



EFFECT OF INTELLECTUAL CAPITAL ON FINANCIAL PERFORMANCE OF LISTED DEPOSIT MONEY BANKS IN NIGERIA

Ogar-Abang John Oyong

Department of Accounting,
Faculty of Administration and Management Sciences,
University of Calabar, Cross River State, Nigeria.

Kechi Alphonsus Kankpang

Department of Accounting,
Faculty of Administration and Management Sciences,
University of Calabar, Cross River State, Nigeria

Ibrahim Mallam Fali

Department of Accounting,
Faculty of Administration and Management Sciences,
University of Calabar, Cross River State, Nigeria
faliibrahim7@gmail.com

Akpan, Anambuk Ette

Department of Accounting,
Faculty of Administration and Management Sciences,
University of Calabar, Cross River State, Nigeria

Abstract: This study investigates the effect of intellectual capital components on the financial performance of listed deposit money banks in Nigeria. The study employed an Ex Post Facto design method using twelve selected commercial banks out of the total population of fifteen banks listed on the Nigerian Exchange Group. The study relied on secondary sources, specifically the annual reports of the examined financial institutions spanning the years 2012 to 2021. The hypotheses were formulated and tested using a panel regression analysis via STATA version 14. The results revealed that VAIC, CEE, and HCE had a positive and statistically significant effect on EPS, while SCE showed a positive but non-significant effect. In conclusion, intellectual capital, as represented by VAIC, CEE, and HCE, influences the financial performance of Nigerian deposit money banks. It was recommended amongst others that organizations invest in intellectual capital development, allocate resources for human capital management, optimize capital structure, and enhance structural capital efficiency to improve long-term financial performance.

Keywords: *Intellectual capital, financial performance, value-added intellectual capital, capital employed efficiency, Human capital efficiency, structural capital efficiency and earning per share*



1. Introduction

Financial performance is a relative indicator of a company's success in turning its principal business model's assets into profit. It is also used to characterize the state of a company's finances throughout a certain time frame. To assess changes in potential economic resources that may be controlled in the future, information on company performance, particularly profitability, is required (Anik et al., 2021).

Intellectual capital has replaced physical capital as the most crucial factor in a company's bottom line. According to Daud and Yusoff (2011), organizations confront significant challenges in maximizing the value of knowledge as a competitive resource in today's uncertain and complicated business environment. While land, labor, and money remain crucial in production-based economies, in knowledge-based economies, the intangible assets of organizations are receiving increased attention. A knowledge-based economy is one in which knowledge generation, distribution, and application across all industries drive growth, wealth creation, and employment, according to the OECD (1996). Knowledge-intensive businesses are those that effectively create and disseminate data and expertise, as explained by Foray (2006). Businesses in today's information-driven market strive to stay ahead of the competition by developing and applying innovative strategies. Human intelligence is a crucial intellectual and strategic asset that boosts business productivity (Zahid, 2011).

In economics, land, labor, and capital were traditionally regarded as the most valuable resources. Traditional physical assets have long been thought to be the primary determinants of any economic activity's performance. But the quick advancement of science, technology, and ultimately globalization altered the structure and organization of the production system. Technology, knowledge, expertise, relationships with stakeholders, etc., which collectively can be referred to as "intellectual capital," are the main forces behind the new production system. Intangible or intellectual assets have finally been acknowledged as significant resources in the new economic system, which is commonly referred to as the knowledge economy. Companies in industries like software, finance, pharmaceuticals, banking, hotels, etc. rely heavily on their intellectual capital to generate profits (Gharoie Ahangar, 2011). One component of a company's success is the extent to which it is able to monetize the assets created by its primary mode of operation.



