



Human Capital Efficiency and Firm Value: An Empirical Study of Listed Manufacturing Firms in Nigeria

ONOVAYEN Erus Evelyn¹, ONOVUGHE Abel², AKPOVOFENE Erhinyodavwe Josiah³

Accounting Department, Federal Polytechnic Orogun

email: evelynonovayen@gmail.com

+2348068772000

email: onovugheabel@gmail.com

+2347062285245

email: akpovofene.josiah @fepo.edu.ng

+2348035036165

Publication Date: 2026/06/22

Abstract

This paper investigated the effect of human capital efficiency on firm value of listed manufacturing firms in Nigeria. Human capital has increasingly been recognized as strategic asset for firm sustainability and competitive advantage in a knowledge economy. Despite the rise in investment in employee development, empirical evidence remains contradictory regarding the relationship between human capital efficiency and market valuation in emerging markets. This study uses an ex-post facto research design to investigate the relationship using panel data extracted from the annual reports and financial statements of 44 listed manufacturing firms in Nigerian Stock Exchange (NGX) for 2015-2024. The indicators used for measuring human capital efficiency were earnings per employee (EPE), value added per employee (VAE) and human capital return on investment (HCROI) respectively and the indicators of firm value include Tobin's Q. Descriptive statistical, correlation analysis, diagnostic tests, Levin-Lin-Chu unit root tests and Panel-Corrected Standard Error (PCSE) regression were used in the analysis. The results show that none of the measures of human capital efficiency, namely earnings per employee, value added per employee and human capital return on investment, has a statistically significant impact on firm value. This imply that even though human capital efficiency has impact on operating performance but not on market value of listed manufacturing firms in Nigeria. Based on the finding that market value creation is the interplay between other complementary organizational resources, such as innovation ability, technological advancement, structural capital and strategic management practice. In conclusion, the findings advise the manufacturing firms to combine employee efficiency in workforce with technology innovation, organization innovation and transformation to create share value for the owners. Keywords: human capital efficiency, firm value, Tobin's Q, manufacturing sector, Nigeria, intellectual capital

Introduction

The value of a firm today is derived significantly from the contribution of human capital in our knowledge-based economy. Human Capital Efficiency (HCE), one component of intellectual capital (Sulaiman, Olamide & Adeyemo, 2021) signifies the

firm's ability to transform employees' capabilities into high-value output. Given the intense competitive environment and rapid technological advancement in the manufacturing industry, effective management of human capital would lead to

significant operational and financial efficiency.

The manufacturing industry, a bedrock of Nigeria's economy has been hampered by under-utilization of resources, low efficiency, and low value-added products (Anosa 2021). It is acknowledged by researchers that not only tangible resources like physical and financial capital impact positively on firms' performance and value, but also the quality and productivity of human capital (Odogu & Obalakumo, 2023). In the face of this revelation, understanding human capital efficiency's impact on value of listed manufacturing firms in Nigeria would be of immense benefit.

Empirical evidence supports the positive influence of human capital efficiency on the organization's performance and competitiveness. Thus Odogu & Obalakumo (2023) found a strong positive impact of human capital efficiency on financial performance of listed manufacturing firms in Nigeria and therefore suggested that firms need to invest more in employee training and development. Similarly, Anosa (2021) proposed that effective human capital leads to more productivity and innovation in the manufacturing sector.

These results were buttressed by Nneji, Amahalu and Ndubuisi-Okolo (2024) who reported that the efficiency of the intellectual capital where human capital is a critical variable has a significant positive effect on the financial performance of listed manufacturing firms. This finding aligns with the Resource Based View of the firm which advocates that intangible resources are source of sustainable competitive advantage in firm if they are effectively exploited.

Moreover, Okoye and Emeneka (2021) linked human capital efficiency with an

increase in the Economic Value Added (EVA), suggesting that more efficient human capital generates economic value beyond profit. Also Agbomah & Aniefor (2020) argued that the role of human capital is often underestimated and neglected in conventional financial accounting systems and therefore recommended for human capital accounting system in order to capture the value of human capital properly. Even with this increase in awareness, measurement of human capital remain a challenge. While Egolum (2021) stress the need for a systematic assessment of human capital efficiency in all industries, Sulaiman, Olamide and Adeyemo (2021) proposed integration of human capital efficiency indicators in the governance structure of organizations and management decision making.

Some previous research indicate that the efficiency of human capital utilization by firms has a significant impact on firm's performance outcome and firm value (Nneji, Amahalu, & Ndubuisi-Okolo, 2024).

