ROA, ROE, and IHSG impact on stock returns. *South East Asia Journal of Contemporary Business, Economics and Law*, 20(1), 11–27.

Daniswara, H. P., & Daryanto, W. M. (2020). Earnings per share, price-to-book value, ROA, ROE, and IHSG impact on stock returns. *South East Asia Journal of Contemporary Business, Economics and Law*, 20(1), 11–27

Eze, T. C., & Okoye, A. E. (2021). Corporate governance and financial performance of listed manufacturing firms in Nigeria. *International Journal of Business Research*, 21(4), 112–127.

Ernest, N. E., & Monday, F. J. (2024). An empirical analysis of the relationship between firm size and financial performance of selected Nigerian manufacturing firms. *CEDTECH International Journal of Social Science & National Development*, 4

Edvinsson, L., & Malone, M. S. (1997). Intellectual capital: realising your company's true value by finding its hidden brainpower. New York: Harper Business.

Fatihudin, D., & Mochklas, M. (2018). How to measure financial performance. *International Journal of Civil Engineering and Technology, 9*(6), 553–557.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate data analysis (7th ed.). Pearson.

Hamidah, I. (2015). EVA, ROCE, ROE, and EPS as methods of assessment of financial performance and their effect on shareholders' wealth: Evidence from Indonesian banks, 2011–2013. *International Journal of Scientific and Research Publications, 5*(2), 1–7.

Har, W. P., & Ghafar, M. A. A. (2015). The impact of accounting earnings on stock returns: The case of Malaysia's plantation industry. *International Journal of Business and Management, 10*(4), 155–163.

Hermuningsih, S., Kusuma, H., Fasa, M. I., & Panjaitan, R. (2020). Inside Ownership, Financial Performance and Firm Size as Moderating Variables. *Journal of Utopía y Praxis Latinoamericana, 25*(10), 220–230. https://doi.org/10.5281/zenodo.4155513

Ismail, A. M., Donald, A. N., & Ibrahim, K. B. (2023). Effect of Firm Size and Firm Age on Profitability: A Study of Listed Industrial Goods Firms in Nigeria (2013–2022). *International Journal of Public Administration and Development, 2*(2)

Joshi, M., Cahill, D., Sidhu, J., & Kansal, M. (2013). Intellectual capital and financial performance: An evaluation of the Australian financial sector. *Journal of Intellectual Capital, 14*(2), 264–285.

Khalique, M., & de Pablos, P. O. (2015). Intellectual capital and performance of electrical and electronics SMEs in Malaysia. *International Journal of Learning and Intellectual Capital, 12(*3), 251–269.

Martín-de-Castro, M., Delgado-Verde, P., López-Sáez, J. E., & Navas-López, J. E. (2011). Towards an intellectual capital-based view of the firm: Origins and nature. *Journal of Business Ethics, 98*(4), 649–662.

Mehralian, R., Rajabzadeh, G., Sadeh, M. R., & Rasekh, H. R. (2012). Intellectual capital and corporate performance in the Iranian pharmaceutical industry. *Journal of Intellectual Capital, 13*(1), 138–158.

Minovski, Z., & Jancevska, I. (2018). The role of intellectual capital and its accounting recognition and measurement. *Journal of Contemporary Economic and Business Issues, 5*(1), 67–76.

Mohammad, S., Ismail, N., & Al-Khadash, H. (2018). Intellectual capital and corporate performance: Evidence from publicly listed companies in Malaysia. *Asian Economic and Financial Review, 8*(3), 386–397.

National Bureau of Statistics. (2023). GDP Report – Q1 2023. Abuja: NBS.

Nafiah, N. I., & Setiawati, E. (2023). Effect of Capital Structure, Company Size, Company Age, and Profitability on Company Value: Empirical Study of Manufacturing Companies Listed on the Indonesia Stock Exchange (2019–2021). International Journal of Business Management and Technology, 7(1)

Pulic, A. (2004). Does intellectual capital create or destroy value? Measuring Business Excellence, 8(1), 62–68.

Saleh, M. (2015). Relationship between a firm's financial performance and stock returns: Evidence from Pakistan's oil and gas sector. *Journal of Energy Technologies and Policy, 5*(10), 27–32.

Samad, S. (2012). The contribution of human capital to business performance. *International Journal of Trade, Economics and Finance, 3*(4), 337–342.

Sardo, F., & Serrasqueiro, Z. (2018). Intellectual capital, growth opportunities, and financial performance in European firms: A dynamic panel data analysis. *Journal of Intellectual Capital, 19*(4), 747–767.

Sekaran, U., & Bougie, R. (2016). *Research methods for business*: A skill-building approach (7th ed.). Wiley.

Smriti, N., & Das, N. (2017). *Impact of intellectual capital on business performance*: Evidence from the Indian pharmaceutical sector. Polish Journal of Management Studies, 15(1), 232–243.

Sunaryo, D. (2020). Effect of net profit margin, ROA, and ROE on share price in the metal industry (Indonesia). *International Journal of Science, Technology and Management, 1*(3), 198–208.

Wuttaphan, P. (2017). Human capital efficiency and firm performance: An empirical study of Thai manufacturing firms. *ABAC Journal, 37*(2), 82–94.

Zorn, A., Esteves, M., Billaud, I., & Lasseur, J. (2018). *Financial ratios as indicators of economic sustainability*: A quantitative analysis for Swiss dairy farms. Sustainability, 10(8), 2942.