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EFFECT OF INTELLECTUAL CAPITAL ON PERFORMANCE OF LISTED FIRMS IN THE NON-FINANCIAL SECTOR IN NIGERIA

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Abstract
The study investigated the effect of Intellectual capital on performance of listed firms in the non-financial sector in Nigeria, on all quoted non-financial firms in Nigeria from 2019-2023 using ex-post facto research design. The variables used were relational capital and human capital for intellectual capital, return on assets, return on equity and Tobin's Q for firm performance. Panel regression analysis, using random effects model, as determined by Hausman specification test performed, was used for data analysis. Findings were that, there exists a negative and insignificant effect of relational capital m on both return on assets, return on equity and Tobin's Q. However, human capital had a positive and significant effect on return on assets, return on equity and Tobin's Q. Based on the results, the study recommended, among others, that owners and managers of firms should note that irrespective of whether the component of intellectual capital is relational or human if the process of investment and subsequent management is not planned, organized, well-coordinated, controlled and monitored such investment may not likely enhance firm performance.

Keywords: Intellectual capital, Relational capital, Performance, Return on assets, Return on equity

Introduction

In the knowledge economy, intellectual capital (IC) is considered a more important contributor to firms rather than tangible assets in firm competitiveness improvement and value generation (Chang, 2024). Based on resource-based theory, the resources possessed by any organization are unique and inimitable. IC, a relatively new designation as a strategic resource, is related to securing a competitive edge and superior performance by value generation. Therefore, it is essential for firms to understand, identify, develop, and utilize IC efficiently, all of which can help firms gain competitive advantage. The manufacturing industry, as a capital- and knowledge-intensive industry, is the backbone of a nation's economy (Hejazi, 2023). Tangible assets are vital in achieving firm efficiency, especially in an industrial economy. However, there is currently a transition

toward a knowledge economy in which intangible assets play a crucial role in improving firm efficiency and growing knowledge to build a competitive advantage. Intangible assets impact economic development and performance and enhance firms' competitive competence (Smriti, 2018). Intangible assets, particularly intellectual capital (IC), refer to the knowledge assets that can build and enhance a firm's value. IC is the most essential and sensitive factor influencing business performance in today's global and knowledge economy. IC quickly becomes a fundamental capital component and a crucial instrument for creating new economic value (Nadeem. 2017; Smriti, 2018). Extant studies have indicated that IC serves as an intangible asset of the company (Wang, 2019). For many years, the position of IC has controlled the generation of wealth in businesses. However, many firms are unfamiliar with measuring intangible assets or IC compared to tangible and physical assets. Many companies and sectors in developing economies have not yet incorporated the measurement of IC in their business. It is predicted that if such economies can grow its number of skillful workers in the knowledge economy, the phenomenon will push IC to the center of the organization's long-term competitive advantage (Kamath, 2023).

In the contemporary business world, the management and harnessing of intellectual capital have become paramount for firms facing myriad of challenges (Xu & Li, 2022). Rapid technological advancements, the rise of the knowledge economy, and the increasing interconnectedness of markets underscore the critical importance of intellectual assets. More so, the ongoing digital revolution demands continuous innovation and adaptability, further emphasizing the role of intellectual capital in shaping a firm's competitive edge. Global issues such as talent mobility, cybersecurity threats, and the need for sustainable practices amplify the significance of effectively leveraging intellectual capital for both short-term resilience and long-term viability in an ever-changing world. Firms grapple with the complexities of attracting and retaining skilled talent, protecting intellectual property, and adapting to evolving business models due to the myriad of challenges (Skhvediani et al., 2023). As firms navigate these challenges, the strategic deployment of intellectual capital emerges as a key determinant of performance over the world (Hussinki et al., 2017). Thus, the study of intellectual capital within firms has

emerged as a crucial area of investigation in the realm of firm performance.

Intellectual capital refers to the intangible assets that contribute to a firm's value, encompassing knowledge, skills, innovation, and relationships. As markets become increasingly knowledge-based, the recognition and effective management of intellectual capital have become essential for sustaining competitive advantage and fostering sustainable firm performance (Gracioli et al., 2024). The concept of intellectual capital has its roots in the 1960s and 1970s when traditional measures of corporate value, such as physical and financial assets, no longer adequately explained a firm's market performance (Bayraktaroglu et al., 2019). Notably, the economist Fritz Machlup introduced the term "knowledge industry," laying the groundwork for understanding the economic importance of knowledge-based resources. However, it wasn't until the late 20th century that researchers began systematically exploring intellectual capital as a distinct and critical aspect of firm value (Abdulai et al., 2024).