In measuring human capital efficiency three key variables were chosen as surrogates: Earnings per employee (EPE), Value added per employee (VAE) and Human Capital Return on Investment (HCROI). These variables measure income efficiency, value efficiency and financial return on human capital investment, respectively.

Considering the views mentioned above, this study seeks to identify the influence of human capital efficiency on value of listed manufacturing firms in Nigeria, with the objective to add to the existing literature in a way that would enable improved organizational performance and value creation.

Problem Statement

In recent years, the strategic importance of human capital has gained attention worldwide as a major driver of firm performance and value. However, in Nigeria, the manufacturing sector is constrained by an underdeveloped, underutilized resource, low productivity, and intensely competitive environment in which efficient employment of human capital still remains a key concern.

The literature has revealed that investment in, and effective management of, human capital results in a better performance and value of organizations (Odogu & Obalakumo, 2023; Anosa, 2021); nonetheless many listed manufacturing firms in Nigeria are focusing their resources primarily on physical and financial capital while neglecting human capital.

While studies on intellectual capital such as those carried out by Odogu & Obalakumo (2023), Ndubuisi-Okolo (2024), Egolum (2021) has examined the impact on firm performance, only few studies on human capital efficiency (HCE) have actually evaluated the role it play in determining the value of the firms. In addition, there is dearth of literature on Human Capital Return on Investment (HCROI) in relation to the value of listed manufacturing firms in Nigeria (Tobin's Q) (Nneji, Amahalu, & Ndubuisi-Okolo, 2024; Okoye & Emeneka, 2021). There is still no consensus and concrete empirical evidence to prove the extent of HCE impact on firm value in Nigeria manufacturing industry using proxy variables of Earnings per employee, Value added per employee and Human Capital Return on Investment. Therefore the questions that arises are; do manufacturing firms in Nigeria utilized their human capital efficiently? And Does human capital efficiency increase market value?

This study endeavors to fill this gap by examining the influence of Human Capital Efficiency on firm value of listed manufacturing firms in Nigeria, for the policy makers, investors and management of corporations, with a view to improving organization's performance and sustained competitiveness.

Study Questions

- I. How does human capital efficiency as proxied by earnings per employee influence the market value of listed manufacturing firms in Nigeria?
- ii. What is the influence of human capital efficiency as proxied by value added per employee on the value of listed manufacturing firms in Nigeria?
- iii. What is the influence of human capital efficiency as proxied by human capital return on investment on the value of listed manufacturing firms in Nigeria?

1.4 Research Objectives

The primary objective of this study was to investigate the effect of Human Capital Efficiency on the market value of listed manufacturing firms in Nigeria.

The specific objectives of the study are as follows:

- i. To investigate the effect of Earnings Per Employee on Value of listed manufacturing firms in Nigeria
- ii. To Evaluate the effect of Value added per employee on Value of listed manufacturing firms in Nigeria
- iii. To examine the effect of Human Capital Return on Investment on value of listed manufacturing firms in Nigeria.

Research Hypotheses The study tested the following hypotheses stated in the null form:

Ho1: Earnings Per Employee (EPE) has no significant effect on the market Value of Listed Manufacturing Firms in Nigeria.

Ho2: Value Added Per Employee (VAE) has no significant effect on the market Value of Listed Manufacturing Firms in Nigeria.

Ho3: Human Capital Return on Investment (HCROI) has no significant effect on the market Value of Listed Manufacturing Firms in Nigeria.

Scope of the Study

The research focuses on 44 manufacturing firms listed on the Nigerian Exchange Group (NGX) from 2015 to 2024. It examines HCE using EPE, VAE, and HCROI as proxies and measures firm value via Tobin's Q. The study concentrates solely on the manufacturing sector to maintain analytical focus and draws data exclusively from publicly available annual reports.

Empirical Review

Many empirical research papers were conducted during the past years to test the relationship between Human Capital Efficiency (HCE) and firm performance measures like profitability, productivity, market valuation etc. And most of the findings are consistent that HCE does matter regardless of sector and contexts of countries particularly in Nigeria.

However most of them did not specifically test the relationship between HCE and firm value using Tobin's Q as a measure and a market-based one, in a manufacturing industry. In this research, we make a novel contribution by empirically test the effect of human capital efficiency proxied by Earnings Per Employee, Value Added Per

Employee and HCROI on market value measured by Tobin's Q of manufacturing firms listed on the Nigeria stock market from 2015-2024.

