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HUMAN CAPITAL INVESTMENT ON THE FINANCIAL OUTCOMES OF LISTED PHARMACEUTICAL FIRMS IN NIGERIA

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Abstract
This study investigates the effect of human capital investment on the financial outcomes of listed pharmaceutical firms in Nigeria, with particular focus on how Training and Development Cost (TDC) and Employee Acquisition Cost (EAC) influence Return on Assets (ROA). An ex-post facto research design was adopted, utilizing multi-year panel data derived from audited annual reports of pharmaceutical companies listed on the Nigerian Exchange between 2015-2024. Descriptive statistics, correlation analysis, E_view version 22 was employed to determine the relationship between human capital variables and financial outcomes of listed pharmaceutical firms in Nigeria. The empirical findings show that Employee Acquisition Cost (EAC) exerts a positive and statistically significant effect on ROA across both fixed and random-effects estimations. This implies that recruitment-related spending, covering attraction, selection, and onboarding of skilled professionals, directly enhances asset utilization and financial efficiency. The result show that specialized human capital provides valuable, rare, and inimitable resources capable of improving firm performance. Conversely, Training and Development Cost (TDC) demonstrates a positive but statistically insignificant relationship with ROA, indicating that training interventions may not generate immediate financial benefits. This suggests that training outcomes in the pharmaceutical industry are often long-term, intangible, or dependent on contextual factors such as employee retention, regulatory requirements, and applicability of acquired skills. Firm size (FS) also shows no statistically significant influence on ROA, highlighting that larger asset bases do not automatically translate into superior financial outcomes. Overall, the study concludes that human capital investment—particularly employee acquisition—plays a critical role in improving the financial outcomes of Nigerian pharmaceutical firms. The study recommends strengthening recruitment processes, prioritizing the acquisition of specialized technical talent, and implementing retention strategies to ensure the long-term payoff of training investments. By disaggregating human capital investment into TDC and EAC and examining their distinct effects on ROA, the study contributes to existing literature and provides industry-specific insights into optimizing human capital strategies for improved financial performance within Nigeria's pharmaceutical sector.

Keywords: Human Capital Investment, Training and Development, Employee Acquisition, Financial Outcome, Return on Assets

Introduction
In contemporary business environments, human capital investment has emerged as a cornerstone of organizational competitiveness and profitability. Firms increasingly recognize that investments in employee training, development, and acquisition directly shape innovation capacity, operational efficiency, and long-term sustainability (Okafor & Akinlabi, 2024). Within Nigeria's pharmaceutical industry, characterized by labour-intensive

production, regulatory complexity, and supply chain volatility, strategic allocation of resources toward human capital has become essential. According to Adeniran and Obembe (2023), pharmaceutical companies facing market turbulence can achieve superior financial outcomes through sustained investment in employee competencies and adaptive capabilities. Every company needs reliable and competitive human capital to succeed. This is because human capital plays a vital role in the progress of the firm. According to Robbins (2001), the characteristic that differentiates successful organizations from their contemporaries in almost all the sectors is the quality of the people they can get and retain. Therefore, money spent on employees' training and development is one of the best investments that companies could make. In accounting, expenses on human capital are not capitalized but are expensed as they occur. They are identified as recruitment cost, training cost, staff welfare, pension, and so on. Although it has been argued that human capital should be treated as capital expenditure, human beings cannot be kept from moving between organizations, and their life span cannot be determined; hence depreciation is difficult to ascertain. The study seeks to ascertain the usefulness of human capital and its contribution to organizational growth.

Human Capital Cost (HCC) refers to identifying, measuring, and analyzing the potential of a company's workforce (Enofe et al., 2013). It assigns a cost to every employee and the value that the employee would generate in the future. Human capital cost reporting in Nigeria remains at an infant stage. Companies that have invested heavily in human capital, including the pharmaceutical sector, usually do not reflect such investments as assets but expense them in profit and loss accounts (Okpala & Chidi, 2010; Micah et al., 2012). In Nigeria, quoted pharmaceutical companies such as Evans Medical Plc, GlaxoSmithKline Plc, and Pharmdeko Plc have invested significantly in human capital development. Their financial statements reveal that such investments are treated as expenses rather than assets. However, Okpala and Chidi (2010) noted that recruitment, training, and development costs are substantial and contribute meaningfully to firm performance. Performance is the function of an organization's ability to gain and manage resources to develop competitive advantage (Chen & Wong, 2004). Financial performance emphasizes profitability, productivity, and market premium (Walker, 2001). Spira (2013) identifies return on assets (ROA), return on equity (ROE), and return on investment (ROI) as key indicators. It is clear that effective investment in human capital — through recruitment, training, and staff welfare — positively affects financial performance. According to Kirfi and Abdullahi (2012), human capital cost practices in Nigeria are limited, as firms rarely recognize human capital as an asset. Against this backdrop, this study seeks to evaluate the relationship between human capital cost and the financial performance of listed pharmaceutical firms in Nigeria, using training and development cost, employee acquisition cost, and earned staff cost as independent variables, and net profit, ROA, and ROE as dependent variables.

