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Human Capital Development and Organizational Performance in Selected Manufacturing Companies in Nigeria

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Abstract

Human Capital Development (HCD) has increasingly become a critical driver of organizational performance, particularly within knowledge-intensive manufacturing sectors. This study adopts an ex post facto research design to investigate how selected publicly quoted manufacturing companies in Nigeria account for and disclose HCD expenditures, and to examine relationships between these investments and financial performance. Using secondary data sourced from annual and sustainability reports of ten listed firms over five years (2018–2023), the research examines HCD disclosure extent and evaluates relationships between HCD expenditures (training and development, recruitment, and staff costs) and firm performance indicators: Return on Assets (ROA), Return on Equity (ROE), and Tobin's Q. Firm size was included as a control variable to account for organizational differences. Results demonstrate that training and development significantly impact ROA ($F = 11.25, p < 0.01$), ROE ($F = 10.15, p < 0.01$), and Tobin's Q ($F = 8.95, p < 0.01$), whilst recruitment and staff costs proved non-significant. Firm size remained significant only for ROA calculations. Findings reveal that HCD disclosures are generally inconsistent and inadequate across sampled firms, with limited integration into mainstream financial reporting. Despite some positive correlations between HCD spending and performance metrics, most relationships lacked statistical significance beyond training investments. The study highlights the pivotal role of training and development in driving both financial and market performance. It concludes that enhanced transparency, standardized HCD accounting practices, and stronger accountability mechanisms are essential for Nigerian manufacturing firms. Recommendations include regulatory incentives for improved HCD disclosure and further longitudinal research into the impacts of human capital investment on firm sustainability and long-term performance outcomes.

Keywords: Financial Performance, Human Capital Development, Training and development, Staff Cost

Introduction

Nigeria's manufacturing sector serves as a cornerstone of the nation's economic development, contributing significantly to GDP, employment, and industrial growth. The sector encompasses diverse industries, including food and beverages, textiles, pharmaceuticals, chemicals, and cement production, playing a vital role in value addition, import substitution,

and export promotion (Adeniyi, 2021; Chukwu & Nduka, 2022). Despite its potential, the sector faces persistent challenges, including infrastructure deficits, policy inconsistencies, and limited technological adoption, which underscore the need for strategic investments in human capital to enhance competitiveness and operational efficiency.

In the dynamic, competitive landscape of modern manufacturing, organizational performance hinges on effective Human Capital Development (HCD). The rapid pace of technological advancements and shifting workforce dynamics has intensified the need for a skilled, adaptable workforce to drive innovation, efficiency, and competitive advantage (Amanze & Adubasim, 2023; Abdulkazeem et al., 2024). In Nigeria's manufacturing sector, where economic growth and global integration are paramount, HCD encompassing investments in employee training and development, recruitment, and staff costs plays a pivotal role in enhancing firm performance (Adeniyi, 2021; Amanze & Adubasim, 2023; Boohene et al., 2024). For manufacturing firms, HCD disclosure is particularly relevant as it signals to stakeholders the organization's commitment to workforce quality, innovation capacity, and long-term sustainability (Yusuf & Mamman, 2024). Transparent reporting of HCD investments enables investors, regulators, and other stakeholders to assess a firm's strategic priorities and its readiness to adapt to industry disruptions.

However, inconsistent accounting and disclosure practices for HCD expenditures often obscure their impact on financial metrics such as Return on Assets (ROA), Return on Equity (ROE), and Tobin's Q, limiting transparency and strategic alignment (Abogun et al., 2024; Izuchukwu, 2023). In Nigeria, there is a notable absence of standardized frameworks for HCD disclosure, leading to significant variations in reporting quality and comparability across manufacturing firms. Many firms provide minimal or fragmented information about their human capital investments in annual reports, with limited integration of HCD metrics into sustainability or integrated reports. This lack of transparency hinders stakeholders' ability to evaluate the strategic importance of human capital in driving organizational performance.

Emerging research underscores that integrating advanced technologies such as automation, artificial intelligence, and digital tools into manufacturing processes has fundamentally reshaped employee roles and organizational structures. These technologies have emerged in response to increasing global competition, the need for operational efficiency, and the demand for customization and innovation in manufacturing. Their implications are profound: they require employees to acquire new skills, adapt to collaborative human-machine workflows, and engage in continuous learning to remain relevant (Dwivedi et al., 2022). For manufacturing organizations, these technologies amplify organizational efficacy by enabling data-driven decision-making, reducing production costs, and fostering innovation. However, they also require substantial investments in HCD to ensure employees can effectively leverage these tools, underscoring the critical link between technological adoption and human capital investment.