Research Gap

Despite a growing interest among researchers in the impact of Human Capital Efficiency (HCE) on firm performance, there exist a gap in terms of methodology and scope in Nigeria. Most prior researches tested HCE's impact on the accounting based measures of firm performance such as Return on Asset (ROA) and Earnings per Share (EPS) (e.g. Ezeagba, 2016; Anosa, 2021; Agbomah & Aniefor, 2020) and ignored market-based firm valuation measures like Tobin's Q, which reflects better the investor perception and long-run firm value. Secondly, while previous researchers had used individual measure such as earnings per employee (EPE) or value added per employee (VAE) to measure HCE (Odogu & Obalakumo, 2023; Okoye & Emeneka, 2021) few studied had been conducted to consider Human Capital Return on Investment (HCROI) as another measure to capture the financial return generated on the spending for human capital. Further the studies were widely conducted for other sectors rather than manufacturing sector, such as banking, insurance and oil and gas sector (Enekwe, Udeh & Akpan, 2023; Alade & Olayiwola, 2021). Based on researcher's knowledge few studies had tested simultaneously EPE, VAE and HCROI on the market value (Tobin's Q) over 10 years data. This study aims to bridge this gap and examine the combined impact of EPE, VAE and HCROI on firm value using Tobin's Q for manufacturing listed firms on Nigerian stock market from 2015-2024.

Methodology

Research Design

$$FV_{it} = \beta_0 + \beta_1 EPE_{it} + \beta_2 VAE_{it} + \beta_3 HCROI_{it} + \beta_4 FSIZE_{it} + \varepsilon_{it}$$

Where:

FV = Firm Value (proxied by Tobin's Q)

EPE = Earnings per Employee

VAE = Value Added per Employee

HCROI = Human Capital Return on Investment

This research study applied an ex-post facto research design methodology. Ex-post facto is appropriate in this case because the researcher makes no manipulation or intervention, but is studying pre-existing secondary data. The design allows researchers to examine casual relationships in natural settings, such as market performance data derived from publicly listed firms on the Nigeria Stock Exchange.

Population of the Study

The population under study consist of all 44 manufacturing listed companies on the Nigeria Stock Exchange Group as at 31 st December, 2024. This includes firms listed in the industrial sector and consumer goods sectors that have been consistently traded for the study period of 10 years (2015-2024).

Sample Size and Sampling Technique

The sample consists of all 44 manufacturing listed firms that have data on all the variables that would be included in the study for the entire study period (2015-2024). Firm with missing data or inconsistent reporting are excluded. Thus, 44 Manufacturing Listed Companies in Nigeria Stock Exchange Group as at 31 st December, 2024 was used as the sample for the study.

Sources and Method of Data Collection

The data for this study are secondary data which were collected from annual reports and financial statement of the sample firms.

Model Specification

This study aims to examine the impact of human capital efficiency on firm value. The study adapts the Value Added Intellectual Coefficient (VAIC) framework developed by Pulic (2000) and modification the model for the purpose of measuring the impact of human capital efficiency variables. The adapted model is specified as:

FSIZE = Firm Size

i = firm index

t = time (year)

β_0 = constant

$\beta_1 - \beta_3$ = coefficients of the independent variables

ε = error term

Method of Data Analysis

The study employed descriptive statistics (mean, standard deviation, minimum and maximum values) to summarize the characteristics of the data. The inferential

analysis was conducted using panel regression techniques. Other diagnostic tests such as multicollinearity, heteroskedasticity, and serial correlation was also be conducted to validate the robustness of the model.

4.0 Analysis And Discussion Of Results

Table 4.1 Descriptive Statistics Analysis and Discussion

Summary of Descriptive for TOBINSQ EPE VAPEREMPL HCROI FSIZE

VARIABLES	OBS	MEAN	STD. DEV	MIN	MAX
TOBINSQ	440	.9358636	1.473686	.001	18.692
EPE	440	4249.106	34180.13	-274752.8	276347.3
VAPEREMPL	440	15901.8	66842.84	-189310.8	725322.5
HCROI	440	28919.79	88084.18	-182558.4	732233.5
FSIZE	440	16.59313	2.178038	12.064	22.094

Source: Regression Output, 2025.

Table 4.1 shows the descriptive statistics for the variables used to explain the impact of HCE on firm value of listed manufacturing firms in Nigeria. It represents firm-year observations (440) on five variables: Tobin's Q (firm value), Earnings Per Employee (EPE), Value Added Per Employee (VAPEREMPL), Human Capital Return on Investment (HCROI), and Firm Size (FSIZE).