Because of recent events like the global financial crisis and a number of local and international financial scandals, people are once again worried about and talking about the link between intellectual capital and the performance of deposit money banks. There is also disagreement about how important financial accounting and reporting are to good corporate governance and how much an organization's intellectual capital is worth. The rise of globalization, the formation of strategic coalitions, the merging of multinational corporations, and the move to a knowledge-based economy have all led to this conversation. Even though many studies have been done on the topic, there isn't a lot of information about how Nigerian banks did financially during the time period in question. Scholars of financial and corporate reporting have done a lot of theoretical and real-world research on how intellectual capital affects how well a business does financially. The fact that earlier investigations into the subject had produced results that were both inconsistent and contradictory, rather than an answer to the issues at hand, prompted this inquiry, and also the following studies were found to be there is inconsistent in their finding, some found positive and significant effect, while others found insignificant effects (Akamelu et al., n.d.; Al-Musali & Ismail, 2014; Anik et al., 2021; Bayu et al., n.d.; Emma et al., 2015; Fathi et al., 2013; Gharoie Ahangar, 2011; Lucy & Ifeanyi, 2017; Ofurum et al., 2023; Onyekwelu et al., 2017; Ousama et al., 2020; Ozkan et al., 2017; Poh et al., 2018; Soewarno & Tjahjadi, 2020; Wasim-ul-Rehman et al., 2013; Xu & Wang, 2018; Zahid, 2011). Against this background that the study seeks to investigate the effect of intellectual capital on financial performance of listed deposit money banks in Nigeria in order to close this gap in the literature.

The remainder of the paper is organized as follows: Section 2 will look at the relevant literature and theoretical foundation; Section 3 will go over our technique. Section 4 presents the findings and debate, while Section 5 provides a summary and recommendations.

The study was guided by the following hypotheses, each of which was expressed as a null and tested:

- H₀₁: Value-added intellectual capital has no significant effect on financial performance of listed deposit money banks in Nigeria
- H₀₂: Capital employed efficiency has no significant effect on financial performance of listed deposit money banks in Nigeria



H₀₃: Human capital efficiency has no significant effect on financial performance of listed deposit money banks in Nigeria

H₀₃: Structural capital efficiency has no significant effect on financial performance of listed deposit money banks in Nigeria.

2. Literature Review

This section will look at the concept of intellectual capital and financial performance.

Conceptual framework

This is a theoretical framework that shows the relationships between the independent variables and the dependent variables of the study.



