Intellectual Capital Investment and Business Sustainability of Deposit Money Banks in Nigeria

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ABSTRACT

There have been a lot of studies on listed Deposit banks in Nigeria, however, the focus on banks' performance has mostly been on the short term with an emphasis on profitability and returns. Limited work has been done on Intellectual capital and firms' long-term performance, particularly Business sustainability. This study, therefore, examines the effect of Intellectual capital investment on the Business sustainability of Listed deposit banks in Nigeria. The investigation employed an ex-post facto design with a sample size of twelve deposit money institutions. The analysis utilised secondary data obtained from the Nigerian Exchange Group. The random effect regression analysis technique was used to analyse the data. The dependent variable is Business sustainability which was computed as Strategic growth rate (SGR) while the independent variables are Intellectual Capital computed as Intellectual capital efficiency), and Structural capital efficiency (SCE*).*

Keywords: Intellectual capital, Investment, Business Sustainability, Sustainable Growth Rate, Structural capital efficiency.

INTRODUCTION

In recent years, the word sustainability has become synonymous with the environment and natural resources covering ecological, social, and economic dimensions. However, before sustainability became popular in this manner, it was attributed mainly to realistically achievable growth that a company could maintain without running into any financial hurdles. The going concern concept of accounting assumes that a company is financially stable and can meet its business obligations in the long term. This is why Business sustainability is very important in measuring the performance of a business, looking beyond short-term financial performance indicators. It is a valuable tool to assess the strength and potential of the organizations. According to Mukherjee and Sen (2018), the Business sustainability of a firm is determined by sustainable growth. The survival and expansion or the death and collapse of an enterprise largely rest on its Business sustainability strategy and investment is one such strategy.

Investments in business come in different forms, however, the focus of the paper is the investment in the Intellectual capital of a firm. Continuous Investment in Intellectual capital yields long-term benefits and enhance an organization's competitive edge. Humans have always looked for how to make things better and more convenient for their benefit thereby increasing productivity and performance. The most important asset in any organization is human resources whose responsibility is to manage other resources of the organization. The advancement in technology around Machine learning, Robotics and Artificial intelligence, and this change has been rapid in recent years, however, this change has been largely facilitated by Intellectual capital. The launching of Chat Generative Pre-training Transformer (Chat GPT), an artificial intelligence chatbot developed by Open AI, on November 30, 2022, has been widely celebrated, but it only works by combining large sets of data with intelligent, iterative processing algorithms to learn from patterns

and features in the data that they analyze, which simply means it uses available data, and when there no data, it cannot respond. Hence, if humans do not think Chat GPT cannot work. It, therefore, is imperative to mention that the celebration of advancement in technology and the improvement of processes in different organizations is largely due to human Intellectual capital. This position is supported by Ionita and Dinu (2021) who noted that intellectual capital (IC) contributes to the generation of knowledge utilized to enhance the firm's value and create a competitive advantage.

According to Orbunde *et al* (2023), the ratio of the reported value of total intangible assets to tangible assets in the books of deposit money banks in Nigeria increased from 1% in 2010 to 16% in 2020. This increase shows the level of investment in intellectual capital during the period as Intellectual capital is the main driver of Intangible assets, in fact, writers like Miho (2015) and Okoye, et.al (2019) equate Intangible assets to Intellectual capital. However, Intellectual Capital is human-centred, involving the investment made by a company in employees for a useful package of knowledge. This knowledge makes or mars an organization as it influences its overall performance and survival through the creation of competitive advantage and value. Minovski, and Jancevska, (2018) advance further to state that the source of companies' economic value no longer depends on the production of material goods, but on the creation and management of intellectual capital. As a result, the concept of intellectual capital, which quantifies knowledge, skills, relationships, processes, innovations, and other components of intangible assets, has become the most important business factor.

Since the survival and expansion of an organisation largely rest on its Business sustainability strategies and investment in intellectual capital in recent years has increased it is motivating to establish the effect of the investment of intellectual capital on business sustainability, hence, this study. There have been limited studies in the area of business sustainability over the years, Orbunde et al, (2023), Amer *et al* (2021), Ionita and Dinu, (2021), Mukherjee and Sen (2019). Oack and Finik (2017). Rastić *et al*. (2021), Xu, X. *et al,* (2020), Xu, X. *et al,* (2021), Pendo (2020), and Nadeem (2016) and further few on Intellectual capital and Business sustainability with contrasting findings. This study will therefore add to the limited papers on Intellectual capital and Business sustainability on Deposit money banks in Nigeria. Thus, the specific objective of this paper is to examine the effect of Intellectual capital investment on the business sustainability of Nigerian deposit money institutions. The hypotheses to be tested are as follows:

Ho1: Intellectual capital efficiency does not significantly affect the business sustainability of deposit money banks in Nigeria.