Existing empirical studies consistently show that human capital investment enhances firm performance across manufacturing, service, and regional pharmaceutical sectors (Okafor & Akinlabi, 2024; Eze & Ojo, 2024; Mensah et al., 2024). However, these studies largely treat human capital investment as a *single, aggregated construct*, combining all personnel-related expenses into one composite measure. As a result, they do not isolate the specific effects of Training and Development Cost (TDC) and Employee Acquisition Cost (EAC) on financial outcomes, particularly Return on Assets (ROA). Within Nigeria's pharmaceutical industry, where firms face regulatory hurdles, high technical labour requirements, and significant staff turnover, the failure to disaggregate human capital components creates a strategic

blind spot. Although Adeniran and Obembe (2023) examined recruitment in the sector, and Okafor and Akinlabi (2024) assessed TDC in manufacturing generally, no study has jointly evaluated TDC and EAC as separate determinants of ROA for Nigerian pharmaceutical firms. Consequently, pharmaceutical firms continue to expense human capital investments without understanding which component drives asset efficiency and profitability. This lack of empirical clarity contributes to weak asset utilization and persistent profitability challenges despite rising personnel expenditure (Eze & Ojo, 2024). Therefore, the problem this study addresses is the absence of industry-specific, disaggregated evidence on how training and recruitment costs independently influence ROA in listed Nigerian pharmaceutical firms.

Conceptual Framework

This study conceptualizes human capital investment as a dual-dimensional construct encompassing training and development cost (TDC) and employee acquisition cost (EAC). Financial outcome, proxied by return on assets (ROA), measures how efficiently management converts total assets into profit. The model is expressed as:

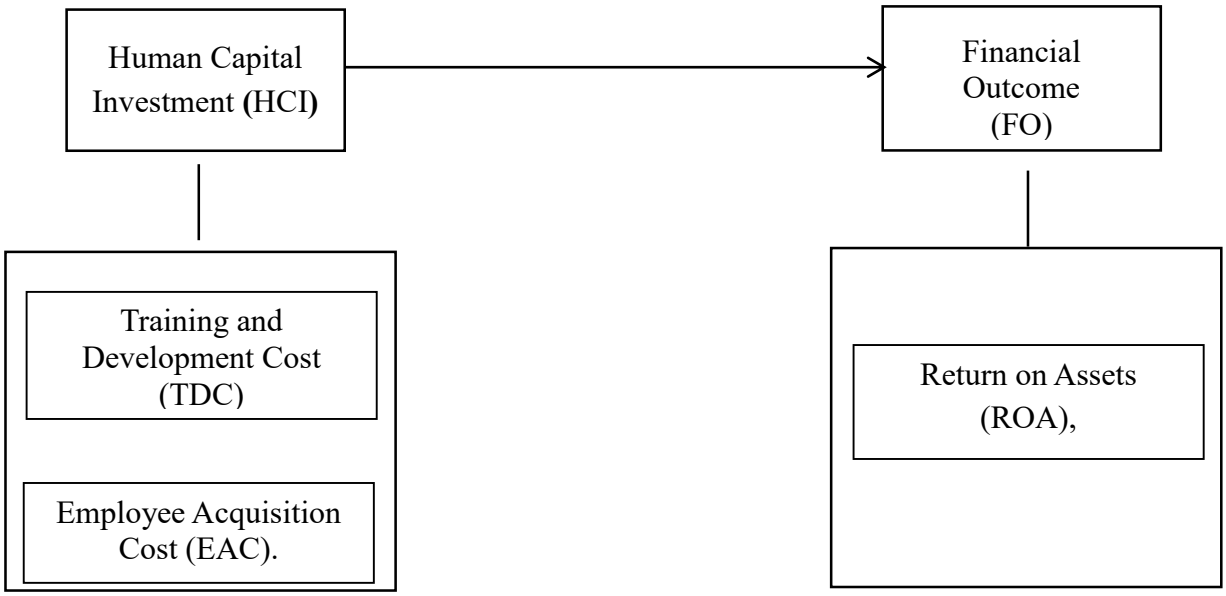

Fig 1.1 Conceptual framework showing **t**he relationship between human capital investment on the financial outcomes of listed pharmaceutical firms in Nigeria
Source: Researcher's Conceptualization, 2025