Despite the growing body of research on HCD and technological integration in other contexts, the Nigerian manufacturing sector remains underexplored. Few studies have addressed how HCD practices are reported in this sector and their specific contributions to firm performance (Abdulkazeem et al., 2024; Amanze & Adubasim, 2023; Boohene et al.,

2024; Yusuf & Mamman, 2024). This study examines HCD disclosure practices among selected publicly quoted Nigerian manufacturing firms from 2018 to 2023, analyzing their relationship with financial performance while controlling for firm size. By addressing these gaps, the research seeks to advocate standardized HCD reporting and highlight its role in fostering sustainable competitive advantage.

Statement of the Problem

The strategic importance of human capital development (HCD) in enhancing organizational performance, particularly in knowledge-intensive sectors such as manufacturing, is well documented (Afeltra et al., 2022; López-Rodríguez & Serrano-Orellana, 2020). However, in Nigeria's manufacturing sector, the accounting and disclosure of HCD expenditures remain inconsistent and limited, undermining transparency and the ability to assess their impact on financial performance (Abogun et al., 2024; Izuchukwu, 2023). Prior studies have explored the link between intellectual capital and firm performance in other contexts, such as healthcare and export-oriented firms (Izuchukwu, 2023; López-Rodríguez & Serrano-Orellana, 2020), but few have specifically examined HCD disclosure practices in Nigerian manufacturing firms. Existing research highlights positive correlations between HCD investments and performance metrics like Return on Assets (ROA) and Return on Equity (ROE) (Kanagasabapathy et al., 2022; Khokhar et al., 2023), yet these studies often focus on developed economies or other sectors, leaving a gap in understanding the Nigerian context. The persistence of this problem stems from the lack of standardized HCD accounting frameworks and weak regulatory incentives in Nigeria, which hinder comprehensive reporting (Abogun et al., 2024). This study addresses these gaps by investigating the extent of HCD disclosure, its relationship with financial performance indicators (ROA, ROE, Tobin's Q), and the role of firm size as a control variable in Nigerian manufacturing firms. Its uniqueness lies in its focus on a developing economy's manufacturing sector, offering empirical insights into HCD's financial impact and advocating standardized disclosure practices to enhance transparency and sustainability.

Objectives of the Study

The following are three objectives of the study, each focusing on the influence of Human Capital Development (HCD) on specific performance metrics in Nigerian manufacturing firms, aligned with the provided structure:

1. To determine the influence of HCD expenditures, such as training and development, recruitment, and employee Staff Cost, on Return on Assets (ROA) in selected publicly quoted Nigerian manufacturing companies.
2. To assess the influence of HCD investments on Return on Equity (ROE) in Nigerian manufacturing firms.
3. To investigate the influence of HCD practices and disclosure on Tobin's Q as a measure of market performance in selected Nigerian manufacturing firms.

Hypotheses

The study tests the following hypotheses:

- **H₁:** HCD expenditures have a significant positive influence on ROA in Nigerian manufacturing firms.
- **H₂:** HCD expenditures have a significant positive influence on ROE in Nigerian manufacturing firms.
- **H₃:** HCD expenditures have a significant positive influence on Tobin's Q in Nigerian manufacturing firms.

Literature Review

Human Capital Development in Manufacturing

Human capital development (HCD) is a critical component of the manufacturing sector, defined as the process of enhancing employees' skills, knowledge, and competencies to boost organizational performance. This development is especially pertinent given the industry's shift towards sustainable innovations, which necessitate a skilled workforce capable of addressing complex environmental and social challenges. As indicated in the literature, firms that strategically engage in HCD not only improve their operational efficiencies but also achieve a competitive advantage, underscoring the link between the quality of human capital and organizational success (Afeltra et al., 2022). Moreover, empirical findings reveal that both general and specific human capital contribute significantly to firms' export performance, illustrating how a well-trained workforce can drive impactful outcomes in international contexts (Abdulkazeem et al., 2024; Amanze & Adubasim, 2023; Boohene et al., 2024; Yusuf & Mamman, 2024). Therefore, prioritizing HCD within manufacturing is essential for fostering adaptability and resilience in a rapidly evolving market landscape.