H02: Structural capital efficiency does not significantly affect the business sustainability of deposit money banks in Nigeria.

LITERATURE REVIEW

Conceptual Framework

Intellectual Capital

Tefera (2018) defined intellectual capital from a managerial perspective as the knowledge, applied experience, organisational technology, relationships, and professional skills that provide for a competitive edge in the market. A more dynamic version of this definition is that intellectual capital is the knowledge that can be converted into value or profit; it is the value embedded in the ideas embodied in people, processes, and customers. Nhon *et al.,* (2020) defined intellectual capital as the accumulation of all knowledge, information, intellectual property, experiences, social networks, capabilities and competencies that enhance organisational performance; not only as held by individuals, but also as embedded in business processes. Simply put, Intellectual capital is generally defined as knowledge related to intangible assets

belonging to an organisation (Kehelwalatenna & Premarantne, 2014). Gioacasi (2014) states that One of the most succinct definitions of intellectual capital is provided by Sveiby. He defined Intellectual capital as a useful package of knowledge which also includes organizational processes, patents, employee skills, and information about customers, suppliers and business partners.

According to Tefera (2018), the term Intellectual capital was first published by John Kenneth Galbraith in 1969, who believed that Intellectual capital meant more than just "intellect as pure intellect" but rather incorporated a degree of "intellectual action" in that sense, intellectual capital is not only a static intangible asset but an ideological process; a means to an end. Intellectual capital can be described in terms of a tripartite connotation containing human capital, relational capital and structural capital components, and its concept is relatively new in the worldwide business environment.

According to Mart´ın-de Castro *et al.,* (2011), intellectual capital evolution has two stages. First is its emergence in the last decade of the twentieth century, where intangible assets, i.e. goodwill, patent, trademark etc., remained the basic theme of intellectual capital. In the second stage intellectual capital remained a focal area of research for academia from the year 2000 onward, researchers started examining intellectual capital and its facets. The focus of the management world too changed from a traditional, physical resource-based view to the intellectual capital-based concept for competitive advantage and sustainable development in business prospects.

Kaw (2020) explained that intellectual capital allows knowledge to be transformed into value and further differentiates the book and market values of intellectual capital. It is categorise intangible assets that include brand name, technology, customer details and reputation that are not useful to a company's competitive forces. Due to the various dimensions identified, Bordianu (2014) suggested that the definitions of intellectual capital can be categorised into the following process definitions, which identify intellectual capital as a part of the production process, knowledge definitions, which highlight the knowledge component of intellectual capital, non-accounting definitions which differentiate intellectual capital from the accounting concept of intangible assets, and the classification models which divide intellectual capital into individual elements and separately define each of them.

Knowledge-based resources are gaining more prominence than ever before as a matter of survival and of having a competitive advantage for the firm to compete strategically, thus it is no secret that the organization that continues to in new skills and technology will continue to be successful. (Tefera 2020). He further states that intellectual capital has become the critical driver for sustainability because intellectual capital can improve the financial performance of organizations, create value, and provide a sustainable environment for competitive advantage globally. The use of intellectual capital should become one of the priorities of all organizations (Cohen and Kaimenakis, 2007).

Accounting and reporting Intellectual capital has been a burning issue among Accountants in recent times. However, significant progress has been made in the areas of accounting for intangible assets in general with the development of the International Accounting Standard (IAS) 38. The accounting standards on intangible assets (IAS 38) states that for assets to be recognised as Intangible asset if they meet three critical attributes of an intangible asset which are identifiability, control (power to obtain benefits from the support) and future economic benefits (such as revenues or reduced future costs), but intellectual capital as a whole those not fit into this category and so its measurement varies but Value Added Intellectual Coefficient (VAIC) formulated by Pulic in 1999 is the most used. The VAIC is made up of two major components, that is, the Capital employed efficiency and the Intellectual capital efficiency.

Intellectual Capital Efficiency (ICE)

According to Public (2000), Intellectual capital efficiency is one of the two major indicators of the Value-

Added Intellectual Coefficient (VAIC), the other being Capital Employed Efficiency (CEE). Intellectual Capital Efficiency (ICE) is the indicator of the value-added efficiency of a company's intellectual capital base. Intellectual capital efficiency is further divided into two other variables namely Human Capital Efficiency (HCE) which is the indicator of value-added efficiency of human capital that include the total salary and wage costs of a firm and Structural Capital Efficiency (SCE) which is the indicator of value-added efficiency of structural capital. The formula to calculate VAIC is, therefore, CEE + HCE + SCE. Pulic (1998) stated that the higher the VAIC coefficient, the better the efficiency of VA by a firm's total resources.