Objectives of the Study

The study aims to examine the relationship of human capital investment on the financial outcomes of listed pharmaceutical firms in Nigeria. Precisely, it seeks to:

1. assess the relationship between training and development cost (TDC) and return on assets (ROA) of listed pharmaceutical firms in Nigeria.
2. examine the relationship between employee acquisition cost (EAC) and return on assets (ROA) of listed pharmaceutical firms in Nigeria.

Research Questions

1. What is the relationship between training and development cost and return on assets of listed pharmaceutical companies in Nigeria?

2. What is the relationship between employee acquisition cost and return on assets of listed pharmaceutical companies in Nigeria?

Hypotheses

$H0_1$: There is no significant relationship between training and development cost and return on assets of listed pharmaceutical companies in Nigeria.

$H0_2$: There is no significant relationship between employee acquisition cost and return on assets of listed pharmaceutical companies in Nigeria.

Literature Review

Human Capital Investment (HCI)

Human Capital Investment refers to the deliberate allocation of resources to acquire, develop, and retain employees whose skills and knowledge drive firm productivity. According to Eze & Ojo (2024), HCI encompasses measurable expenditures on training, recruitment, and employee welfare. In this study, HCI is operationalized through its two key components: Training and Development Cost (TDC) and Employee Acquisition Cost (EAC).

Training and Development Cost (TDC)

TDC captures all spending on employee skill enhancement, including seminars, certifications, mentoring, and technical workshops. Empirical evidence in Nigeria (Okafor & Akinlabi, 2024; Bello et al., 2023) consistently shows that TDC improves worker efficiency and adaptability, which can enhance overall firm performance.

Employee Acquisition Cost (EAC)

EAC involves expenses related to attracting, selecting, and onboarding new personnel. In dynamic industries such as pharmaceuticals, Adeniran & Obembe (2023) find that effective recruitment enhances organizational innovation and reduces turnover costs, which indirectly contributes to improved performance outcomes.

Financial Outcomes

Financial outcomes represent the overall economic results of a firm's operations, reflecting its ability to generate profit, utilize resources efficiently, and achieve sustainable growth. They provide a broad measure of a firm's success in translating investments—including human capital investments—into measurable economic value (Horsfall, 2022).

Return on Assets (ROA)

ROA is a specific indicator of financial performance, quantifying how effectively management converts total assets into net income. Scholars (Kehinde & Onuoha, 2025) emphasize that ROA is suitable for inter-firm comparison in asset-intensive industries. Given the capital- and knowledge-intensive nature of pharmaceutical production—including R&D, quality control, and logistics—ROA provides a robust, industry-relevant measure of financial outcomes.

Theoretical Framework

Human Capital Theory

This theory by Becker, 1962 posits that spending on employee education, skills enhancement, and professional development constitutes an *investment* rather than a cost, because it generates future economic benefits. In the context of pharmaceutical firms, training and development (TDC) improve employees' technical competence, innovation

capacity, and productivity, which in turn enhance operational efficiency and financial returns, such as Return on Assets (ROA). Therefore, this theory supports the idea that TDC is a strategic lever for financial performance improvement, as the knowledge and skills gained through training translate into better processes, reduced waste, and higher profitability.

Resource-Based View (RBV)

Barney 1991 in the RBV argues that a firm's competitive advantage depends on resources that are valuable, rare, inimitable, and non-substitutable (VRIN). Human capital fits this description when employees possess specialized expertise and industry-specific knowledge that competitors cannot easily replicate. In Nigeria's pharmaceutical industry, which relies heavily on regulatory compliance, research capability, and technical know-how, strategic employee acquisition (EAC) becomes critical. Recruiting and retaining skilled professionals provide firms with distinctive capabilities that improve efficiency and financial outcomes, particularly ROA. Thus, this theory links EAC to financial performance improvement, as acquiring and managing high-quality human resources ensures the firm maintains a sustained competitive edge.