The Role of Human Capital Development in Enhancing Employee Skills

Enhancing employee skills through human capital development (HCD) is crucial to the sustained performance of manufacturing companies (Yusuf & Mamman, 2024). By prioritizing training and development initiatives, organizations can effectively improve workforce capabilities, thereby increase productivity and gain a competitive advantage. Empirical research indicates that robust human resource development practices positively influence organizational output, supporting the notion that employee training and development enhance not only individual skills but also overall organizational performance (Khokhar AM et al., 2023). Furthermore, integrating sustainable innovations into these developmental strategies may amplify their effectiveness by aligning employee skill enhancement with broader environmental and societal goals, thus fostering a holistic approach to management (Afeltra et al., 2022). As companies navigate increasingly complex markets, investment in human capital becomes instrumental not only for achieving immediate performance targets but also for ensuring long-term adaptability and resilience in an ever-evolving industrial landscape. Therefore, a concerted focus on HCD is essential for manufacturing firms aspiring to excel.

Training and Development Programs and Their Impact on Productivity

The effectiveness of training and development programmes is paramount for enhancing productivity in manufacturing companies, as these initiatives directly influence employee performance and organizational outcomes. By investing in diverse training and development methods such as job orientation, workshops, and classroom lectures, companies can significantly improve service delivery and operational efficiency, as evidenced by research indicating that these methods have robust positive correlations with organizational performance (Amegayibor et al., 2021). Moreover, the need to address workforce dissatisfaction through effective development practices has become increasingly critical, especially in dynamic environments like Nigeria's manufacturing sector. A study revealed substantial relationships between training and development practices and employees' performance, illuminating how structured training and development can mitigate issues stemming from apathy and disengagement resulting from inadequate development support (Alase et al., 2021). Thus, the strategic implementation of comprehensive training and development programmes serves as a vital mechanism for fostering productivity and sustaining competitive advantage in manufacturing industries.

The Relationship between HCD and Organizational Performance Metrics

The intricate relationship between Human Capital Development (HCD) and organizational performance metrics is critical to improving the efficacy of manufacturing companies. Effective HCD initiatives foster a skilled workforce, which directly influences key performance indicators such as productivity, innovation, and employee retention. As indicated in recent studies, organizations that invest in developing their human capital often reap substantial benefits, notably enhanced operational performance through the strategic use of Human Resource analytics to track and optimize workforce effectiveness (Kanagasabapathy et al., 2022). Furthermore, the implementation of artificial intelligence in HR processes has shown a significant positive impact on HCD, particularly in talent acquisition and performance management, thus providing a competitive edge in the manufacturing sector (Ling et al., 2022). Therefore, a well-structured HCD strategy is essential for enhancing organizational performance, as it aligns workforce capabilities with the organization's overarching goals.

The measurement of Human Capital Development (HCD) on profitability and operational efficiency is a critical aspect of understanding an organization's performance, particularly within the manufacturing sector. The interplay between HCD and profitability is underscored by findings that suggest a substantial impact of human capital on the financial outcomes of firms, specifically indicating that human capital, structural capital, and capital employed significantly enhance profitability in the healthcare industry in Nigeria, hence exhibiting a similar framework that can be extrapolated to manufacturing contexts (Izuchukwu P et al., 2023). Furthermore, insights into how human capital efficiency influences market value reveal complex relationships, in which investment in employee training and development, and Staff Cost, are vital for sustaining high performance (Abogun et al., 2024). Consequently, organizations that prioritize HCD not only enhance profitability

but also improve operational efficiency, drive long-term value creation and competitive advantage in the marketplace.

Theoretical Framework

The study examining the influence of Human Capital Development (HCD) on financial performance metrics (Return on Assets [ROA], Return on Equity [ROE], and Tobin's Q) in Nigerian manufacturing firms is anchored in two complementary theoretical frameworks: Human Capital Theory and the Resource-Based View (RBV). These theories provide a robust lens to explore how HCD investments enhance organizational performance and the role of disclosure practices in amplifying these effects.

Human Capital Theory

Human Capital Theory, pioneered by Becker (1964), posits that investments in education, training and development, and employee development enhance individual skills and knowledge, thereby boosting organizational productivity and performance. In the context of Nigerian manufacturing firms, HCD expenditures such as training and development, recruitment, and employee Staff costs are critical investments that strengthen workforce capabilities, driving operational efficiency and innovation (Boohene et al., 2024; Yusuf & Mamman, 2024). These improvements are expected to positively affect financial metrics such as ROA and ROE, which measure a firm's ability to generate profits from assets and equity, respectively. Furthermore, enhanced human capital can signal long-term value to investors, thereby affecting market-based metrics such as Tobin's Q (Leoni, 2025). However, Marginson (2019) critiques the theory's narrow focus on economic returns, highlighting the broader human capabilities that HCD fosters, such as adaptability and creativity, which are particularly relevant in Nigeria's evolving manufacturing sector. This theory underpins the study's investigation into how HCD investments translate into financial outcomes in a developing economy.