Independent Variables

Dependent Variables

**Intellectual Capital
Performance**

Financial

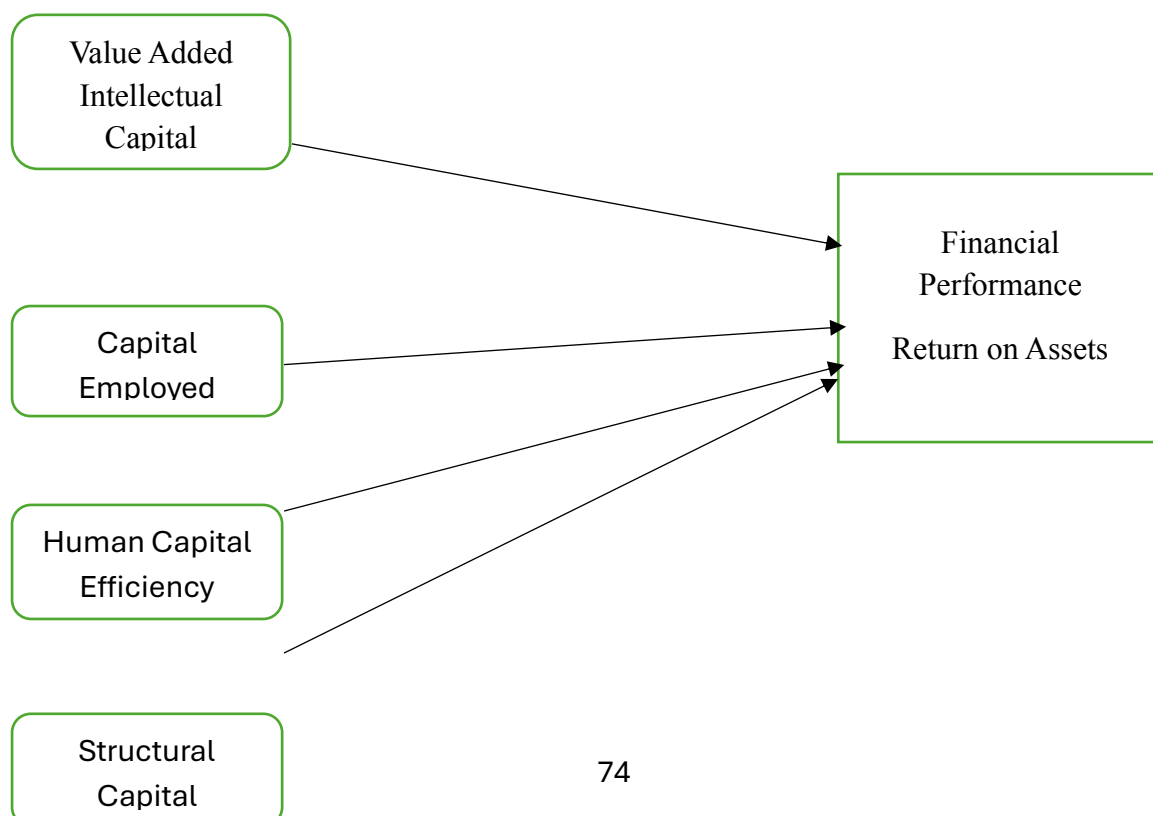




Figure 1

Theoretical Framework

Concept of Intellectual Capital

In the academic community, "intellectual capital" is defined in a variety of ways. Therefore, the concept of "intellectual capital" defies succinct encapsulation. However, intellectual capital can also be thought of in terms of the intangible assets that aren't recorded in a company's financial statements but have a major impact on its performance and success (Mondal & Ghosh, 2012; Ozkan et al., 2017). Since there is no agreement in the literature on what constitutes intellectual capital, scholars have been unable to reach a consensus on its components. It is generally agreed that intellectual capital consists of three components: human, structural, and capital.

There is no single agreed-upon definition of "intellectual capital" among academics. Therefore, the concept of intellectual capital cannot be reduced to a single term. Intellectual capital, on the other hand, is a term used to describe intangible assets that contribute to a company's success but aren't reflected in the financial statements. This definition quantifies the intangibles, such as the relationships between employees, ideas, and data (Ozkan et al., 2017). It's common knowledge that balance sheets don't try to estimate an organization's true worth but rather just disclose its financial position for tax purposes. Furthermore, conventional accounting procedures have decreased the correlation between the information presented in financial reports and the value of a business.

Concept of Financial Performance

The financial performance of a bank is a monetary indicator of the success of the bank's policies and activities. It's a great way to see how a bank has fared financially over time and compare it to others in the banking industry. As defined by Suka (2011), financial performance is a subjective measure of a company's ability to turn its primary business model assets into profit. Commercial bank financial performance can be measured in a number of ways. Return on assets (ROA) and return on equity (ROE) are two key financial performance indicators. This analysis opted to focus on ROA. The return on assets (ROA) is calculated by taking the annual net income and dividing it by the average total assets for the year. Banks' ability to create profits



from their own assets is quantified by their Return on Invested Assets (ROI). According to Khrawish (2011), ROA reflects the effectiveness with which a company's management group turns its resources into net income. Return on assets (ROA) is viewed as the most important indicator of a bank's profitability by a number of researchers (Kwadwo et al., 2018).

Empirical Review of Related Studies

As it turns out, the purpose of this research is to determine if there is a correlation between the financial and intellectual capital performance of 44 Turkish banks from 2005 to 2014. Banks' utilization of intellectual resources is measured using the value-added intellectual coefficient (VAIC) framework. The efficiency of human resources has a bearing on how well Turkey's banking sector uses its HCE. The average VAIC of development and investment banks is the highest of any banking category. Banks' bottom lines benefit from improvements in both CEE and HCE, two subcomponents of VAIC, when the latter are examined separately from the former. The effect of CEE on banks' bottom lines is greater than that of HCE. Therefore, Turkish banks should make use of both their financial and physical capital if they wish to raise their profit margins. Listed banks in Turkey were the focus of this study (Ozkan et al., 2017), but in the present investigation, deposit money banks in Nigeria were the research subjects of interest.

This article examined the effect of intellectual capital on the bottom lines of Nigerian businesses, using the banking sector as a case study. The purpose of this research was to examine the relationship between intellectual capital indicators and the financial performance of three Nigerian companies using the Value-Added Intellectual Coefficient (VAIC). The annual financial statements of the three banks were used to collect data, which was then analyzed with the regression Programme. A favorable and statistically significant effect of IC on bank financial performance was found, while some of the effects were not. The results also showed statistically significant differences between the banks with respect to metrics of IC and FP. It also shows that prosperous banks tend to have high IC. The study concludes that human capital development is a critical driver of company performance and suggests that Nigerian banks devote significant resources to this area. The system's human capital relies on these institutions, so it's important that they give the necessary support (Lucy & Ifeanyi, 2017).