The first step in calculating CEE, HCE and SCE is to determine a firm's total VA. This calculation is defined by the following equation. VA = I + DP + D + T + M + R + WS Where; VA (value-added) I is Interest expense Dp is Depreciation expenses D is Dividends, T is corporate tax, M is equity of Minority shareholders in net income of subsidiaries, R is Profits retained for the year and WS is wages and salaries. Pulic (2000) further states that CEE is the ratio of total VA divided by the total amount of Capital Employed (CE) where capital employed is defined as the book value of a firm's net asset. HCE is calculated as the ratio of total VA divided by the firm's total salary and wages of its employees. SCE is calculated as the Structural Capital (SC) of the firm's total VA less its human capital (HC).

Despite the common use of VAIC, it is not free from criticism (Aybars and Oner 2022). As stated by Dzenopoljac *et al.,* (2017), the model utilizes historical data in financial statements; thus, it demonstrates deficiencies to stand for a measure that provides a feature for future value creation. Also, the model is criticized for its measuring only the operating performance of the firm since it can be derived from financial statements. Iazzolina and Laise (2013) criticize Pulic stating that Human capital in his model is only an income statement-based measure and Stahle, Stahle, and Aho (2011) criticize VAIC on the grounds that it measures the firms' labour capital efficiency rather than intellectual capital as a total. Notwithstanding the criticism, the VAIC still remains the commonly used model especially because of the availability of data.

Structural Capital Efficiency

Structural capital efficiency (SCE) is used to measure structural capital and it is calculated by subtracting human capital from Value Addition that is, Value-added less Human capital cost, where, Value added is equal to output less input. The output represents Business revenues and the Input represents Business costs except for wages to employees. Human capital cost is the total salary and wage expenditure (employee cost) of an organisation. The value gotten above is then divided by the value of value-added (SCE = (VA − all employee expenditures)/VA). This formula has been largely criticized for the use of only the income statement-based items for its calculation (Iazzolina and Laise, 2013) and the fact the formula only recognizes only Human capital and Structural capital (VA − all employee expenditures) and leaves out Relational capital asset major reason MVAIC was introduced.

According to Aybars and Oners (2022), Structural capital is accumulated within the organisation adding to the IC of the firm, and it consists of trademarks, copyrights, and patents generated by the innovative capacity of the firm through R&D investments. Additionally, databases, administrative systems, structures, strategies, distribution networks and supply chains and culture in an organisation are also other essential drivers of structural capital. Apart from these issues, distribution networks and supply chains further contribute to this component. The common feature of all these capabilities that make up structural capital is that they are inseparable from the organisation (Joshi, *et al*, 2013). Muhammad and Ismail (2009) opined that structural capital is competitive intelligence, formulas, information system, patents, policies and others which result from products or systems the company has created over a period of time. Bansal and Singh (2020) refer to Structural capital (SC) as knowledge which remains in the firm, whether employees leave the firm or stay in the firm. It includes databases, culture, systems, and procedures of the firm. They stated further that it is a mechanism in firms which helps employees to optimise intellectual and increase firm

performance, and the in the words of Ahangar (2011) SC is a supportive structure for Human capital, such as organizational processes, data patents This type of capital is also referred to as organisational capital (Petty and Guthrie, 2000). This position of structural capital as a link between human capital and relational capital was buttressed by Namvar, et al. (2010) who refer to structural capital as processes, investments, activities and structures that belong to a company in order to maintain its human capital or influence its relational capital. It shows that an organisational structure could lead to knowledge creation and development

According to Popoola, *et al* (2019), Structural Capital is characterised by two major types of substructures namely, external and internal capital. External capital, otherwise known as relational or customer capital, refers to a firm's connection with external entities. External capital entails all human and structural resources connected with relationships external to the firm, such as relationships with customers, suppliers and other stakeholders. This, by extension, includes perceptions about the firm, connections with customers, ties with suppliers, links with financial institutions, government, research and development, partners, etc. Structural capital is the link between an organisation's internal and external drivers. Organisational external drivers include organisational structures, client files, processes, databases, routines, and software, manuals, while the external drivers include alliance partners, suppliers and customer relationships. This position has been supported by other many scholars (Longo et al. (2009); Hormiga et al. (2011); Akhtar (2020)). Structural capital is categorized into two parts by the Society of Management Accountants of Canada i.e. intellectual property and infrastructure assets. The first category includes trade secrets, copyrights, design rights, patents, trademarks and service marks which can be valued and reported by the organization. While the second category includes management philosophy, corporate culture, processes and systems of networking within an organization (Akhtar 2020).