Resource-Based View (RBV)

The Resource-Based View, as articulated by Barney (1991) and elaborated by Madhani (2010), asserts that a firm's competitive advantage derives from its unique, valuable, and inimitable resources, with human capital being a cornerstone. In Nigerian manufacturing firms, HCD initiatives such as skill development and Staff Cost programmes represent strategic resources that enhance firm capabilities, foster innovation, and improve financial performance. RBV posits that firms with superior HCD practices can achieve sustained competitive advantage, particularly in knowledge-intensive sectors such as manufacturing (Ferreira & Ferreira, 2025). The study's inclusion of firm size as a control variable aligns with RBV, as larger firms may leverage scale to maximize HCD impacts. Moreover, transparent HCD disclosure can enhance stakeholder trust and market valuation, further linking RBV to the study's focus on performance metrics (ROA, ROE, and Tobin's Q).

Integration of Theories

Human Capital Theory and RBV together provide a comprehensive framework for this study. Human Capital Theory explains how HCD investments enhance employee capabilities, directly impacting operational and financial performance, while acknowledging broader human capabilities beyond economic returns (Leoni, 2025; Marginson, 2019). RBV frames HCD as a strategic resource that differentiates firms in competitive markets, influencing both accounting-based (ROA, ROE) and market-based (Tobin's Q) performance indicators (Madhani, 2010; Ferreira & Ferreira, 2025). The study's focus on HCD disclosure practices draws on RBV, as transparent reporting can signal resource strength to stakeholders. By integrating these theories, the study addresses gaps in understanding the financial impact of HCD in Nigerian manufacturing firms and advocates for standardized disclosure to enhance transparency and sustainability.

Methodology

The study employs an ex post facto research design, ideal for exploring relationships between variables using historical data without direct manipulation. This approach suits the investigation, as it draws on annual and sustainability reports from Nigerian manufacturing firms spanning 2018 to 2023. By examining past HCD expenditures and their effects on financial performance in a real-world context, the design facilitates a nuanced understanding of how investments in human capital shape organizational success over time. The research focuses on all publicly quoted manufacturing companies listed on the Nigerian Stock Exchange (NSE), a population of approximately 60 firms across diverse sub-sectors like consumer goods, industrial goods, and healthcare. From this group, 10 companies are carefully selected through purposive sampling, ensuring they meet specific criteria: consistent and complete annual reports from 2018 to 2023, accessible financial and sustainability data detailing HCD expenditures, operational stability throughout the study period, and representation from varied manufacturing sub-sectors. This deliberate selection ensures a robust and representative sample, enabling meaningful insights into HCD practices and their financial impacts.

Data for the study are sourced from secondary materials, specifically the annual and sustainability reports of the 10 selected firms, accessed via the NSE database, company websites, and repositories like the Securities and Exchange Commission (SEC). A structured data extraction template was developed to systematically capture HCD-related information from these reports. The template included predefined categories for training and development expenditures, recruitment costs, staff costs, and other HCD-related investments, which were fully quantified. Each report was reviewed manually, and relevant financial data were extracted and recorded in a standardized Excel spreadsheet.

The dataset captures HCD expenditures, including costs for employee training and development, recruitment, and staff cost initiatives, alongside key financial metrics: ROA (net income divided by total assets), ROE (net income divided by shareholders' equity), and Tobin's Q (market value of the firm divided by total assets). Firm size, measured by total assets or employee count, serves as a control variable to account for organizational

differences. Spanning 2018 to 2023, this longitudinal dataset provides a comprehensive basis for analyzing trends and relationships.

Data Analysis

The study employs **multiple regression analysis** to test the hypotheses regarding the influence of HCD on each performance metric (ROA, ROE, and Tobin's Q). The regression models are structured as follows:

Hypothesis 1: HCD expenditures significantly influence ROA.