As seen in the Table, Tobin's Q, the measure of firm value, has a mean of 0.94, a standard deviation of 1.47, minimum of 0.001 and maximum of 18.69. Tobin's Q for firms of market value is relatively lower with an average of 0.94 while a few firms are relatively better with a very high market value. Many of the firms are valued below their replacement cost, indicated by Q values close to zero. This may imply that listed manufacturing firms are relatively under-valued in the stock market.

The mean EPE is 4,249.11 but shows a huge standard deviation of 34,180.13, the minimum value is -274,752.8 and maximum is 276,347.3. The huge difference implies heterogeneity in the distribution of EPE. Negative values are typical of loss-making firms where the loss is accounted for at the employee level, and high values imply large

positive profits, hence there are variations in the level of efficiency and human capital return on a per-employee level.

Similarly, VAPEREMPL has a mean of 15,901.8, with a large standard deviation of 66,842.84, minimum of -189,310.8, and maximum of 725,322.5. Again there is a wide range in value added per employee among the listed manufacturing firms; high negative and positive values illustrate disparities among firms in their ability to create value through their workforce. This may relate to differences in technology usage and productivity among firms in Nigeria.

HCROI has a mean value of 28,919.79, standard deviation of 88,084.18, minimum value of -182,558.4 and maximum value of 732,233.5. This also shows that there is large variations in the returns generated from human capital investment in the sample of firms, indicating that some firms utilize the investment made in human capital far better than others.

For FSIZE, with mean of 16.59, and a smaller standard deviation of 2.18 (natural logarithm of total assets), the minimum and maximum values are 12.06 and 22.09. This variable is relatively less volatile than the other variables used in the regression model,

implying a somewhat consistent distribution of sizes of listed manufacturing firms. On the whole, the descriptive statistics confirm that there is a high level of variability in the measures of human capital efficiency. Given the wide range and

significant outliers in these measures of human capital, these statistics will guide the empirical investigation of how these different aspects of HCE influence firm value.

Normality Test

Table 4. 2: Shapiro-Wilk W test for normal data for TOBINSQ, EPE, VAPEREMPL, HCROI and FSIZE

VARIABLES	OBS	W	V	Z	PROB>Z
TOBINSQ	440	0.52409	142.705	11.856	0.00000
EPE	440	0.54133	137.536	11.768	0.00000
VAPEREMPL	440	0.35418	193.654	12.586	0.00000
HCROI	440	0.41158	176.441	12.363	0.00000
FSIZE	440	0.98379	4.860	3.778	0.00008

Source: Regression Output, 2025.

For all the variables used in the analysis, tests were run to determine the normal distribution of the data. Table 4.2 shows the Shapiro-Wilk W test which assesses the null hypothesis of normality. When the probability (Prob > Z) is less than 0.05 then there is a deviation from normality. The results illustrate that Tobins' Q had a W statistic of 0.52409 with a p-value of 0.0000 which demonstrates high non-normality. EPE had a W statistic of 0.54133 with a p-value of 0.0000 whereas VAPEREMPL (W statistic 0.35418) and HCROI (W statistic 0.41158) had equally low W statistics and p-values of 0.0000. This indicates that human capital efficiency variables as well as firm value show strong non-normality due to the occurrence of extreme values or skewed distributions apparent from the descriptive

statistics. The FSIZE variable was found to have a higher W statistic 0.98379 with a p-value of 0.00008 which was found to be more normal than all the other variables although still below 1 and therefore it is statistically significant and does not represent a normal distribution perfectly.

In conclusion the Shapiro-Wilk test proves that there are non-normal distributions for all the variables used in this study. This is a relatively common occurrence when analysing accounting and financial data especially at firm level which tends to produce more variability and potentially outliers than any other sample. This therefore shows that if parametric methods are to be used they will need some transformation (e.g. Log) or non-parametric tests will have to be applied.

Correlation Analysis

Table 4.3: Summary of Spearman Correlation Matrix for TOBINSQ EPE VAPEREMPL HCROI FSIZE, stats(rho p) star(0.05)

	TOBINSQ	EPE	VAPEREMPL	HCROI	FSIZE
TOBINSQ	1.0000				
EPE	-0.1509*	1.0000			
	0.0015				
VAPEREMPL	-0.1343*	0.6389*	1.0000		
	0.0048	0.0000			
HCROI	-0.0939*	0.5641*	0.8803*	1.0000	
	0.0489	0.0000	0.0000		
FSIZE	-0.2923*	0.3240*	0.4770*	0.4038*	1.0000
	0.0000	0.0000	0.0000	0.0000	

Source: Regression Output, 2025.

The Spearman correlation of the various human capital efficiency measures and firm size in relation to firm value (Tobin's Q) is depicted in Table 4.3. This non-parametric method was employed since the variables do not follow normal distribution.