Empirical Review

Okafor and Akinlabi (2024) investigated the relationship between training and development cost (TDC) and financial performance among Nigerian manufacturing firms. Using panel regression on ten years of secondary data, they found a significant positive relationship between TDC and return on assets (ROA). Their study concluded that consistent investment in employee skills enhances operational efficiency, which translates to superior financial outcomes. The authors recommended that firms institutionalize continuous learning and technical training to strengthen asset utilization.

Adeniran and Obembe (2023) focused on the pharmaceutical industry in Nigeria, analyzing the effect of employee acquisition cost (EAC) on financial outcomes. Their findings revealed that recruitment and onboarding expenses have a direct and significant influence on ROA, primarily through the acquisition of specialized talent and reduction of employee turnover. They argued that the high technical requirements of the pharmaceutical sector make recruitment a strategic investment rather than a routine administrative expense.

Eze and Ojo (2024) examined a cross-section of quoted Nigerian firms to explore the composite effect of human capital investment on profitability. Employing a random-effects model, they discovered that total human capital expenditure significantly improved both ROA and ROE. The authors emphasized that firms viewing human capital as an investment achieved more sustainable financial performance than those treating it merely as an operating cost.

Adetunji and Lawal (2025) extended the inquiry to the West African pharmaceutical sector, comparing Nigeria, Ghana, and Côte d'Ivoire. Using generalized least squares estimation, they established that human capital expenditures significantly affected ROA and ROE across all countries studied. Their research underscored the regional importance of investing in skilled pharmaceutical professionals to enhance innovation and regulatory compliance.

Ibrahim and Oladipo (2023) approached the topic from a valuation perspective, examining how human capital investment influences Tobin's Q among Nigerian service firms. They reported that training expenditure mediated the relationship between productivity and market valuation, implying that firms with stronger training cultures enjoyed higher investor confidence and, consequently, better financial outcomes.

Kehinde and Onuoha (2025) evaluated the effect of training and development programs on the efficiency of Nigerian industrial firms. Using fixed-effects estimation, they observed that TDC positively influenced operational efficiency and ROA. Their study highlighted that training not only improved technical capability but also fostered employee commitment, leading to more effective asset utilization.

Mensah et al. (2024) conducted a comparative analysis of pharmaceutical firms in Ghana and Nigeria to assess how disaggregated human capital costs affect profitability. Their findings corroborated earlier Nigerian evidence, showing that both TDC and EAC had significant positive relationships with ROA. They concluded that consistent investment in workforce development across ECOWAS markets yields measurable performance improvements.

Collectively, these studies demonstrate a robust and generally positive linkage between human capital investment and financial outcomes. Nevertheless, the strength and mechanisms of this relationship differ across industries and national contexts. A key research gap persists in the Nigerian pharmaceutical sector, where limited studies have isolated training and development cost (TDC) and employee acquisition cost (EAC) as distinct predictors of return on assets (ROA). Addressing this gap forms the core rationale of the present study, which employs multi-year panel data from 2015 to 2024 to provide industry-specific empirical evidence.

Research Gap

Although numerous studies have established a positive link between human capital investment and firm performance, most aggregate all human-capital-related expenditures into a single variable. For example, Eze and Ojo (2024) and Adetunji and Lawal (2025) examined total human capital expenditure and reported significant effects on ROA and ROE, without distinguishing which specific human-capital components drive these outcomes. Similarly, Okafor and Akinlabi (2024) focused solely on training and development cost (TDC), while Adeniran and Obembe (2023) concentrated on employee acquisition cost (EAC) in isolation. These studies therefore provide partial perspectives that do not jointly assess the comparative influence of TDC and EAC on financial performance. Moreover, cross-country studies such as Mensah et al. (2024) highlight the general importance of human capital investment in West Africa but still treat human capital broadly, offering limited industry-specific insight. Within Nigeria's pharmaceutical sector where regulatory demands, technical expertise, and knowledge intensity are uniquely high, there remains insufficient empirical evidence that disaggregates human capital cost into TDC and EAC to determine their distinct impact on ROA. Thus, the existing literature has not adequately answered which component of human capital investment contributes more strongly to asset-based performance among Nigerian pharmaceutical firms. This study deviates from prior research by isolating TDC and EAC as separate predictors, focusing specifically on listed pharmaceutical companies, and using multi-year panel data (2015 to 2024) to provide industry-specific, component-level evidence that has been largely missing from previous studies.