Structural capital deals with the mechanism and the structure of an enterprise that can help support employees in their quest for optimum performance. Bordianu (2014) added that structural capital includes infrastructure, information technology, databases, product technology, process handbooks, organization structure and routines and intellectual property elements such as brands, trademarks, copyrights and patents. The value of structural capital is to emphasize the importance of company structure, which encloses processes and managerial and productive procedures, managerial instruments, information systems and the company's administrative philosophy in order to innovate and develop products and services aiming to better assist clients and gain market share. (Camfield Giacomello and Sellitto, 2018).

Considering the composition of Structural capital which include information technology, databases, product technology, process handbooks, organization structure and routines and intellectual property elements such as brands, trademarks, copyrights and patents, it, therefore, means that it represents the largest chunk of Intangible asset, and this is very evident in the operations of most companies and especially the banking sector as huge funds are invested by banks to improve the services and efficiency of operation to their customers. Customized banking applications are developed for banking activities and transactions while specialized computer software including artificial intelligence is also developed to enhance the internal operations and workings of the staff. With so many transactions occurring simultaneously, banks cannot look at each transaction and verify that each transfer of money is legitimate. This would create enormous bottlenecks, destroying modern life's rapid pace and customer expectations for online banking. Instead, banks should use automated systems programmed which are referred to as artificial intelligence to recognize behaviours specific to fraudulent activity.

Business Sustainability

Contemporarily, the word sustainability has taken a new dimension now relating more to the environment and natural resources and is defined as the process of living within the limits of available physical, natural, and social resources in ways that allow the living systems in which humans are embedded to thrive.

It is a holistic approach that considers ecological, social and economic dimensions, recognising that all must be considered together to find lasting prosperity. However, before sustainability became popular in this manner, it was attributed mainly to realistically achievable growth that a company or national economy could maintain without running into problems and this is the focus and scope of this paper. The concept of the latter has been largely discussed in relation to keeping an organisation afloat and steady with the available resources available. This largely relates to growth and have discussed by manner scholars. Ocak and Findik (2019) wrote that the term sustainable growth emerged in the 1970s in the field of business with the term used to address firms' optimal growth from a financial perspective. Accordingly, it indicates a maximum rate that a firm grows at relying on itsown resources without using any financial tools outside the company. According to Parker *et al*. (2010), sustained business growth for a more extended period requires the timely adaptation of a firm's organisation and strategies; otherwise, fast-growing firms could be a "one-hit wonder" and then lose relevance. Many businesses run into challenges if they cannot manage and sustain growth. According to Serbian, et.al (2015), growth is the target of both firms and economies, yet increased volatility can inadvertently lead to failure. Business sustainability, on the other hand, is the goal of achieving long-term high growth with a low downside. In the context of firms, they further state that sustainability can be operationalised with three measures: growth persistence which is defined as the correlation of growth rates over time; volatility, the uncertainty and risk associated with growth; and survival, accounting for firm closure.

The business sustainability of firms is significant and beneficial to every stakeholder and the Nigerian economy in general. However, accelerated growth overloads corporate resources and requires new borrowing in order to prevent corporate insolvency (Xu et al., 2021). If such growth is not properly managed and funds are tied to the development of intangible assets like software to meet up with the frequent change in trends, it could be a threat to the going concern of the organisation. Rapid growth could cause a loss of coordination throughout the organisation due to an increase in assets and overhead costs. Sustainability growth is measured by the Sustainability growth rate (SGR). The growth rate is therefore a complex long-term indicator that belongs to the business and financial performance of the company. Any growth that deviates from a sustainable growth rate can be considered unsustainable growth (Xu et al., 2021). Organisations that want to maintain a target payout ratio and capital structure without issuing new equity are constrained by the sustainable growth rate.

Sustainable Growth Rate

According to Orbunde et al (2023), the sustainable growth rate refers to the maximum and consistent growth rate that a company can achieve without mobilizing additional funds in the form of borrowing. Growth below a sustainable growth rate can affect the loss of a company's competitive advantage due to reduced business efficiency. Growth above a sustainable growth rate involves additional borrowing by the company, which can worsen its financial health (Rastic et.al 2021). According to Arora, et.al, (2018), the expression of Sustainability growth rate is clarified through several modalities, among which the most famous is the first, Higgins model of Sustainability growth rate. In a more concise edition, according to Higgins (1977), the Sustainability growth rate is expressed as SGR = ROE (Return on Equity) x b (Retention Rate) ROE indicator is an indicator with a long tradition and is calculated as ROE = Net profit/ Shareholders' equity. On the other hand, retention rate b indicates the number of funds remaining for the company to reinvest in business activities after the payment of dividends. It is calculated as (Net profit – paid dividends)/Net profit.

Revenue Growth

Revenue growth is an important concept for business. It is a very important indicator of measuring a company's performance and often serves as the foundation for future investment, expansion, and other growth opportunities (Orbunde et al 2023). Revenue growth is a measurement tool used to measure how the

total revenue of a business has grown in a specific period. Revenue growth is the rate of increase in total revenues divided by total revenues from the same period in the previous year. That is the total revenue of year 2 minus year 1 divided by year 1 total revenue.