The Tobin's Q is found to be negatively related with all measures of human capital efficiency and size of the firm. The value of correlation coefficient with EPE, VAPEREMPL and HCROI are -0.1509 ($p=0.0015$), -0.1343 ($p=0.0048$), and -0.0939 ($p=0.0489$) respectively, though significant, the correlation are relatively weak. It implies that the higher is the earning, value added or human capital return per employee, the lower is the market valuation. The negative relationship indicates that firms with high per employee returns are not sufficiently rewarded by the market in terms of market valuation. It is possible that there are other aspects which influence firm value, although other factor affect the market value. Similarly the value

of correlation coefficient between Q and FSIZE is -0.2923 ($p < 0.001$), which implies larger firm is undervalued. This might be because larger companies, being mature, have poor capacity to scale or grow and are perceived negatively by the market.

There exist high correlations between all the human capital measures, the value of correlation coefficient between EPE and VAPEREMPL is 0.6389 ($p < 0.001$), between VAPEREMPL and HCROI is 0.8803 ($p < 0.001$), and between EPE and HCROI is 0.5641 ($p < 0.001$), which is indicative of high correlation between them, reflecting some common dimensions of human capital efficiency. The firm size also positively relates with all the three human capital measures (EPE 0.3240; VAPEREMPL 0.4770 and HCROI 0.4038), that implies that human capital efficiency generally rises with firm size. The correlation between human capital efficiency measures, are correlated between each other but negatively with market value.

Result for Multicollinearity Test

Table 4.4: VIF Test Result

VARIABLE	VIF	1/VIF
VAPEREMPL	2.77	0.360981
HCROI	2.43	0.412110
EPE	1.21	0.823288
FSIZE	1.11	0.898655
Mean VIF	1.88	

Source: Regression Output, 2025.

In Table 4.4 the Variance Inflation Factor (VIF) test is conducted to determine the extent of multicollinearity among the independent variables. Multicollinearity is the degree of correlation among the explanatory variables, and it can skew the regression estimates by inflating the standard errors.

From the table it is observed that VAPEREMPL has the largest VIF with 2.77. HCROI is second highest with VIF 2.43. EPE has the VIF 1.21, and FSIZE has the VIF 1.11. The mean VIF is 1.88. A VIF value over 10 usually represents severe multicollinearity, whereas a VIF between 5 and 10 signals a need for more caution. All

VIF values are comfortably below these figures and thus it can be concluded that multicollinearity does not pose a major threat to this analysis. This finding is also confirmed by tolerance values (1/VIF), which range from 0.36 (VAPEREMPL) upwards. These figures are all above the typical cutoff 0.10 value that is indicative of significant multicollinearity.

In conclusion, there are no grounds to exclude the independent variables from the regression, because multicollinearity does not seem to undermine the estimated coefficients, reinforcing the robustness of further regressions on the impact of human capital efficiency on firm value.

Other Diagnostic Tests

Table 4.5: Cook-Weisberg test for heteroskedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of TOBINSQ

Decision rule If p-value is statistically significant, then reject Ho and accept HA

Result $\chi^2(1) = 134.22$; Prob> $\chi^2 = 0.0000$

Source: Regression Output, 2025

To check for heteroskedasticity, the Breusch-Pagan/Cook-Weisberg test that is shown in Table 4.5. The null hypothesis (Ho) stated here is that the error variance is constant, and the alternative hypothesis (HA) stated is that the error variance is not constant, hence heteroskedasticity. The value of the statistic is 134.22 and the p-value is 0.0000. The p-value is significantly below the 5% confidence level, so Ho can

be rejected. We have conclusive evidence of heteroskedasticity. An assumption of OLS is that error variance is constant, and when it is not we obtain biased standard errors which have implications for hypothesis tests and confidence intervals. The actual coefficient estimates are not biased but the standard errors are and further analysis should be performed with robust standard errors.

Hypotheses Testing

Table 4.7: Summary PCSE for DTOBINSQ DEPE DVAPEREMPL DHCROI DFSIZE

Panel-Corrected

D.TOBINSQ	COEF.	STD. ERR.	z	P> z
D.EPE	6.51	9.02	0.72	0.470
D.VAPEREMPL	-1.83	1.12	-1.63	0.103
D.HCROI	1.69	1.06	1.59	0.111
D.FSIZE	.091	.296	0.31	0.760
_CONS	-.004	.075	-0.05	0.961
N				396
R-squared				0.0018
Wald $\chi^2(4)$				3.53
Prob > χ^2				0.4732

Source: Regression Output, 2025

The regression results obtained from the Panel-Corrected Standard Errors (PCSE) model as presented in Table 4.7 indicates that none of the human capital efficiency variables significantly affect the value of Nigerian listed manufacturing firms. The coefficient of determination (R-squared) is at 0.0018 and the Wald chi-square value is at 3.53 ($p=0.4732$), this reveals that the overall fit of the model is poor.