Methodology

Research Design

The study adopts an ex-post facto research design because it relies on historical data that cannot be manipulated. Panel data were extracted from audited annual reports of listed Nigerian pharmaceutical firms covering 2015 to 2024. This design enables longitudinal

assessment of how variations in human capital investment affect firm performance over time.

Population and Sample

The population comprises all pharmaceutical companies listed on the Nigerian Exchange (NGX). As of 2025, six major firms qualify. Where complete data are unavailable, firms with consistent disclosures for at least seven years will be retained to maintain balanced panels.

Company

1. Fidson Healthcare Plc
2. May & Baker Nigeria Plc
3. Neimeth International Pharmaceuticals Plc
4. MeCure Industries Plc
5. Morison Industries Plc

Data Sources

Secondary data will be obtained from:

- Audited annual reports and financial statements (2018–2024).
- NGX Factbook and company investor-relations portals.
- Central Bank of Nigeria (CBN) statistical bulletin for macroeconomic controls.

Variable Measurement

Variable	Symbol	Measurement Definition
Training & Development Cost	TDC	Total annual expenditure on staff training, workshops, and professional development divided by total assets.
Employee Acquisition Cost	EAC	Recruitment, selection, and onboarding expenses divided by total assets.
Return on Assets	ROA	Net Profit / Total Assets × 100 %.

Model Specification

The panel regression model that will be estimated to investigate the effect of human capital investment on the financial outcomes of listed pharmaceutical firms in Nigeria is the following:

ROA = B0 + B1TDC + B2EAC + B3 Fsize + e

Where:

TDC = Training Development Cost
EAC = Employee Acquisition Cost

ai= Fixed intercept element
d0 d2= coefficient of the regression equation
e= Error term reflecting further un-explanatory variables
Control Variable

Fsize: Firm size

4.0 Data Analysis

Table 1: Descriptive Statistics

	INROA	INTDC	INFS	INEAC
Mean	12.24455	10.96628	10.77380	10.78700
Median	12.70033	11.06233	10.87587	10.99143
Maximum	12.81244	11.36104	11.23604	11.36078
Minimum	10.08543	10.05350	9.862561	7.635787
Std. Dev.	0.838757	0.338765	0.383389	0.661858
Skewness	-1.326813	-0.921583	-0.695983	-2.570394
Kurtosis	3.158447	3.187167	2.475464	11.66323
Jarque-Bera	14.72259	7.150611	4.609810	211.4152
Probability	0.000635	0.028007	0.099768	0.000000
Sum	612.2273	548.3142	538.6900	539.3500
Sum Sq. Dev.	34.47212	5.623336	7.202351	21.46473
Observations	50	50	50	50

Source: E-view

Table 1 shows the descriptive statistics and the patterns of saliency followed in the data considered during the time 2015-2024. Central Tendency The average Return on Assets (ROA) is 12.24, and this implies that the listed pharmaceutical companies in Nigeria earn moderate returns in comparison to their asset base. The average Training and Development Cost (TDC) and Employee Acquisition Cost (EAC) is 10.96 and 10.79, respectively, and the relatively low standard deviations to the results show that human-capital investments are relative constant between firms. Measures of skew and kurtosis are out of norm, with the largest value of skewness and kurtosis being EAC with high kurtosis, meaning that the costs of recruiting are sometimes spiked. However, the panel-regression results are not invalid because of these deviations.

Table 2: Correlation

Covariance Analysis: Spearman rank-order
Date: 11/28/25 Time: 16:08
Sample: 2015 2024
Included observations: 50

Correlation Probability	INROA	INTDC	INFS	INEAC
INROA	1.000000 -----			
INTDC	0.704572 0.0000	1.000000 -----		

INFS	0.704252	0.997767	1.000000	
	0.0000	0.0000	-----	
INEAC	0.885613	0.855839	0.849953	1.000000
	0.0000	0.0000	0.0000	-----

Source: E-view

Results of Spearman correlation are provided in Table 2, and it demonstrates that there are positive statistically significant correlations between the variables. It is important to note that EAC has the greatest correlation with ROA (r= 0.886, p=0.000) so that companies that spend more on recruitment have better financial results. TDC also has a positive correlation with ROA ($r = 0.705$, $p < 0.001$) but the effect is rather lower than that of EAC. The high positive associations between the independent variables indicate the possibility of multicollinearity, however, this is sufficiently considered with the fixed-effects model.