Empirical Review

Orbunde *et al* (2023) examined the effect of Intangible Asset Investment and Business Sustainability of Deposit Money Banks in Nigeria, the study employed an ex-post facto design with a sample size of twelve deposit money institutions between 2012 and 2021. The analysis utilised secondary data obtained from the Nigerian Exchange Group. The panel regression analysis was conducted using the random effects estimates, and the results indicated that goodwill intensity has a significant positive effect on the sustainable growth rate, whereas asset intangibility intensity has a significant negative effect on the sustainable growth rate of deposit money banks in Nigeria. Therefore, the study concluded that intangible asset investment has a significant effect on the business sustainability of deposit money banks in Nigeria. Based on the findings of this study and the conclusion made, the following recommendations are made to the management of deposit money banks in Nigeria Management of deposit money banks should strategically monitor their Asset Intangibility Intensity because of its negative effect on the strategic growth rate of the bank and that Goodwill should be maintained, and deposit money banks should still invest more in intangible assets for sustained business growth. The paper used assets' intangibility intensity to measure Intangible assets however, with the availability of data on the respective items of computer software, artificial intelligence and machine learning, computerised databases, research and development (R&D), copyright, licence, design, advertising, marketing, firm-specific human capital, and organisational capital would have been more effective in the study.

Olohunlana, *et.al* (2022) carried out a study that empirically investigated the level of intellectual capital efficiency amongst the listed commercial banks in Nigeria and the factors influencing its efficient utilisation. The study employed longitudinal data to examine the determinants of the intellectual capital efficiency of listed commercial banks in Nigeria. The data were obtained from the annual reports of listed commercial banks as published in the Nigerian Stock Exchange (NSE). The data span from the year 2013 through 2019. The study selected only 12 listed commercial banks. The paper employed Data envelopment analysis (DEA) to determine intellectual capital efficiency and the VAIC model. The Tobit regression technique was used to analyse the impact of firm-specific factors on intellectual capital efficiency. The study found that only 8.33% of the sampled Nigerian commercial banks are at optimum capacity in utilising their intellectual capital, while 91.67% are inefficient. It also finds that bank size and directors' shareholdings positively impact intellectual capital efficiency, while market and ownership concentration debar the attainment of optimum intellectual capital efficiency. The study contributed to the very scarce literature on intellectual capital efficiency measurements by using the non-parametric analysis (DEA) to measure intellectual capital efficiency for listed banks in Nigeria. The paper recommended the need for policy improvements on banks' performance in Nigeria, it is advised that bank regulators should intensify efforts to enforce the disclosure of the banks' intellectual capital in their financial reports, as this would considerably drive the attention of the bank managers on the need to effectively identify and manage their intellectual capital resources for improved efficiency and value creation. The paper fails to establish the significant level of Intellectual capital on the bank's performance in Nigeria, also as part of its recommendation, the paper asks bank regulators to enforce the disclosure of banks' intellectual capital in their financial reports but fails to advise on how it is to be done considering that there are no know measurement criteria currently for intellectual capital.

Ionita and Dinu (2021), studied the effect of intangible assets on sustainable growth and firm value with evidence on intellectual capital investment in companies listed on Bucharest Stock Exchange. The study investigated the connection between company investments in intellectual capital (IC) and how they translate

into financial value. The aim was to test the impact of intangible assets on the firm value and its sustainable growth. The research employed computation models to determine the sustainable growth rate (SGR) and the firm value (FV), and by using the ordinary least squares (OLS) model through linear regression, it assessed the relationship between the dependent variables and expenditures on intangibles like Research and Development (R&D), IT programs and patents. A sample of 42 companies was selected out of the 78 listed on the Bucharest Stock Exchange (BSE), based on the appropriateness of the information disclosed in the financial reports for the period 2016–2019. The results showed that intangibles classified as innovative competencies (R&D and Patents) do not have a positive impact on SGR and FV in listed companies from Romania. Moreover, R&D has a negative and significant effect on FV, while IT Programs have a positive and significant impact on FV, but not on the SGR. Variables categorised as economic competencies (Brands, Shares held in associates and jointly controlled entities) and firm structure-specific variables (Leverage, Firm Performance) seem to have a significant effect on SGR and FV. Shares held in associates and jointly controlled entities is the variable that can have the biggest impact when it comes to FV for companies listed at BSE. The study concluded that Companies listed on the Regulated Market from the Bucharest Stock Exchange should maintain their scale of liabilities at a reasonable level when financing intangible assets in order to ensure corporate long-term and sustainable development. Also, these companies should maintain awareness about the importance of intangible assets and invest more in specific sub-components, in order to sustain competitive advantage. Recognizing the roles of intangibles, managers need to develop strategies to invest in profitable intangibles by reasonably allocating their limited resources, in order to achieve sustainable growth and increase company success.