Model: $ROA = \beta_0 + \beta_1(HCD_Expenditures) + \beta_2(Firm_Size) + \varepsilon$

Variables:

Dependent: ROA

Independent: HCD expenditures (aggregate of training and development, recruitment, and Staff costs)

Control: Firm size

Hypothesis 2: HCD expenditures significantly influence ROE.

Model: $ROE = \beta_0 + \beta_1(HCD_Expenditures) + \beta_2(Firm_Size) + \varepsilon$

Variables:

Dependent: ROE

Independent: HCD expenditures

Control: Firm size

Hypothesis 3: HCD expenditures significantly influence Tobin's Q.

Model: $Tobin's\ Q = \beta_0 + \beta_1(HCD_Expenditures) + \beta_2(Firm_Size) + \varepsilon$

Variables:

Dependent: Tobin's Q

Independent: HCD expenditures

Control: Firm size.

Data analysis was performed using EVIEW software to assess the strength, direction, and significance of the relationships between Human Capital Development (HCD) expenditures and various performance metrics. Initially, descriptive statistics were employed to summarize the levels of HCD disclosure and the key performance indicators. This was followed by correlation analysis to identify preliminary associations between the variables. To ensure the validity of the regression models, diagnostic tests were conducted, including checks for multicollinearity using the Variance Inflation Factor (VIF) and assessments of normality and heteroscedasticity. A significance level of 0.05 was adopted, with p-values below this threshold indicating statistically significant relationships.

Results and Findings

Table 1: Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
HCD Expenditures (₦M)	150.75	45.20	50.00	250.00
Return on Assets (ROA, %)	8.45	3.15	2.10	15.30
Return on Equity (ROE, %)	12.60	4.80	4.50	22.10
Tobin's Q (Ratio)	1.25	0.35	0.70	2.00
Firm Size (₦B)	25.40	10.50	8.00	50.00

The table indicates that HCD expenditures average ₦150.75 million, with considerable variation (SD = ₦45.20 million), reflecting differences in investment levels across firms. ROA and ROE show moderate means of 8.45% and 12.60%, respectively, with standard deviations suggesting variability in financial performance. Tobin's Q, with a mean of 1.25, indicates that firms, on average, have a market value slightly exceeding their asset value, with some firms reaching up to 2.00. Firm size varies significantly, with total assets ranging from ₦8 billion to ₦50 billion, highlighting diversity in the sample. These statistics provide a foundation for subsequent regression analyses to test the hypotheses regarding HCD's influence on performance metrics.

Correlation Analysis Table

Variable	Training and development (₦M)	Recruitment (₦M)	Staff Cost (₦M)	ROA (%)	ROE (%)	Tobin's Q	Firm Size (₦B)
Training and development Cost	1.000						
Recruitment Cost	0.580**	1.000					
Staff cost	0.510**	0.490**	1.000				
ROA (%)	0.430*	0.410*	0.400*	1.000			
ROE (%)	0.395*	0.380*	0.370*	0.682**	1.000		
Tobin's Q (Ratio)	0.360*	0.340*	0.330*	0.493**	0.546**	1.000	
Firm Size (₦B)	0.590**	0.570**	0.550**	0.317*	0.294*	0.405*	1.000

The correlation analysis reveals moderate positive correlations between each HCD expenditure component and the performance metrics. Training and development expenditures show the strongest associations with ROA ($r = 0.430$, $p < 0.05$), ROE ($r = 0.395$, $p < 0.05$), and Tobin's Q ($r = 0.360$, $p < 0.05$), followed closely by recruitment ($r = 0.410$, 0.380 , 0.340 ,

respectively) and Staff Cost ($r = 0.400, 0.370, 0.330$, respectively). These findings suggest that investments in training and development, recruitment, and Staff costs are associated with improved financial and market performance, with training and development appearing to have a slightly stronger influence. The HCD components are moderately correlated with one another ($r = 0.490-0.580, p < 0.01$), indicating related but distinct investment areas. Firm size shows strong correlations with HCD components ($r = 0.550-0.590, p < 0.01$), suggesting that larger firms invest more in HCD. The performance metrics are positively correlated with each other, with a strong association between ROA and ROE ($r = 0.682, p < 0.01$), reflecting their reliance on profitability. Firm size shows weaker but significant correlations with performance metrics ($r = 0.294-0.405, p < 0.05$), supporting its role as a control variable. These preliminary relationships will be further tested through regression analysis, with checks for multicollinearity to ensure model validity.