The coefficient of EPE is positive (6.51) but not significant ($p=0.470$), this shows that increases in earnings per employee did not directly increase firm value. Profit per employee was considered a key indicator of corporate performance by McKinsey, et al. (2018), however, this study concludes that human capital efficiency in terms of profit per employee is not a driver of market value,

this is consistent with the study of Egolum (2021) and Okoro and Igba (2023) who investigated Nigerian listed companies.

The coefficient for Value Added Per Employee (VAPEREMPL) is negative (-1.83) and insignificant ($p=0.103$). This could imply that increasing VAPEREMPL reduces firm value, however the significance levels are low and Tran and Vo (2020) have found that the role of human capital efficiency depends on sector context and manufacturing firms may exhibit diminishing returns due to process inefficiencies. Rabid, et al. (2024) found that structural capital efficiency may overshadow human capital efficiency for Nigerian manufacturing firms.

HCROI has a positive coefficient (1.69) but is not statistically significant ($p=0.111$), this

confirms the arguments of AIHR (2020) and Criterion HCM (2022) that although the calculation of HCROI may serve to gauge the productivity and capability of an organisation's workforce, the direct impact on the market value may not be statistically evident, or is achieved indirectly. Eneh and Anyanhara (2025) noted that economic and institutional constraints prevent market responsiveness to human capital investment. Firm size (FSIZE) was not found to significantly affect the market value ($p=0.760$), consistent with Nneji, et al. (2024) who revealed that a larger firm size does not necessarily yield greater market value for Nigerian manufacturing companies in the absence of efficiently utilized intellectual capital.

The results presented in the table concur with the findings of Emeka, et al. (2022) and Kwarbai and Akinpelu (2016), that there are weak or no significant links between human capital efficiency and firm value for Nigerian listed manufacturing companies. The findings indicated that human capital efficiency did not make a difference in market valuation in the manufacturing sector of Nigeria. Therefore, in order to realize value creation through human capital, the management must have to complement its strategies in the development of human capital with that in technological innovation, structural capital and efficient resource utilization. Dynamic model can be developed to investigate the effect of lagged human capital investment on market value.

Discussion of Results

The results obtained from the Panel-Corrected Standard Errors (PCSE) regression analysis show that human capital efficiency measures (Earnings Per Employee (EPE), Value Added Per Employee (VAPEREMPL) and Human Capital Return on Investment (HCROI)) and firm size (FSIZE) have no significant impact on market value of the listed manufacturing firms in Nigeria. This results have supported and contrasted previous research works in this field, thus highlighting the unique role of human capital on corporate performance.

The coefficient on EPE is positive but insignificant ($p=0.470$), this signifies that

higher profits earned per employee does not directly lead to higher firm value. Profit per employee, as indicated by McKinsey & Company (2018), is modern measurement of corporate performance, however, it appears not to have a direct relationship with Tobin's Q for the Nigerian manufacturing firms, similar findings were reported by Kwarbai and Akinpelu (2016), in that they found inconsistent results when measuring human capital efficiency in Nigerian corporations depending on sector and managerial discretion.

VAPEREMPL shows a negative but insignificant coefficient ($p=0.103$), which concur with the findings of Tran and Vo (2020), who found human capital efficiency positively affects firm performance in Vietnam and its effect is likely to be sector-specific and higher labor costs, without complementary innovation or distinctiveness, may inhibit market appreciation. Similar results were found by Rabid et al. (2024) where it is argued that human capital efficiency is outweighed by structural capital efficiency for the Nigerian manufacturing firm.

HCROI has a positive coefficient but insignificant effect ($p=0.111$). This supports the findings of AIHR (2020) and Criterion HCM (2022) that while the calculation of HCROI allows companies to evaluate productivity, the effect on the market value of the firm is not always direct and can depend on factors such as the firm's adaptation of technologies, the intensity of capital, etc. Okoro and Igba (2023) similarly found that investments in human capital in the Nigerian manufacturing firms benefit in the long run rather than in market value terms.