Ofurum et al., (2023) the purpose of their research is to examine if there is a link between intellectual capital (IC) and the financial performances (FP) of Nigerian deposit money institutions. It's looking for a correlation between structural and human capital, two types of IC, and PF indicators like ROA and EPS. All deposit money banks that are traded on the Nigerian stock exchange are included in the sample. However, only eight institutions were selected as samples, and only those that disclosed the necessary data between 2012 and 2020. To examine the model and the data, a simple regression analysis was performed. The research found that structural capital significantly correlates with ROA. It was also found that human capital was significantly correlated with EPS. Our research suggests that bank CEOs and policymakers in Nigeria should prioritize the use of IC in their institutions. If they adjust how they make decisions and give this new form of funding more weight, it will boost their bottom line. Additionally, the bank's management should make the workplace a pleasant place to work, enhance the advantages offered to employees, and guarantee a top-notch internal training Programme. The current study examined twelve Nigerian deposit money banks using four independent variables and an index of financial performance, while the prior study only examined eight banks. This research stretches the time frame of the prior studies to 2021 in the literature.

Emma et al., (2015) in their research, they set out to link the various forms of IC (human, structural, relational, and innovation capitals) to the FP of companies trading on the Nigerian Stock Exchange. To establish the ongoing impact of IC on FP across the 182 listed businesses, this study used multiple regression analysis to analyzed data from the sampled companies' annual reports and accounts. The study found that almost 40% of the variation in company financial performance could be attributed to the integrated influence of the components (human capital, structural capital, relational capital, and innovation capital). The study developed a framework for appreciating the role of IC factors in companies' bottom lines. Consequently, it is recommended that Nigerian listed businesses spend heavily in IC to increase their FP. This is because investment in IC can contribute to more than 40% of changes in FP.

Intellectual capital theory

In 1969, Jon Kenneth Galbraith coined the term "intellectual capital (IC)" (Chang and Hsieh, 2010; Khalique et al., 2013). IC scholars give a plethora of interconnected definitions and roles for this concept. Kozak (2011) noted that the idea of IC is still in its infancy and that there is



no generally agreed-upon definition of its constituent parts. Edvinsson and Sullivan (1996) coined the phrase "IC" to refer to the body of "focused and ordered information" (knowledge) that is available to an organization for use in its operations. Human capital, organizational capital, structural capital, technological capital, social capital, customer capital, and business process capital were all highlighted by Ramezan (2011) as components of IC. While researching this topic, it became clear that different models used different aspects of IC. Human capital, customer capital, structural capital, social capital, technological capital, and spiritual capital were formerly treated separately; however, Khalique et al. (2011b) proposed the new idea and unified the major components of IC into a single model. Organizational performance in a knowledge economy depends heavily on IC, according to Khalique et al. (2011c) and Khalique et al., 2013. Furthermore, they claimed that in order for businesses to gain a competitive edge, they needed to identify and make use of their most important intellectual assets.

3. Methodology

The Ex Post facto design method was used for this investigation. The information used in the study came from secondary sources, specifically the annual reports of the examined financial institutions from 2012 through 2021. In order to determine the combined effect of intellectual capital components on financial performance among the twelve (12) commercial banks out of the population of fifteen (15) listed on the Nigerian exchange group after applying some filters, this study used multiple regression to analyzed data collected from annual reports and accounts of the sampled DMBs in Nigeria. The information was analyzed with the help of STATA.

Model Specifications

The following equations were used in this study to analysis and test the hypotheses:

$$FP_{it} = \beta_0 + \beta_1 VAIC_{it} + \beta_2 CEE_{it} + \beta_3 HCE_{it} + \beta_4 SCE_{it} + \varepsilon_{it}$$

Where:

FP = Financial Performance measured by EPS = Earnings per share, CEE= Capital employed efficiency, HCE = Human capital efficiency, SCE = Structural capital efficiency, VAIC = Value added intellectual capital; *it* is for firm *i* in year *t* and ε is the error-term; β_0 , β_1 , β_2 , β_3 , β_4 = the coefficients of the variables.