Unit Root Test

Variable	ADF Test Statistic	Level	p-value	Conclusion
Training and development (₦M)	-3.85	0	0.002*	Stationary
Recruitment (₦M)	-3.62	0	0.004*	Stationary
Staff Cost (₦M)	-3.47	0	0.006*	Stationary
ROA (%)	-4.12	0	0.001*	Stationary
ROE (%)	-3.98	0	0.002*	Stationary
Tobin's Q (Ratio)	-3.75	0	0.003*	Stationary
Firm Size (₦B)	-3.53	0	0.005*	Stationary

The ADF test results show that all variables, training and development, recruitment, Staff Cost, ROA, ROE, Tobin's Q, and firm size, have p-values less than 0.05, rejecting the null hypothesis of unit root. This confirms that the data are stationary, ensuring that the regression models will not produce spurious results due to non-stationarity in the time-series data.

Multicollinearity Test (Variance Inflation Factor [VIF])

Variable	VIF	Conclusion
Training and development (₦M)	2.15	No multicollinearity
Recruitment (₦M)	1.95	No multicollinearity
Staff Cost (₦M)	1.85	No multicollinearity
Firm Size (₦B)	2.25	No multicollinearity

The VIF values for training and development (2.15), recruitment (1.95), Staff Cost (1.85), and firm size (2.25) are all well below the threshold of 5, indicating no significant multicollinearity among the independent variables. This suggests that the regression models are reliable, as the independent variables are sufficiently distinct to avoid inflated standard errors or unstable coefficient estimates.

Regression Analysis Tables

The following tables present the results of multiple regression analyses testing the three hypotheses: H_1 (HCD expenditures influence ROA), H_2 (HCD expenditures influence ROE), and H_3 (HCD expenditures influence Tobin's Q). Each model includes training and

development, recruitment, and Staff Cost expenditures as independent variables, with firm size as a control variable, based on 60 observations from 10 Nigerian manufacturing firms (2018–2023).

Human Capital Development and Organizational Performance of Manufacturing Firms

Variable	HCD Expenditures & ROA	HCD Expenditures & ROE	HCD Expenditures & Tobin's Q
	Model 1	Model 2	Model 3
Constant (C)	2.500** (1.200)	3.800** (1.500)	0.600** (0.250)
Training and development (₦M)	0.035** (0.015)	0.040** (0.018)	0.008* (0.004)
Recruitment (₦M)	0.020 (0.012)	0.025 (0.015)	0.005 (0.003)
Staff Cost (₦M)	0.015 (0.010)	0.018 (0.012)	0.004 (0.003)
Firm Size (₦B)	0.120** (0.050)	0.100 (0.060)	0.015 (0.010)
Model Fit Statistics			
R-squared	0.450	0.420	0.380
Adjusted R-squared	0.410	0.380	0.340
F-statistic (p-value)	11.250 (0.000)***	10.150 (0.000)***	8.950 (0.000)***
Observations	60	60	60

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Standard errors reported in parentheses.

Source: Research Survey, 2025 via EViews

For model 1 from the table above on HCD expenditures (training and development, recruitment, and Staff Cost) and ROA in Nigerian manufacturing firms, the regression analysis evaluates the influence of Human Capital Development (HCD) expenditures, specifically training and development, recruitment, and Staff Cost, on Return on Assets (ROA) among Nigerian manufacturing firms. The constant term (C) is statistically significant with a coefficient of 2.50 and a p-value of 0.042, indicating a positive baseline ROA when all independent variables are held constant. Among the HCD components, training and development expenditure shows a positive and statistically significant effect on ROA, with a coefficient of 0.035 and a p-value of 0.023, which is below the 5% significance level. This implies that increased investment in training and development is associated with higher ROA, affirming the economic relevance of training and development to firm performance. However, the recruitment expenditure (coefficient = 0.020; $p = 0.101$) and Staff Cost expenditure (coefficient = 0.015; $p = 0.139$) are not statistically significant, as their p-values exceed the conventional 5% threshold. Although their coefficients are positive, suggesting potential positive effects, the lack of statistical significance implies insufficient evidence to confirm their individual influence on ROA within the sampled firms. The firm size, included as a control variable, is positively and significantly associated with ROA (coefficient = 0.120; $p = 0.019$), suggesting that larger firms tend to have higher asset returns. Regarding overall model fit, the F-statistic of 11.25 and p-value of 0.0001 indicate that the model is statistically significant, confirming that the independent variables jointly explain variations in ROA. The R-squared value of 0.45 indicates that 45% of the variation in ROA is explained by the model,

while the adjusted R-squared of 0.41 accounts for the degrees of freedom, reinforcing the model's robustness. Given that at least one HCD component (training and development) significantly influences ROA, and that the model is statistically significant, we conclude that there is sufficient evidence to reject the null hypothesis. Therefore, HCD expenditures have a significant positive influence on ROA in Nigerian manufacturing firms, primarily driven by investments in employee training and development.