Xu, *et.al* (2021) carried out a study on intellectual capital efficiency and corporate sustainable growth nexus: a comparison of agriculture, tourism and renewable energy sector. The paper selected the listed companies of agriculture, tourism and the renewable energy industry as research samples, and it employed the MVAIC (Modified value-added intellectual coefficient) model and runs the panel data to explore the role of capital employed efficiency, intellectual capital efficiency and its components on corporate sustainable growth. The paper selected the enterprises in the agriculture, tourism and renewable energy sector of the A-share listed companies in Shanghai and Shenzhen stock exchanges of China from 2009 to 2018 and the fixed-effect model was adopted for regression analysis. The sustainability growth ratio was used as the dependent variable while Capital employed efficiency, Intellectual capital efficiency, Human capital efficiency, Structural capital efficiency and Relational capital efficiency were used as the independent variables. The results showed that the capital employed efficiency, intellectual capital efficiency and its components have a significant positive effect on corporate sustainable growth while the impact of the relationship capital efficiency on the corporate sustainable growth of agricultural enterprises is not significant, and the impact of structural capital efficiency on the corporate sustainable growth of tourism enterprises is not significant. While there is a significant positive impact of intellectual capital efficiency and its components on the corporate sustainable growth of renewable energy enterprises. Based on the conclusions, the paper proposed policy suggestions for promoting the sustainable development of enterprises, aiming to provide theoretical guidance and empirical evidence for managers to invest and develop intellectual capital.

Xu, *et.al* (2020) studied the impact of Intellectual capital efficiency on corporate sustainable growth-evidence from Smart Agriculture in China expanding the value-added intellectual coefficient (VAIC) model by constructing a comprehensive financial capital (FC) component. They also divided Human capital efficiency into executive (EHCE) and nonexecutive human capital efficiency (NHCE). They sampled listed agriculture companies (LAC) in China's Shanghai and Shenzhen A-share markets from 2009 to 2018 and categorized them as high-tech (HTAC) and non-high-tech agriculture companies (NHTAC). They found that capital employed efficiency (CEE) and EHCE have a significant positive effect on the corporate sustainable growth (CSG) of HTAC but no significant effect on the CSG of NHTAC, while FC has a significant positive effect on both. These results suggest that companies, especially HTAC, should invest in human capital, and their executives and policymakers should develop effective knowledge management tools and

begin accumulating the necessary intellectual capital to allow adaptation to their changing environment. The study further concluded that the most critical part of Intellectual capital is human capital (executive professional quality, ability to acquire knowledge, work experience, leadership strategy, and dynamic learning capacity). Therefore, investment in human capital should be included in long-term plans. Although the results also showed an insignificant correlation between structural capital and CSG. Structural capital can influence how human capital is applied to increase CSG.

Mukherjee and Sen (2019), studied Intellectual capital and corporate sustainable growth: The Indian evidence. The study investigated the impact of intellectual capital (IC) and its components on corporate sustainable growth in India. In addition, the study determined the most influential component of Intellectual Capital on corporate sustainable growth in India. A sample size of the top 139 National Stock Exchange-listed non-financial companies over a time period of five years from 2012 to 2016 was used in this monograph. The study was analysed using the Pooled OLS model, the fixed effects least squares dummy variable (LSDV) model and the random effects model (REM). The findings of the study with intellectual capital measured by the M-VAIC model demonstrated a significant positive impact on corporate sustainable growth. Considerably, the results also reveal that almost all the explanatory variables viz. Physical capital, Relational capital, Innovation capital, and Process capital exercise notable influence in explaining corporate sustainable growth. The study concluded that in the Indian context, Intellectual capital and its components play a crucial role to explain corporate sustainable growth besides physical capital. The study also has one major limitation, it focused on a sample size of the top 139 National Stock Exchange-listed non-financial companies over a time period of five years. The five years period could be too short to statistically determine the impact of intellectual capital (IC) and its components on corporate sustainable growth in India.