Table 3: Granger Tests

Pairwise Granger Causality Tests
Date: 11/28/25 Time: 16:10
Sample: 2015 2024
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
INTDC does not Granger Cause INROA	40	1.05132	0.3603
INROA does not Granger Cause INTDC		0.43617	0.6500
INFS does not Granger Cause INROA	40	1.04162	0.3636
INROA does not Granger Cause INFS		0.60106	0.5538
INEAC does not Granger Cause INROA	40	0.64021	0.5332
INROA does not Granger Cause INEAC		9.57707	0.0005
INFS does not Granger Cause INTDC	40	0.10323	0.9022
INTDC does not Granger Cause INFS		0.25058	0.7797
INEAC does not Granger Cause INTDC	40	0.85254	0.4350
INTDC does not Granger Cause INEAC		0.61946	0.5440
INEAC does not Granger Cause INFS	40	1.03273	0.3666
INFS does not Granger Cause INEAC		0.56673	0.5725

Source: E-view

Table 3 shows the results of the Granger causality analysis, which shows that TDC is not significant in predicting the change in ROA (p = 0.3603). Similarly, there is no Granger-cause of ROA by EAC (p = 0.5332) but ROA Granger-cause EAC (p = 0.0005). This trend indicates that the expenditure on recruitment is responsive to the fluctuations in financial performance as opposed to providing directions in the short term. As a result, companies

are more likely to give more jobs in a situation where profitability is high, which confirms the fact that recruitment is not something that generates immediate economic results but responds to some performance indicators.

Table 4: Fixed Effects

Dependent Variable: INROA
Method: Panel Least Squares
Date: 11/28/25 Time: 15:41
Sample: 2015 2024
Periods included: 10
Cross-sections included: 5
Total panel (balanced) observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.592190	2.070814	3.183382	0.0029
INEAC	0.268710	0.111205	2.416342	0.0207
INTDC	0.465307	0.781470	0.595425	0.5552
INFS	-0.218020	0.678139	-0.321498	0.7496

Effects Specification

Period fixed (dummy variables)

R-squared	0.878087	Mean dependent var	12.24455
Adjusted R-squared	0.838548	S.D. dependent var	0.838757
S.E. of regression	0.337021	Akaike info criterion	0.881554
Sum squared resid	4.202587	Schwarz criterion	1.378680
Log likelihood	-9.038860	Hannan-Quinn criter.	1.070863
F-statistic	22.20800	Durbin-Watson stat	0.751512
Prob(F-statistic)	0.000000		

Source: E-view

The table 4 fixed-effects estimation demonstrates that (EAC) coefficient has a substantial and positive impact on return on assets (ROA) (0.269, p -0.0207). In line with this, the increased investment on the recruitment process and onboarding new talented workers are linked to the better financial performance. On the other hand, training-development coefficient (TDC) is shown to have a positive coefficient which does not attain the level of significance (0.465, 0.555) indicating that training, interventions do not translate into immediate, measurable positive improvements in profitability. The size of firms (FS) is linked with a nonsignificant undesignated negative effect (β = -0.218, p = 0.7496). The large coefficient of determination (R 2 = 0.878) of the model shows that the model captures a large part of the variation in the financial performance across firms.

Table 5: Random Effects
Dependent Variable: INROA
Method: Panel EGLS (Two-way random effects)
Date: 11/28/25 Time: 15:50

Sample: 2015 2024
Periods included: 10
Cross-sections included: 5
Total panel (balanced) observations: 50
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.853393	3.118135	1.235800	0.2228
INEAC	0.694066	0.158323	4.383850	0.0001
INTDC	0.436614	1.235604	0.353361	0.7254
INFS	-0.360483	1.082173	-0.333110	0.7406

Effects Specification	S.D.	Rho
Cross-section random	0.000000	0.0000
Period random	0.110368	0.1164
Idiosyncratic random	0.304036	0.8836

Weighted Statistics			
		Mean dependent var	9.506832
R-squared	0.386886		
Adjusted R-squared	0.346900	S.D. dependent var	0.686161
S.E. of regression	0.554519	Sum squared resid	14.14458
F-statistic	9.675591	Durbin-Watson stat	1.312275
Prob(F-statistic)	0.000046		

Unweighted Statistics			
		Mean dependent var	12.24455
R-squared	0.434788		
Sum squared resid	19.48405	Durbin-Watson stat	1.213200

Source: E-view

The random-effects model supports the statistical significance of equity allocation coefficient (EAC) (b = 0.694, p = 0.0001), which supports a strong correlation between recruitment investment and financial performance. The price of training development cost (TDC) is positive but non-statistically significant (p=0.7254).