Table 1

Variable Measurement and Sources

Variable	Symbol	Type	Measurement	Source
Return on assets	ROA	Independent	Measured as Net profit after tax divided by total assets.	Akhmadi, & Januarsi, (2021) and Andriani, <i>et al.</i> , (2023).
Capital Employed Efficiency	CEE	Independent	Measured as revenue minus cost of revenue divided by total asset minus intangible asset.	Ozkan et al. (2017)
Human Capital Efficiency	HCE	Independent	Measured as revenue minus cost of revenue divided by staff cost.	Ozkan et al. (2017)
Structural Capital Efficiency	SCE	Independent	Measured as revenue minus cost of revenue and staff cost divided by revenue minus cost of revenue.	Ozkan et al. (2017)
Value Added Intellectual Capital	VAIC	Independent	Measured as the sum of capital employed efficiency plus human capital efficiency plus structural capital efficiency.	Ozkan et al. (2017)

Authors Compilation (2023)



4. Results and Discussion

Heteroskedasticity test

Table 1
 Cameron & Trivedi's decomposition of IM-test

Source	Chi2	df	Prob
Heterscedascity	18.35	13	0.1448
Skewness	13.69	4	0.0084
Kurtosis	4.71	1	0.0299
Total	36.75	18	

Source: STATA output Version 14

The table shows the results of Cameron and Trivedi's decomposition of the IM-test (Incidental Parameter Test) into various components, including tests for heteroscedasticity, skewness, and kurtosis. The heteroscedasticity test assesses whether there is a violation of the assumption of constant variance (homoscedasticity) in the regression model. In this case, the chi-square test statistic is 18.35 with 13 degrees of freedom. The associated p-value is 0.1448. Since the p-value is greater than the typical significance level of 0.05, we do not have strong evidence to reject the null hypothesis of homoscedasticity. This suggests that there is no significant heteroscedasticity in the data. The chi-square test statistic is 13.69 with 4 degrees of freedom. The associated p-value is 0.0084, which is less than the typical significance level of 0.05. This indicates that there is significant skewness in the data, meaning that the distribution of residuals is not symmetric. More so, the Chi-Square test statistic is 4.71 with 1 degree of freedom. For kurtosis, the associated p-value is 0.0299, which is less than the typical significance level of 0.05. This indicates that there is significant kurtosis in the data, suggesting that the distribution of residuals has heavier tails than a normal distribution.

Regression of Fixed effect

Table 2

OLS fixed effect of regression coefficient results

Variables	Coefficient	Prob.
VAIC	-13.10787	0.441
CEE	-2.307533	0.893
HCE	13.16564	0.439
SCE	15.27705	0.380
Constant	1.259504	0.065
R ² Overall	0.1566	
F-Stat.	4.83	0.0013



Source: STATA Output version 14

The above output is the results of a fixed-effects (within) regression analysis. The R-squared (overall) is 0.2424, indicating that the model explains about 24.24 per cent of the variation in the dependent variable (EPS). The F-statistic is 4.83 with a p-value of 0.0013, suggesting that the model as a whole is statistically significant.

The coefficient of the constant is 1.259504. It implies holding all the independent variables (VAIC, CEE, HCE and SCE) constant, the dependent variables is subject to change by an increase of 1.259504 meaning other variables outside the ones used for the studied model are subject to account for this change.

The coefficient of the independent variables (VAIC, CEE, HCE and SCE) were -13.10787, -2.307533, 13.16564, and 15.27705 respectively. This shows that both VAIC and CEE have negative effect on EPS while HCE and SCE influences EPS positively. Notwithstanding, they all shows non-significant effect as their P-values were all greater than 0.05.

Regression of random effect

Table 3

OLS random effect of regression coefficient results		
Variable	Coefficient	Prob.
VAIC	-16.82423	0.323
CEE	0.7374861	0.966
HCE_	16.88576	0.322
SCE	19.41575	0.264
Constant	19.41575	0.186
R ² Overall	0.1559	
Hausman test	0.60	0.9636
Breusch LR	189.23	0.0000

Source: STATA Output version 14

The above table is the output of a random-effects Generalized Least Squares (GLS) regression analysis. The R-squared (within) is 0.1559, indicating that the model explains about 15.59 per cent of the variation in the dependent variable (EPS) within each group. This chi-square statistic (Wald test) is 22.82 with a p-value of 0.0001, suggesting that the model as a whole is statistically significant.