Xu and Wang (2018) empirically investigated the impact of Intellectual capital on financial performance and sustainable growth in the Korean manufacturing industry. Multiple regression models are applied with data collected from 390 manufacturing companies listed on the Korean Stock Exchange from 2012 to 2016. A total of 1950 list manufacturing companies were used. Financial data are sourced from the DataGuide database. The regressions are carried out using SPSS Version 20. VAIC and its three components namely Capital employed efficiency, Human capital efficiency, and Structural capital efficiency were used as the independent variables while the Sustainable growth rate is used as the dependent variable. The results of the analysis show that Intellectual capital has a positive impact on financial performance and companies' sustainable growth. In addition, companies' performance and sustainable growth are positively related to physical capital, human capital (HC), and relational capital (RC). RC is found to be the most influencing factor. Finally, innovative capital captures additional information on structural capital (SC) which negatively affects the performance of Korean manufacturing companies. The results extend the understanding of IC in creating corporate value and building sustainable advantages in emerging economies. IC is increasingly recognized as a major driver of corporate competitiveness and sustainability. This study corroborates earlier findings and expands the understanding of IC in enhancing financial performance and sustainable growth. The main conclusions of this study are that Korean manufacturing companies with better Intellectual capital efficiency achieve greater profitability and higher sustainable growth and that Human capital, Structural capital, and Relational capital have positive impacts on companies' sustainable growth. The study also one major limitation, it focused on listed companies from the manufacturing industry of an emerging economy for just 5 years, the five years period could be too short to statistically determine the impact of Intellectual capital on financial performance and sustainable growth.

Yudawisastra, *et.al* (2018) studied the relationship between value-added capital employed, value-added human capital, structural capital value added and financial performance using a population that consists of the companies listed from 2014 to 2016 with as many as 34 companies. Panel data analysis was used to test the hypothesis about the influence of independent variables which includes Value Added Capital Employed (VACA), Value Added Human Capital (VAHU) and Structural Capital Value Added (SCVA) on the

dependent variable which is Return on Asset (ROA). Panel data regression testing was performed using the fixed-effect test, classical assumption test, heteroscedasticity test, multicollinearity test, and autocorrelation test. The result stated that value-added capital employed has no effect on the return on assets, value-added human capital has an effect on the return on assets and the structural capital value-added has an effect on the return on assets. The paper concluded by saying that the magnitude of the contribution made by structural capital can improve the performance of the company in the management of returns to shareholders. Therefore, if Companies can manage the facilities and infrastructure supporting employee performance effectively it will provide added value to the company. The study also has one major limitation, the paper used a population that consists of the companies listed from 2014 to 2016 with 34 companies. The three years period could be too short to statistically determine the relationship between value-added capital employed, value-added human capital, structural capital value added and financial performance.

Theoretical Framework

Resource-Based Theory

In 1959, Penrose introduced the theory of "Resource-Based view" ("RBV") to the strategic management field as a set of strategic resources such as knowledge, assets, and processes; and recognises the importance of these resources to a company's competitive position. The Resource-based view of a firm to achieve competitive advantage was further developed in 1980 after the seminal work of Wernerfelt (1984) and Barney (1991). According to their views, organisations should look inside the organisation to find the sources of competitive advantage instead of looking at the competitive environment and other sources externally. According to the resource-based concept, when such resources are bundled or combined, they can be mutually reinforcing, further differentiating the firm's capabilities. The resource-based view seeks to explain why some firms perform better than others by looking at the firms' resources. The Resource-based view (RBV) confirms that an organisation's performance relies on a set of internal resources and capabilities. It focuses on the internal resources and capabilities which can reinforce competitive advantage. These resources are employed to support firms in producing better products and services to satisfy customers " needs. These resources have four attributes. They are rare, valuable, have few substitutes and are not easily imitable (Njuguna, 2014). The resource-based (RB) theory is considered the pioneer that focused on the importance of intangible assets for firms (Barney, 1991). This theory argues that any firm is a bundle of tangible and intangible resources that depend on each other. This means that the performance of tangible assets depends upon the performance of intangible assets and vice versa. Physical and intangible assets have long been considered strategic resources for a firm. With the passage of time, the focus of this theory has been mainly dragged towards intangible resources (Reed *et.al.* 2006). They argued that physical assets such as plant, machinery and financial assets are generic and can be substituted at any time

Knowledge-Based Theory

Originating from the strategic management literature, this perspective builds upon and extends the resource-based view of the firm (RBV) initially promoted by Penrose in 1959 and later expanded by others (Wernerfelt 1984, Barney 1991). The theory assumes that the competitive ability of any firm is based on capabilities and competencies which are driven by knowledge. The knowledge-based theory of the firm considers knowledge as the most strategically significant resource of a firm (Njuguna 2014). Knowledge is embedded and carried through multiple entities including organisational culture and identity, policies, routines, documents, systems, and employees. Also, that knowledge draws strategic significance from its appreciative value as opposed to other traditional factors of production, which depreciate.