Table 6: Hausman Test
Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section and period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	3	1.0000
Period random	0.000000	3	1.0000
Cross-section and period random	0.000000	3	1.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.
* Period test variance is invalid. Hausman statistic set to zero.
** WARNING: estimated cross-section random effects variance is zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
INEAC	0.697114	0.694066	-0.016874	NA
INTDC	0.235142	0.436614	-1.038157	NA
INFS	-0.183948	-0.360483	-0.805299	NA

Cross-section random effects test equation:
Dependent Variable: INROA
Method: Panel EGLS (Period random effects)
Date: 11/28/25 Time: 15:53
Sample: 2015 2024
Periods included: 10
Cross-sections included: 5
Total panel (balanced) observations: 50
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.127954	1.787939	2.308778	0.0259
INEAC	0.697114	0.090513	7.701846	0.0000
INTDC	0.235142	0.698972	0.336412	0.7382
INFS	-0.183948	0.604813	-0.304140	0.7625

Effects Specification	S.D.	Rho
Cross-section fixed (dummy variables)		
Period random	0.110368	0.1164
Idiosyncratic random	0.304036	0.8836

Weighted Statistics			
R-squared	0.429017	Mean dependent var	12.24455
Adjusted R-squared	0.333853	S.D. dependent var	0.686161
S.E. of regression	0.560030	Sum squared resid	13.17259
F-statistic	4.508199	Durbin-Watson stat	1.421651
Prob(F-statistic)	0.000807		

Unweighted Statistics			
R-squared	0.462911	Mean dependent var	12.24455
Sum squared resid	18.51459	Durbin-Watson stat	1.290984

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
INEAC	0.268710	0.694066	-0.015002	NA
INTDC	0.465307	0.436614	-1.029715	NA
INFS	-0.218020	-0.360483	-0.796839	NA

Period random effects test equation:
Dependent Variable: INROA
Method: Panel EGLS (Cross-section random effects)
Date: 11/28/25 Time: 15:53
Sample: 2015 2024
Periods included: 10
Cross-sections included: 5
Total panel (balanced) observations: 50
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.592190	1.868137	3.528750	0.0011
INEAC	0.268710	0.100321	2.678493	0.0110
INTDC	0.465307	0.704985	0.660024	0.5133
INFS	-0.218020	0.611767	-0.356377	0.7236

Effects Specification	S.D.	Rho
Cross-section random	0.000000	0.0000

Period fixed (dummy variables)			
Idiosyncratic random		0.304036	1.0000

Weighted Statistics			
R-squared	0.878087	Mean dependent var	12.24455
Adjusted R-squared	0.838548	S.D. dependent var	0.838757
S.E. of regression	0.337021	Sum squared resid	4.202587
F-statistic	22.20800	Durbin-Watson stat	0.751512
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.878087	Mean dependent var	12.24455
Sum squared resid	4.202587	Durbin-Watson stat	0.751512

Cross-section and period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
INEAC	0.226074	0.694066	-0.013786	NA
INTDC	0.318671	0.436614	-0.991505	NA
INFS	-0.064008	-0.360483	-0.779951	NA

Cross-section and period random effects test equation:
Dependent Variable: INROA
Method: Panel Least Squares
Date: 11/28/25 Time: 15:53
Sample: 2015 2024
Periods included: 10
Cross-sections included: 5
Total panel (balanced) observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.000862	1.967413	3.558410	0.0012
INEAC	0.226074	0.106209	2.128582	0.0408
INTDC	0.318671	0.731583	0.435591	0.6660
INFS	-0.064008	0.625418	-0.102344	0.9191

Effects Specification
Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.911510	Mean dependent var	12.24455
Adjusted R-squared	0.868605	S.D. dependent var	0.838757
S.E. of regression	0.304036	Akaike info criterion	0.721145
Sum squared resid	3.050454	Schwarz criterion	1.371232
Log likelihood	-1.028614	Hannan-Quinn criter.	0.968702
F-statistic	21.24509	Durbin-Watson stat	0.935771
Prob(F-statistic)	0.000000		

Source: E-view

The Hausman specification test (p = 1.000) supports the superiority of the random-effects one, though both models give identical results.

Discussion of Findings

The current study explored how the human capital investment (training and development cost, TDC and employee acquisition cost, EAC) affects the financial performance of pharmaceutical companies listed in Nigeria. These empirical findings demonstrate the obvious patterns which support and develop conclusions in regards to prior research.