The coefficient of the constant is 19.41575. It implies holding all the independent variables (VAIC, CEE, HCE and SCE) constant, the dependent variables are subject to change by an increase of 19.41575. Meaning other variables outside the ones used for the studied model are subject to account for this change. The coefficient of the independent variables (VAIC, CEE, HCE and SCE) are -16.82423, 0.7374861, 16.88576 and 19.41575 respectively. This shows that only VAIC has a negative effect on EPS while CEE, HCE and SCE influence EPS positively. Notwithstanding, they all shows non-significant effect as their P-values were all greater than 0.05

Furthermore, the Hausman test was conducted to determine whether the difference in coefficients between the FE and RE models is systematic or random. The $\chi^2(4)$ statistic for the Hausman test is 0.60 and the p-value associated with the chi-square statistic was 0.9636, thus quite high, indicating that the null hypothesis should be accepted and implying that there is no systematic difference between the coefficients obtained from the FE and RE models. Based on this, it appears that both the Fixed Effects (FE) and Random Effects (RE) models provide similar coefficient estimates for the panel data analysed. In such cases, the research chooses the model that best aligns with the assumptions of its data or the theoretical framework of its analysis which is the random effects. However, the need to further assess whether there is heteroskedasticity (unequal variance) in the error terms in a random effects model using the Breusch and Pagan Lagrangian multiplier test results. Finding from the results was 189.23 with a p-value ($\text{Prob} > \chi^2_{(4)}$) is very close to zero (0.0000). Based on this, there is strong evidence to suggest that there is heteroskedasticity in the error terms of your random effects model. In other words, the variance of the random effects (u) is not equal to zero, indicating that the assumption of homoskedasticity is violated. However, in order to avoid issues such as heteroscedasticity, clustering, and potential model misspecification, and to ensure more accurate and reliable of data, the robust standard errors was carried in the panel regression.



Random-effects GLS (Generalized Least Squares) regression with robust standard errors

Table 3

Random effect with robust standard error regression results		
Variables	Coefficient	Prob.
VAIC	.5366922	0,043
CEE	23.58353	0,007
HCE_	.5608673	0.044
SCE	2.83993	0.158
Constant	2.89	0.002
R ² Overall	0.3052	
Walid chi2(4)	12868.81	0,043

Source: STATA Output version 14

The above output is the random-effects GLS (Generalized Least Squares) regression with robust standard errors result. The overall R-squared (R-sq overall) which is the combined R-squared considering for overall R-squared values is 0.3052. It indicates that the independent variables (VAIC, CEE, HCE, SCE) explain .30.52 per cent of variation in the dependent variable (eps). This however shows a poor fit of the model

The coefficient of the constant is 2.89. It implies holding all the independent variables (VAIC, CEE, HCE and SCE) constant, the dependent variables is subject to change by an increase of 2.89. Meaning other variables outside the ones used for the studied model are subject to account for this change. The coefficient for vaic is 0.536692 with a standard error of 0.2658293. The associated z-statistic is 2.02, and the p-value is 0.043. This suggests that the variable vaic has positive effect and it is statistically significant at the 0.05 significance level. Also, the coefficient for CEE is 23.58353 with a p-value of 0.007. This suggests that the variable CEE has positive effect and it is statistically significant at the 0.05 significance level. More so, the coefficient for HCE is .5608673 with a p-value of 0.044. This also suggests that the variable HCE has positive effect and it statistically significant at the 0.05 significance level. However, on the contrary, result shows that SCE has positive but statistically and non-significant effect at the 0.05 significance level as p value (0.158) was greater than 0.05. Overall, the Wald chi 2 (4) statistic is 12868.81, and the associated probability (Prob. Chi) is reported as 0.000, indicating that at least one of the coefficients is significantly different from zero.



5. Conclusion and Recommendations

The study provides valuable insights into the relationship between intellectual capital and financial performance in the context of Nigerian deposit money banks. The results indicated that VAIC, CEE and HCE had a positive and statistically significant effect on EPS, while SCE showed a positive but non-significant effect. In conclusion, intellectual capital influences the financial performance of commercial banks in Nigeria. Based on the following findings it is recommended that;

Organizations should consider investing in the development of intellectual capital, such as employee training, knowledge management systems, and innovation initiatives. This will help sustain their human capital asset hence improved their financial performance in a long run.

ii. Allocate of resources should constantly be made to attract, retain, and develop skilled employees in the organization. When this is done, it will enhanced human capital thus contribute to improved financial performance and long-term sustainability.

iii. Companies should continuously carry out evaluation to optimize their capital structure and allocation of strategies. This will enable them efficiently make use of their capital and it can help lead to improved returns and financial performance.

iv. Organizations should invest more on technology, infrastructure, and organizational processes. This can help enhance operational efficiency and contribute to financial performance.

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