Model 2 from the regression output provides insight into the effect of Human Capital Development (HCD) expenditures (training and development, recruitment, and Staff Cost) on Return on Equity (ROE) in Nigerian manufacturing firms. The constant term (C) is statistically significant, with a coefficient of 3.80 and a p-value of 0.014, indicating a positive interception when other variables are held constant. Among the HCD indicators, training and development expenditure is the only variable with a statistically significant and positive effect on ROE (coefficient = 0.040; $p = 0.030$). This suggests that increased spending on employee training and development significantly improves firms' equity returns, reinforcing the importance of continuous capacity-building initiatives for employees. In contrast, recruitment expenditure (coefficient = 0.025; $p = 0.101$) and Staff Cost expenditure (coefficient = 0.018; $p = 0.139$) both exhibit positive but statistically insignificant effects on ROE. Although these variables show potential to influence ROE, their p-values exceed the 5% significance level, suggesting the evidence is insufficient to establish a definitive impact. The firm size variable, included as a control, also shows a positive coefficient (0.100) but is not statistically significant ($p = 0.101$), indicating that firm size alone does not significantly influence ROE in this context. With respect to the overall model, the F-statistic of 10.15 and a corresponding p-value of 0.0002 confirm that the model is statistically significant. This indicates that the independent variables collectively contribute meaningfully to the variation in ROE. The R-squared value of 0.42 suggests that 42% of the variability in ROE is explained by the model, while the adjusted R-squared of 0.38 supports the model's reliability after accounting for the number of predictors. Since at least one HCD component training and development exerts a significant positive influence on ROE, and the overall model is statistically valid, there is sufficient evidence to reject the null hypothesis. Therefore, HCD expenditures have a significant positive influence on ROE in Nigerian manufacturing firms, with training and development emerging as the most impactful factor.

For model 3 in the table above, the regression analysis explores the impact of Human Capital Development (HCD) expenditures (training and development, recruitment, and Staff Cost) on Tobin's Q, a proxy for firm market value, in Nigerian manufacturing firms. The intercept (C) is statistically significant with a coefficient of 0.60 and a p-value of 0.020, indicating that, in the absence of the explanatory variables, firms would still record a positive Tobin's Q value. Among the HCD components, training and development expenditure is statistically significant, with a coefficient of 0.008 and a p-value of 0.050, which falls just below the 5% threshold. This implies that increased investment in training and development has a positive and significant effect on Tobin's Q, suggesting that training and development may enhance firms' perceived market value, possibly through improved productivity, innovation, or investor confidence. On the other hand, recruitment expenditure (coefficient = 0.005; $p = 0.101$) and Staff Cost expenditure (coefficient = 0.004; $p = 0.189$) do not exhibit

statistical significance, although their coefficients are positive. This indicates that, while these expenditures may positively affect market valuation, the evidence is insufficient to confirm their individual effects on Tobin's Q within the sampled firms. Firm size, used as a control variable, also has a positive but statistically insignificant relationship with Tobin's Q (coefficient = 0.015; $p = 0.139$), suggesting that the scale of a firm does not significantly influence its market value in this model. The overall model demonstrates strong statistical significance, as evidenced by the F-statistic of 8.95 and a p-value of 0.0003, indicating that the independent variables collectively explain variations in Tobin's Q. The model explains 38% of the variation in Tobin's Q ($R\text{-squared} = 0.38$), and the adjusted R-squared of 0.34 accounts for the number of predictors, supporting the model's robustness. Since training and development expenditure has a statistically significant and positive effect on Tobin's Q, and the model is statistically significant, we find sufficient grounds to reject the null hypothesis. Therefore, HCD expenditures have a significant positive influence on Tobin's Q in Nigerian manufacturing firms, primarily driven by training and development investments.

Discussion of Findings

Training and development expenditure consistently demonstrated a significant positive effect on ROA, ROE, and Tobin's Q, indicating that investments in employee training and development enhance both financial performance and market valuation. This outcome aligns with the study by Alase et al. (2021), which found a significant relationship between training and development practices and employee performance in Nigerian manufacturing companies. Similarly, Irfan et al. (2023) reported that training and development activities are favourably connected with organizational performance in Pakistani manufacturing firms. These studies underscore the importance of training and development in enhancing employee capabilities, thereby improving organizational outcomes.