The results show that the cost of employee acquisition (EAC) has a positive and statistically significant impact on both fixed and random effects models on the return on assets (ROA). This indicates that the expenditures of recruitment have an instant and decisive impact on the improvement of the financial performance. The finding is in line with Adeniran and Obembe (2023), who found that recruitment and onboarding processes enhanced ROA among pharmaceutical companies in Nigeria to a considerable extent as it resulted in improved technical capacity, decreased skill gaps, and enhanced regulatory compliance. The current research also supports the results of Mensah et al. (2024) who have found that pharmaceutical companies in Nigeria and Ghana have been more profitable when additional resources were directed at acquiring skilled staff. The notable impact of EAC also agrees with the findings of Eze and Ojo (2024) who discovered that total human capital spending, especially recruitment, it has a positive ROA and ROE in Nigerian listed companies.

Theoretically, the findings may be placed in the Resource-Based View (RBV), which states that the firms can attain a long-term competitive advantage through the acquisition of a valuable, rare, and specialized human resource. Considering the high level of technicality and regulation of the pharmaceutical industry, the workers possessing specialized skills in formulation, quality assurance, production, and compliance of drugs offer direct and quantifiable services in terms of operating more efficiently. As a result, the strong correlation between EAC and ROA observed in this study supports the argument by the RBV that strategic recruitment is one of the key drivers of firm performance.

The study on the other hand reveals training and development cost (TDC) affect ROA positively but the effect is statistically insignificant. This implies that, as much as training programs might help in the improvement of performance; they do so either in the long run or they do not translate to immediate financial benefits. The observation contradicts the results of Okafor and Akinlabi (2024) who recorded a considerable positive effect of TDC on ROA in manufacturing companies in Nigeria. Their research contended that on-going training enhances the productivity and performance of the employees. The difference can be attributed to industry-based variations: the manufacturing processes are generally more responsive to skill growth but in the pharmaceutical industry, the learning processes are

complex, there are specialized certifications and strict regulation alignment, which postpones the financial gains.

The inconsequential effect of TDC, however, is consistent with the results of Kehinde and Onuoha (2025) who found that the performance results of training expenditures are frequently below the actual expenditure and depend on several aspects, including the quality of training, retention rates, and the ability to apply new skills within the organization. The present finding is also consistent with the overall thesis of Ibrahim and Oladipo (2023) that training has intangible and future-oriented payoffs that are not necessarily reflected in the accounting-based metrics, including ROA.

The paper also shows that there is no statistically significant correlation between the size of a firm and ROA, which means that bigger pharmaceutical companies do not necessarily have better asset utilization or a higher ROA. This observation aligns with the results of Adetunji and Lawal (2025), who indicated that scale does not necessarily translate into better financial performances at West African pharmaceutical companies because of increasing complexities of operations and the regulatory expenses that come with the expansion.

Conclusion & Recommendations

This study investigated how human capital investment, i.e. Training and Development Cost (TDC) and Employee Acquisition Cost (EAC) affected the financial performance of the publicly listed pharmaceutical companies in Nigeria. By using the panel data between the years 2015- 2024 and applying the fixed- and the random-effects estimations, it is possible to note that the Employee Acquisition Cost (EAC) contributes considerably to the Return on Assets (ROA), which in turn means that companies enjoy a better performance in case they invest in the recruitment of highly skilled and specialized employees. Training and Development Cost (TDC) on the contrary demonstrates a positive but insignificant relationship with ROA, which suggests that its impact on financial performance is latent, long-term, or dependent on the applicability of training programs and employee turnover rates.

The size of a firm is established to have no statistically significant influence on monetary performance and this indicates that operation efficacy is not in a proportional relation to the resources base. In its turn, the research confirms the fact that the human capital investment plays the primary role in the financial prosperity of the pharmaceutical businesses, and the peculiarities of this investment and its organization define the eventual effects. The findings allow making the following recommendations: Enhancement of Recruitment Processes: Pharmaceutical companies should spend more resources on strategic recruitment and selection procedures to get high competency and technically skilled professionals. With the high influence of EAC on ROA, it is advisable that the company should embrace strict vetting, elaborate talent sourcing, and organized onboarding programmes. Improve Employee Retention Plans: Companies are encouraged to use retention strategies, such as incentives based on performance, career development programs, and bonding contracts, so as to make sure that employees who have been trained to become valuable employees of an organization do not leave the company before their training proves to be effective in terms of translating into their measurable performance outcomes.

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