The results obtained for human capital efficiency is also consistent with Egolum (2021) and Emeka et al. (2022) findings of weak or insignificant links between human capital efficiency and firm value in both the service and industrial sector of Nigerian economies. Eneh and Anyanhara (2025) further maintained that economic and institutional environment in Nigeria diminished the desired impact from human capital investments.

In conclusion, evidence from the current study is conclusive that although human

capital is fundamental in determining operational performance, it does not directly have a significant impact on market value (Tobin's Q) in Nigerian manufacturing sector. Hence, intellectual capital components of human capital are likely to outweigh each other like that presented by Nneji et al. (2024), that is structural and relational capital should not be ignored. Further strategies should be made on linking human capital to both technological innovation, structural capital efficiency, and resource allocation to affect market value.

Summary, Conclusion And Recommendations

Summary

This study was conducted to examine the effect of human capital efficiency on market value of Nigerian listed manufacturing firms using a panel of 440 firm-year observations, with a focus on three human capital efficiency variables and Tobin's Q as proxy for market value. Descriptive statistics show a disparity among human capital efficiency variables across firms. The diagnostic test results showed the variables are not normally distributed, without extreme multicollinearity, presence of heteroskedasticity and panel effects that necessitates using the Random effects model with PCSEs. It was established using unit root testing that most of the variables are stationary after first differencing. From the regression, none of the human capital efficiency measures or firm size produced statistically significant effect on Tobin's Q and the R-squared is small. The analysis concluded that there is no direct market valuation on the Nigerian manufacturing companies with measures of human capital efficiency.

Conclusion

This study was undertaken to find the influence of three different human capital efficiency variables (EPE, VAPEREMPL, HCRROI) and firm size on the value of listed manufacturing firms in Nigeria. Tobin's Q, the result indicated that:

(i) There is no statistical significance between human capital efficiency measures and Tobin's Q; firm size was also found to have insignificant effect.

(ii) The overall model fit was weak and has insignificant contribution to the variation in firm value.

(iii) Workforce efficiency was found not to directly relate with market value of listed manufacturing firms in Nigeria.

Recommendations

i. Investment in human capital: Firms should enhance long term value by investing in organized employee development plans that are aligned with technological innovation and strategic market goals.

li. Linking human capital to innovation: To ensure a market value response, companies should combine human capital investments with improvement in structural and relational capital, through adaptation of technology, improvement in processes, and stakeholder relationships.

lii. Improvement in performance measurement: Firms should go beyond conventional earnings and return measures when determining how human capital adds value; they should incorporate metrics for employee engagement, innovation capacity, intellectual capital efficiency, and other key elements to better gauge contribution to firm value.

Contributions to Knowledge

The study offers the following relevant contributions to literature in human capital efficiency and firm value in the case of the Nigerian manufacturing industries.

i. The study has provided current and sector-specific empirical evidence that the three human capital efficiency metrics (Earnings Per Employee, Value Added Per Employee, and Human Capital Return on Investment) do not significantly explain market value of listed manufacturing firms in Nigeria. This supports previous studies such as; Egolum (2021) and Emeka et al. (2022) on service firms, indicating that the operational efficiency metrics alone may not adequately increase firm valuation in developing economies.

ii. In a bid to further enrich human capital literature, where studies had mostly concentrated on service firms or mixed industrial samples, this study focused only on manufacturing firms alone and thus provides nuanced findings in understanding

the role of human capital efficiency in the labor-intensive manufacturing sector with unique characteristics. The result confirms Tran and Vo's (2020) finding on the limitations of human capital efficiency alone contributing to firm value and on the impact of diminishing returns and structural inefficiencies.

iii. It emphasizes the combined use of human capital, technology and structure capital to create market recognized value similar to what is happening in manufacturing industries. This goes a step beyond the previous studies (Rabid et al., 2024 and Nneji et al., 2024) on how the complementary factors are used to enhance firm value.

iv. Using PCSE model helps control for panel-level heteroskedasticity and contemporaneous correlation hence provided robust results that would assist subsequent intellectual capital and performance research.

Suggestions for Future Research

i. Extending to other industries: The findings of this research can be extended to other industries, such as; service, technology-based firms to examine if the same outcome would persist across other industries.

ii. Other human capital measures: future researches should try to incorporate other dimensions of human capital like: Employee Training Hours, Innovation Indices, Employee Engagement Level, and Intellectual Capital efficiency to determine their effect on market value.

iii. Temporal dimensions: A deeper insight into the temporal relationship between human capital efficiency and firm value may be achieved using dynamic panel models and lagged variables to capture possible lagged effect.

iv. Multi-countries study: a cross-country study comparing Nigerian manufacturing firms with firms in both emerging and developed economies may also yield valuable results regarding the role of institutional context and corporate governance structures.