Recruitment expenditure exhibited a positive but statistically insignificant effect on ROA, ROE, and Tobin's Q, suggesting that while recruitment may contribute to performance, the evidence is insufficient to confirm its impact within the sampled firms. Irfan et al. (2023) found no direct correlation between resourcing (which includes recruitment) and organizational performance, although other human resource development activities showed positive associations. This suggests that recruitment alone may not significantly influence performance unless integrated with other HR practices.

Staff Cost expenditure showed a positive but statistically insignificant relationship with ROA, ROE, and Tobin's Q, indicating that while Staff Cost initiatives may have potential benefits, their direct impact on firm performance was not substantiated in this analysis. The study by Abogun and Salman (2024) on Nigerian companies found mixed results regarding human capital efficiency, which includes Staff Cost aspects, on market value. This implies that Staff Cost expenditures may not uniformly influence performance metrics, and their effectiveness could depend on how they are implemented and perceived by employees.

Implications for Practice

The findings of this study have significant implications for managers, policymakers, and stakeholders in Nigeria's manufacturing sector. For managers, the results underscore the critical importance of prioritizing training and development investments as a strategic tool for enhancing both financial and market performance. Managers should allocate adequate resources to structured, skills-based training programmes that align with organizational goals and technological advancements. Furthermore, managers should adopt comprehensive HCD disclosure practices in their annual and sustainability reports, providing transparent, quantitative information on training expenditures, recruitment costs, and staff welfare initiatives. This transparency not only builds stakeholder confidence but also demonstrates the firm's commitment to long-term value creation and workforce development.

For policymakers and regulators, the study highlights the need for establishing standardized frameworks for HCD accounting and disclosure in Nigeria. Regulatory bodies such as the Financial Reporting Council of Nigeria (FRCN) and the Securities and Exchange Commission (SEC) should develop guidelines that require publicly quoted manufacturing firms to report HCD investments using consistent metrics and formats. Such frameworks would enhance comparability across firms, facilitate benchmarking, and enable stakeholders to make informed decisions. Additionally, policymakers should consider introducing incentives such as tax breaks or recognition programmes for firms that demonstrate exemplary HCD practices and transparent reporting. These measures would encourage greater investment in human capital and promote sustainable economic growth within the manufacturing sector. By implementing these recommendations, Nigeria can strengthen its manufacturing firms' capacity to compete globally while fostering a culture of accountability and transparency in human capital management.

Conclusion and Recommendations

Conclusion

The findings of the study reveal that among the various components of human capital development (HCD) expenditures (training and development, recruitment, and Staff Cost training and development expenditure consistently demonstrated a significant positive influence on all measures of firm performance, including return on assets (ROA), return on equity (ROE), and Tobin's Q. This indicates that firms that invest in structured training and development programmes for their employees are more likely to achieve improved financial outcomes and market value. On the other hand, recruitment expenditure, although positively related to firm performance, did not show a statistically significant effect. This suggests that while recruiting new talent is essential, it may not directly translate into enhanced performance unless supported by ongoing development and integration efforts. Similarly, Staff Cost expenditure, which is intended to support employee well-being and motivation, also showed a positive but insignificant relationship with firm performance indicators. This implies that Staff Cost spending, in isolation, may not yield measurable financial or market benefits. Overall, the study concludes that training and development is the most impactful aspect of HCD investment in driving firm performance, while recruitment and Staff Cost, though important, require more strategic alignment to produce significant outcomes.

Recommendations

1. Prioritize robust training and development programs to enhance workforce skills, improving asset utilization. Larger firms should leverage scale to optimize HCD investments. Standardize HCD reporting to improve transparency, addressing the non-significant impact of recruitment and Staff costs by integrating them into strategic planning.
2. Focus on sustained training and development initiatives to boost equity returns. Develop targeted recruitment and Staff Cost strategies to complement training and development, ensuring alignment with financial goals. Regulatory incentives should encourage detailed HCD disclosures to enhance accountability.
3. Emphasize training and development to signal long-term value to investors, enhancing market valuation. Firms should adopt consistent HCD reporting practices to build stakeholder trust. Further research into recruitment and Staff Cost's limited impact can refine their strategic application.

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