Statement of the problem

The ongoing digital revolution demands continuous innovation and adaptability, further emphasizing the role of intellectual capital in shaping a firm's competitive edge. Global issues such as talent mobility, cyber security threats, and the need for sustainable practices amplify the significance of effectively leveraging intellectual capital for both short-term resilience and long-term viability in an ever-changing world. Firms grapple with the complexities of attracting and retaining skilled talent, protecting intellectual property, and adapting to evolving business models due to the myriad of challenges (Skhvediani et al., 2023). As firms navigate these challenges, the strategic deployment of intellectual capital emerges as a key determinant of performance over the world (Hussinki et al., 2017). Thus, the study of intellectual capital within firms has emerged as a crucial area of investigation in the realm of firm performance. However, there is little empirical research in the extant literature concerning the specific effect of Intellectual capital on firm performance in Nigeria. consequently, the need for research for more robust knowledge in the area for firms to make informed decisions to enhance firm performance.

Objectives of the Study

The broad objective of the study is to investigate the effect of intellectual capital on performance of firms in the non financial sector in Nigeria.

The study has the followings as the specific objectives

i. To examine the effect of Relational capital on performance of firms in the non financial sector in Nigeria.
ii. To ascertain the effect of Human capital on performance of firms in the non financial sector in Nigeria.

Research Questions

The research attempted to answer the following questions:

i. To what extent does relational capital affect performance of firms in the non financial sector in Nigeria.
ii. How does human capital affect performance of firms in the non financial sector in Nigeria.

Statement of Hypotheses

The following null hypotheses were employed to help in the research study.

H_{01}: Relational capital has no significant effect on performance of firms in the non financial sector in Nigeria.

H_{02}: Human capital has no significant effect on performance of firms in the non financial sector in Nigeria.

Literature Review

Concept of Relational Capital

Relational capital, a pivotal dimension of intellectual capital, centers on the external relationships and networks that organizations cultivate with customers, suppliers, partners, and other stakeholders. Relational capital, as a component of intellectual capital, refers to the intangible assets and value embedded in the relationships, networks, and partnerships that an organization has with external entities. These external entities can include customers, suppliers, distributors, strategic alliances, and other stakeholders (Skhvediani et al., 2023). Relational capital emphasizes the importance of managing and leveraging these relationships to enhance the overall value and competitiveness of the organization. Effectively managing relational capital involves building and maintaining positive relationships, fostering open communication, and aligning the organization's objectives with the interests of its external stakeholders. In a global and interconnected business environment, the ability to leverage relational capital can be a significant driver of sustainable competitive advantage.

At its essence, relational capital recognizes that the quality of an organization's interactions and collaborations with external entities significantly contributes to its overall value and competitive advantage (Smriti et al., 2018). This dimension of

intellectual capital encompasses the reputation, trust, and goodwill an organization builds with its external stakeholders. It extends beyond transactional relationships to encompass the social and collaborative aspects that foster long-term partnerships (Susanto, 2017).

Intellectual Capital

Intellectual capital refers to the intangible assets and resources possessed by an organization that contribute to its value and competitive advantage. Unlike physical or financial assets, intellectual capital is rooted in knowledge, creativity, skills, and other intangible qualities that drive innovation, efficiency, and effectiveness within an organization (Kamath, 2023). This concept recognizes that a company's success is not solely dependent on its tangible assets, but also on the intellectual abilities and capabilities of its employees, relationships with customers and stakeholders, and the overall knowledge base embedded in its processes and systems. Intellectual capital is a concept that encapsulates the intangible assets contributing to the value and competitive advantage of an organization (Clarke et al., 2023). According to Ewereoke (2018), the significance of intellectual capital has evolved over time, mirroring shifts in the global business environment. The concept of intellectual capital represents a paradigm shift in understanding the drivers of firm performance. Accordingly, Kamukama et al. (2011) stated that, intellectual capital not only shapes competitive advantage but also serves as a key determinant of a firm's ability to innovate, adapt, and prosper in an ever-changing global landscape.