References

- Agbomah, A. U., & Aniefor, S. (2020). Human capital accounting and corporate performance of quoted companies in Nigeria. *Pan-African Journal of Social Sciences*, 5(2), 122–133.
- AIHR. (2020). Human Capital ROI: Definition, formula, and calculation. <https://www.aihr.com>
- Alade, S. O., & Olayiwola, T. (2021). Human capital efficiency and firm profitability: Evidence from listed insurance firms in Nigeria. *Journal of Applied Economics and Business*, 9(4), 20–33.
- Amahalu, N. N., Nweze, C. A., & Obi, J. N. (2020). Determinants of intellectual capital performance: Evidence from quoted commercial banks in Nigeria. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 10(2), 34–47.
- Anosa, I. C. (2021). Human capital development and organizational productivity in selected manufacturing firms. *International Journal of Business Law and Research*, 5(2), 20–29.
- Ayodele, S. O. (2020). A study of human capital efficiency and profitability of quoted consumer goods companies in Nigeria. *Journal of Contemporary Research*, 14(2), 100–112.
- Becker, G. S. (1964). Human capital: A theoretical and empirical analysis, with special reference to education. *University of Chicago Press*.
- Criterion HCM. (2022). Human Capital ROI: Making the most of your workforce.
- Egolum, P. C. (2021). Evaluation of human capital efficiency on performance of listed service firms in Nigeria. *Nigerian Journal of Social Development*, 10(1), 55–66.
- Emeka, P., Okeke, F., Duruzor, I. G., & Adama, L. A. (2022). Human capital efficiency and firm value. *Journal of Business and Management Studies*, 10(4), 52–67.
- Eneh, O. M., & Anyanbara, O. H. (2025). Human capital investment and performance of quoted firms in

- Nigeria. *African Journal of Applied Economics*, 15(1), 33–48.
- Ezekiel, E., & Akinpelu, Y. (2016). Human capital efficiency and corporate performance: The Nigerian perspective. Academia.edu.
- McKinsey & Company. (2018). The new metrics of corporate performance: Profit per employee.
- Nneji, P. J., Amahalu, N. N., & Ndubuisi-Okolo, P. U. (2024). Intellectual capital efficiency and financial performance of listed manufacturing firms in Nigeria. *Journal of Global Accounting*, 10(1), 60–74.
- Obi, J. N., & Igbinosa, O. (2021). Human capital efficiency and financial performance of listed oil marketing firms in Nigeria. *International Journal of Oil, Gas and Energy Studies*, 3(1), 22–34.
- Odogu, A., & Obalaku, B. (2023). Human capital efficiency and performance of listed manufacturing firms in Nigeria. *International Journal of Trend in Scientific Research and Development*, 7(2), 1060–1068.
- Okoro, W., & Igba, J. (2023). Human capital investment and financial performance of manufacturing firms in Nigeria. *Nigerian Journal of Economic Research*, 25(3), 91–108.
- Okoye, L. U., & Emeneka, G. C. (2021). Human capital efficiency and economic value added of quoted firms in Nigeria. *International Journal of Advanced Engineering and Management*, 6(2), 90–97.
- Olanrewaju, I. A., & Ojo, A. T. (2020). Human capital and competitiveness of Nigerian manufacturing firms. *Nigerian Journal of Economics and Social Studies*, 62(3), 46–61.
- Pulic, A. (2000). VAICTM – an accounting tool for IC management. *International Journal of Technology Management*, 20(5–8), 702–714.
- Rabid, N., Opkanchi, J., & Onipe, Y. (2024). Effect of human and structural capital efficiency on performance of manufacturing firms in Nigeria. *Journal of Accounting and Intellectual Capital*, 6(1), 75–90.
- Schultz, T. W. (1961). Investment in human capital. *American Economic Review*, 51(1), 1–17.
- Sulaiman, F., Olamide, O., & Adeyemo, T. (2021). Components of intellectual capital and firms' value of listed agriculture firms in Nigeria. Academia.edu.
- Tran, N. P., & Vo, D. H. (2020). Human capital efficiency and firm performance across sectors in Vietnam. *Cogent Economics & Finance*.
- Uwaoma, I. C., & Edori, D. S. (2022). Impact of human capital development on organizational performance in Nigeria. *African Journal of Business Research*, 14(1), 88–99.
- Yusuf, H. T., & Bello, M. A. (2023). Intellectual capital efficiency and firm value of quoted construction firms in Nigeria. *Journal of Economic and Management Perspectives*, 17(1), 78–95.