The fundamental assumptions of the knowledge-based theory of the firm stemmed from the resource-based view of the firm. The knowledge-based view argue that the resource- based view of the firm does not give knowledge adequate recognition about knowledge and that knowledge was treated among the simple generic

resources of the firm. In order to make up of this perceived gap, the Knowledge-based theory of the firm was developed considering the strategic significance and importance of knowledge-based resources. Knowledge-based principles signify competitive advantage for the firm through increased employee involvement in the formulation and administration of the operational goals and long-term transformational objectives of the firm. The continuous acquisition and transfer of knowledge within business organisations are necessitated by such factors as ever-changing competitive conditions in markets initiated by globalization, frequent deregulations, and technical advancements.

Human Capital Theory

The term human capital was introduced by Schultz (1961) published in the American Economic Review, called investment in human capital. Human capital was widely used after Gary Backer won the Novel prize in 1962 and initiated "human capital theory" stating that a different level of education and training contribute to a different level of wages and salaries, the more knowledge, skill and ability, the more likely to get a better job (Naphat 2017). The human capital theory posits that by emphasizing education and training, workers can become more productive and efficient. As a result, components such as education are part of human capital theory. Effective communication skills. Management of people. Training at work. The ability to solve problems. Personal health and well-being. According to human capital theory, a growing economy can be attributed to a well-invested workforce. An example of the human capital theory is the belief that a more educated population is more likely to earn more money and spend it, which in turn boosts the economy. Another example is that humans are highly adaptable and capable of being reprogrammed. Even if the salary is high, they can perform manufacturing tasks that machines cannot.

Theoretically, this study is anchored on the knowledge-based theory as it emphasises that with education and training, workers can become more productive and efficient. The more knowledge, skill and ability, the more likely to get for an employee to perform and be productive and this can translate to profitability in the short run and sustainability in the long run everything being equal.

METHODOLOGY

The study employs secondary data from audited annual accounts for listed deposit money banks in Nigeria between 2012 and 2021 to test the impact of intangible assets on the strategic growth of these businesses using a post-hoc design informed by a positivist paradigm and a deductive approach informed by the panel data technique. As of the 31st of December, 2021, the analysed population consists of the fourteen (14) deposit money banks now trading on the Nigerian Exchange Group (NGX). Purposive sampling was used, and the sample size was set at 12 with reference to the number of years the banks had been in existence over the time frame of the study. Panel Regression Analysis, as an appropriate statistical method, was incorporated into the inferential analyses as a result of the data's characteristics. This is due to the inferential nature of the analysis. The panel regression analysis was conducted using the pooled ordinary least square (OLS) approach using random and fixed model effects estimates. The purpose of these calculations was to assess the statistical validity of the assumed connection between the dependent and independent variables. The Fixed Effect Likelihood Ratio test is used to check if a model is well specified. The Langranger multiplier test distinguishes between the pooled effect model and the random effects model in panel data analysis, and the Hausman test is used to decide between the fixed effects model and the random effects model.

To check for a strong correlation between the independent variables that might introduce bias, the Multicollinearity test was performed. As a further diagnostic check, the robustness of the estimates where checked with a Heteroskedasticity test. The purpose of both was to verify the stability of the estimations. After trying out several distinct approaches, it was determined that the Random Effect produced the best

overall fit for the regression.

The study adapts the regression model as used by Orbunde *et al* (2023), Bayelign and Ayalew (2022) and Arianpoor (2021).

Model:

$$SGR = \beta_0 + \beta_1 ICE + \beta_2 SCE + \beta_3 REVG + \epsilon_{it}$$

Where:

SGR = Sustainable growth rate

ICE = Intellectual Capital Efficiency

SCE = Structural Capital Efficiency

REVG = Revenue Growth

β0 - β3 coefficients

ϵ_{it} = Stochastic Error term

Table 1: Variable Measurement

Variables	Description	Measurement	Sources
SGR	Sustainable Growth Rate	ROE (Return on Equity) x b (Retention Rate)	Orbunde et al (2023) and Arora, et al, (2018)
ICE	Intellectual Capital Efficiency	Organsation's Value Added divided by its Human capital cost plus its total VA less its human capital (HC).	Popoola et al (2020) and Olohunlana et.al, 2022.
SCE	Structural Capital Efficiency	Organisation's total VA is less its human capital (HC).	Kasoga, (2020) and Nguyen and Doan, (2020).
REVG	Revenue Growth	Total revenue of the year minus the previous year divided by total revenue of the previous year.	Orbunde et al (2023) and Okerekeoti (2021)

Source: Author's Compilation (2023)

Table 2; Apriori Expectation

The apriori expectation for the study is that the independent variables; human capital efficiency and Revenue per Employee Contribution are expected to have a positive and significant effect on the dependent variable, Sustainable growth rate.

Independent Variables	Expected Sign	Expected Probability Result (p)
Intellectual Capital Efficiency	Positive (+)	≤ 0.05
Structural Capital Efficiency	Positive (+)	≤ 0.05

Source: Author's Compilation (2023)

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