Firm Performance

Firm performance is a dynamic concept that serves as a key indicator of an organization's effectiveness and success in achieving its objectives. It encompasses the outcomes and results achieved by a company across various dimensions, reflecting its ability to create value for stakeholders, adapt to changing environments, and sustain competitive advantage (Clarke et al., 2023).Traditionally, firm performance was often measured solely in financial terms, with metrics like profitability, return on investment, and market share dominating the evaluation landscape. However, as business environments evolved, scholars and practitioners recognized the limitations of a narrow, purely financial perspective. A broader and more comprehensive understanding of firm performance emerged, taking into account a range of

factors that contribute to organizational success like operational indicators.

Empirical Review

The study looks into the empirical evidence from past scholarly works in relation to intellectual capital and firm performance. Furthermore this section critiqued the literature relevant to this study and identified the research gaps that this study has intended to fill. The review is done in descending order of years from the most recent studies.

Ayinaddis et al. (2024) examined the role of intellectual capital efficiency and its components on the financial performance of insurance companies. Modified value-added intellectual coefficient was adopted to measure the effect of intellectual capital efficiency. The study chose an explanatory research design with the use of secondary data analysis via document analysis, quantitative approach, and deductive method of inquiry. Panel regression was used with a sample of 14 insurance companies in Ethiopia from 2012–2022. The random effect regression result revealed that the value-added intellectual capital and its component human capital and capital employed efficiency had a positive significance association with financial performance. Where as, relational capital efficiency and structural capital efficiency do not have a significant contribution to the financial performance of insurance firms in Ethiopia. The finding of the study contributes to the theoretical and practical understanding of the relationship between intellectual capital efficiency and financial performance in the context of insurance companies in Ethiopia.

Singhand (2023) examined how intellectual capital (IC) drives firm performance via the lens of dynamic capabilities theory. Drawing on resource-based view (RBV) and dynamic capability view (DCV), the study elaborate the mediating role of learning, integration and reconfiguration-dynamic capability in the Indian banking context. A sample of 358 top- and middle-level managers from the Indian banking sector was administered with structured questionnaires for data collection. Structural equation modeling (SEM) and Sobel test were used to analyze the data and test the hypothesized mediating effect. The findings reveal that learning and integration dynamic capabilities are key mediators in intellectual capital and banks' performance relationships in an emerging economy context. In contrast, the analysis revealed partial mediating role of reconfiguration-dynamic capabilities. Furthermore, the

learning dynamic capabilities have been identified as the primary mediating mechanism for transforming bank's intellectual capital into performance benefits.

Skhvediani et al. (2023) carried out a study to estimate the relationship between intellectual capital and performance indicators of Russian manufacturing companies. The study analyzed a sample of 23,494 observations from 5,873 staff of Russian manufacturing companies for the 2017–2020 periods. The value-added intellectual coefficient (VAIC) and its components were used to evaluate the impact of intellectual capital on firm performance using polled ordinary least squares, fixed, and random effects models. The study found that, intellectual capital significantly and positively affects the performance of companies in both structural and human terms; both through the integrated coefficient VAIC and in the context of individual components of intellectual capital. However, the impact of structural and human capital on performance indicators is significantly lower than the impact of capital employed. The study showed that, there is a distinct focus of enterprises on making profit through the use of company assets, while in the case of Russian manufacturing companies, the potential for profit generation from structural and human capital remains inconclusive.

Weqarand (2022) examines the effect of intellectual capital and its dimensions on the financial performance of Indian firms. The data of 88 Indian firms engaged in tea packaging, selling, and distribution for six years from 2013 to 2018 were extracted. Value added intellectual coefficient (VAIC) forms the basis for quantifying the firm's intellectual capital while profitability is used for performance. By applying the fixed-effect regression analysis, the study result shows that, intellectual capital significantly enhances the profitability and productivity of the Indian tea industry. Likewise, among the three components of VAIC, capital employed efficiency (CEE) plays the most vital role in improving the financial performance of the Indian tea industry, followed by structural capital efficiency (SCE). Human capital efficiency (HCE), the third component of IC efficiency, shows a significant positive influence on profitability and a substantial negative impact on the firm's productivity.

Xuand (2022) examined the impact of intellectual capital and its components (human, structural and relational capitals) on the performance of manufacturing listed companies in China. The study also

investigates the impacts of company ownership, industry attributes and region on the intellectual capital and performance relationship. The study uses the data of 953 manufacturing companies listed on the Shanghai and Shenzhen Stock Exchanges over the period 2012–2016. The modified value-added intellectual coefficient (MVAIC) model is applied to measure intellectual capital efficiency while multiple regression analysis is employed to test the research hypotheses. The study reveals that, intellectual capital significantly affects firm performance in China's manufacturing sector. Overall, earnings are affected by physical capital, human capital (HC) and structural capital (SC), and profitability and productivity are influenced by physical capital, HC, SC and relational capital. The study further shows that, physical capital is the most influential contributor to firm performance. In addition, state-owned enterprises have a greater impact of intellectual capital on firm performance than private-owned enterprises; while high-tech manufacturing companies have higher intellectual capital performance than non-high-tech manufacturing companies. The study focused on sector specific analyses within the manufacturing industry which avail policy makers and managers with more specific information for decision making.

Xuand and Liu (2022) examined the impact of intellectual capital on the performance of Korean manufacturing firms over the period 2013–2018. The modified and extended Value Added Intellectual Coefficient (VAIC) model was adapted to measure intellectual capital, and firm performance was systematically and comprehensively measured in three distinct parameters: profitability, productivity and market value. The study used the ordinary least square regression. The results shows that, physical capital was the most influential factor to firm performance; human capital was viewed as a performance enhancing measure; structural capital had no significant impact on firm performance; and innovation capital and relational capital affects firm’s profitability negatively. It is also evident from the study that, the modified and extended VAIC model performs better than the original VAIC model proposed by Pulic (1998). This study extends the understanding of intellectual capital in achieving a competitive edge in the manufacturing sector, with IC representing a valuable platform for the sustainable development of the manufacturing sector in emerging Asian markets.

Chen et al. (2022) showed that physical capital, HC, SC and R&D expenditure positively affect firms' market value and return on assets (ROA). Based on the manufacturing firms in Thailand,

Phusavat et al. (2011) found that IC can improve firm's performance measured by ROA, return on equity (ROE), revenue growth, and employee productivity.

Pal & Soriya (2022) found that profitability and IC are positively associated but no relationship exists between IC and productivity and market value in Indian pharmaceutical and textile industries. By adding an extra IC component (i.e. RC),

Nimtrakoon also (2021) found that firms with greater IC tend to have greater market value and better financial performance in ASEAN countries. CEE and HCE are observed to be the most contributors in value generation whereas SCE and RCE possess less importance. Based on the survey of 240 manufacturing companies,

Andreeva & Garanina (2019) documented that human and structural capitals positively affect corporate performance, while RC does not in the context of Russia. Recently, taking Korean manufacturing firms as the sample,

Xu & Wang (2019) argued that physical capital; HC and RC positively affect financial performance. Recently, for the Turkish manufacturing sector,

Bayrak- taroglu et al. (2019) proposed an extended VAIC model with the inclusion of customer capital and innovation capital, and found that SCE has a positive impact on firms' profitability and innovation capital efficiency has a direct impact on firms' productivity. Using the VAIC model,

Mohapatra et al. (2019) found that only HC has a positive and significant impact on operating efficiency of Indian banks, whereas physical capital and SC hurt the efficiency. By choosing renew- able energy enterprises in China,

Xu & Liu (2019) concluded that physical and human capitals are the most important components of IC to economic sustainable performance at different life cycle stages. Xu & Wang (2019b), based on the original VAIC model, suggested that profitability is determined by physical capital and HCE, and companies' productivity is positively related to physical capital and negatively related to human resources.

Theoretical Framework

This study reviews past scholarly works on intellectual capital and performance of firms. This section is the theoretical framework which presents a theoretical

framework based on several theories which have been developed to explain the link between intellectual capital and performance of firms. The study is anchored on the resource-based theory but it also discusses the dynamic capability theory as supporting theory.

Resource-Based View Theory

The resource based theory was propounded by Wernerfelt in the year (1984). Resource-Based View Theory (RBV) is considered as a method of analyzing and identifying a firm's strategic advantages based on examining its distinct combination of assets, skills, capabilities, and intangibles as an organization to achieve a set goal. The RBT views the company as a bundle of resources which are combined to create organizational capabilities which it can use to achieve company goals (Maditinos et al. 2011).

Dynamic Capability Theory

The dynamic capability theory is propounded by Teece and Pisano (1994). The dynamic capability theory asserts that firms use their resources to gain market competitive advantage. To Teece and Pisano (1994), competitive attainment ascends from the unceasing growth, alignment and reconfiguration of corporate attributes or resources.

Methodology

An ex-post facto research design was adopted. The ex-post facto (or causal comparative) research design attempts to explore causes that affect relationship where causes already exists and looks backward to explain why. The population of this research work comprised of all firms in the non financial sector quoted on the Nigerian Stock Exchange (NSE). One hundred and two (102) firms listed on the Nigerian Stock Exchange as at 31st December, 2023 constituted the population for the study. The research study considered four variables. They are the dependent variable, independent variable, intervening variable, and control variables. The dependent variable in this study is performance. For the purpose of this study three proxies namely return on assets (ROA), return on equity (ROE) and Tobin'Q from the perspectives of management, shareholders and market respectively (Abese, 2016). The independent variable for this study is intellectual capital. The proxies that were used for the independent variable are; human capital and relational capital (Segun 2017).

Results and Discussions

Summary of Regression Results

Table 9: Summary of random effect regression result for ROA

Variables	Coefficient	Z.value	P.value
RC	-0.034	-1.500	0.133
HC	0.156	2.960	0.004
GROW	0.784	0.280	0.780
COSIZE	-0.994	-0.930	-0.352
F Statistics			0.000
R. Squared			0.480

Source: STATA Output

Table 10 Summary of panel regression (random effect model) result for ROE

Variables	Coefficient	Z.value	P.value
RC	-0.034	-1.510	0.130
HC	0.166	2.990	0.003
GROW	0.774	0.280	0.783
COSIZE	-0.966	-0.910	0.352
F Statistics			0.000
R. Squared			0.486

Source; STATA Output

Table 11 Summary of Random Effect Regression Result for TQ

Variables	Coefficient	Z.value	P.value
RC	-0.034	-1.490	0.136
HC	0.158	2.980	0.002
GROW	-1.803	-0.290	0.775
COSIZE	0.982	0.920	0.357
F Statistics			0.000
R. Squared			0.490

Source: STATA Output

Discussion on Findings

Hypothesis 1 has insinuated that firm's relational capital does not have any significant effect on performance firms in the non financial firms. The regression results in Tables 9 to 11 show that, the coefficients of the leverage measure RC as predicted showed a negative and insignificant effect on ROA, ROE and TQ. RC had a coefficient value of –0.034 and a

p- value of 0.133 for ROA in Table 9, -0.034 coefficient value and p -value of 0.130 for ROE in table 10 and coefficient value of -0.034 and p- value of 0.136 for TQ in Table 11. This result shows that higher level of RC leads to lower return on ROA, ROE and TQ.

The reasons for this negative and insignificant relationship could be due to decisions by the firms complacency to the concept of rational capital. Relational capital consists of all the valuable relationships that an organization maintains with customers, suppliers, partners, clients, and other external entities. It also encompasses brand names, reputation, and trademarks that a company owns. When all of these relationships are either ignorantly or deliberately undermined, it is bound to negatively affect performance.

Hypothesis 2, has predicted that, a firm's HC does not have any significant effect on firm performance. The regression results in Tables 9 to 11 shows that, the coefficient of HC against prediction has shown a positive and significant effect on ROA, ROE and TQ. HC had a coefficient value of 0.156 and a p- value of 0.004 for ROA in Table 9, 0.166 coefficient value and p- value of 0.003 for ROE in table 10 and coefficient value of 0.158 and p- value of 0.002 for TQ in Table 11. This result shows that higher level of HC leads to higher return on ROA, ROE and TQ.

The reason for this positive and significant relationship could be due to the fact that firms have been efficient managing human capital. Human capital represents the collective knowledge, skills, experiences, and capabilities embodied within the workforce of an organization. HC is a component of intellectual capital that refers specifically to the skills, knowledge, abilities, and expertise possessed by the individuals within an organization. It represents the collective intellectual and creative capabilities of the workforce, emphasizing the value of investing in human resources to enhance the overall productivity and performance of the organization.

Conclusion and Recommendations

Based on the result of data analysis and discussion, the study concluded that there is a negative and insignificant relationship between relational capital and the proxies of firm performance (used in this study) in the listed non- financial sector in Nigeria. Indicating that, investment in relational capital can negatively affect firm performance. The study also concluded that there is a positive and significant relationship between human capital and the

proxies of firm performance (used in this study) in the listed non- financial sector in Nigeria. Indicating that, high investment in HC can positively affect firm performance. The study recommends that, Owners, managers and would be investors should focus more on this nature of investment because of the positive and significant impact it has on firm performance

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