INTELLECTUAL CAPITAL AND FINANCIAL PERFORMANCE OF DEPOSIT MONEY BANKS IN NIGERIA

Ifeanyi Madumere *PhD*
Department of Accounting, Faculty of Management Sciences,
Federal University Otuoke, Yenagoa Bayelsa State, Nigeria.
ceify2@yahoo.com

George Ihenacho Ubani *PhD*
Department of Accounting, Faculty of Management Sciences,
Ignatius Ajuru University f Education, Rumuolumeni, Port Harcourt Rivers State, Nigeria.
achoubani006@gmail.com

ABSTRACT

The study examines the effect of Intellectual capital on the financial performance of Deposit Money Banks in Nigeria with emphasis on its effect of Value Added Human Capital, Structural Capital and Value Added capital employed on Return on Asset. We employed a longitudinal research design and adopted a convenience sampling technique to select a sample of 12 banks. Secondary data were retrieved from their annual reports of the sample for the period 2012-2020 financial year. Panel data regression is chosen because of the multidimensional nature of the data which has both time or periodic dimension and also a cross-sectional dimension. Our findings reveal that (i). Value Added Human Capital has a significant effect on the Return on Assets of Deposit Money Banks in Nigeria. (ii). Value Added Human Capital has a significant effect on the Return on Assets of Deposit Money Banks in Nigeria is rejected and (iii). Structural Capital Value Added has a significant effect on the Return on Assets of Deposit Money Banks in Nigeria. We, therefore, recommend that banks should pay attention to human and intellectual capital as it plays a significant role in value creation in today's economies.

Keywords: *Intellectual Capital, Structural Capital, Value Added Human Capital, ROI, ROA.*
Jel classifications: *D81, M51.*

INTRODUCTION

The global economy has for the past few decades witnessed a gradual transition from an industry-based environment, with a focus on physical assets such as factories, plants, machines and equipment; to a high technology, information, and innovation-based environment, which focuses on the expertise, talents, creativity, skill, dedication and experience of people in the organisation (the organisation's intellectual capital). The fundamental difference between these two environments lies in their assets and their

effect on financial performance indices. In the former, the physical assets like plants, machinery, materials, equipment, etc., were of utmost importance and made up the bulk of the organisation's assets and value, while in the latter- knowledge, ability, skills, experience and attitude of workers, assume greater significance.

Furthermore, land, labour and capital (financial and physical) were traditionally considered in economics to be the most valuable assets, as a result, conventional physical assets were considered to be the main determinants of the performance of any economic activity (Ahangar 2011). However, the fast expansion of science, technology and finally globalisation has altered the pattern and structure of the production systems today. The new production system is mainly driven by technology, knowledge, expertise and relations with stakeholders, etc., which may be collectively described as Intellectual Capital (Ahangar 2011). In the new economic system, which is popularly known as the knowledge economy, intangible or intellectual assets have been recognised as the prominent resource needed for organisational survival and growth. Companies that provide services such as software programming, financials, pharmaceutical; banking, hoteling, hospitality, consulting, accounting, legal, educational services, etc. depend to a considerable extent on their intellectual capital for earning revenues. Production or manufacturing companies use intellectual Capital with their physical assets to sharpen their competitive edge (Firer & Williams, 2003). Bornemann 1999) discovers that enterprises, which had managed their intellectual capital better, achieved stronger competitive advantage than the general enterprises. The study further reported that companies which had strengthened their intellectual capital management compared to others performed better. Brennan and Connell (2000) also agree that intellectual capital management plays an important role in the long-term business performance of an enterprise.

Flamholtz (1999) argued that given the growing importance of human and intellectual capital to economic success at both the macroeconomic and enterprise levels, the nature of investments made by firms needs to shift to reflect this reality. There have been contentions among scholars that adequate investments are not being made in intellectual capital in line with its growing importance in organisations today.

Intellectual Capital (IC) is defined as the knowledge-based equity of organisations and has attracted during the last decade, a significant amount of practical interest (Campisi & Costa, 2008; Petty & Guthrie, 2000). Although the importance of Intellectual Capital (IC) is constantly increasing, most organisations are faced with the problem of difficulty in measurement with its management, (Kim, Kumar& Kumar, 2009; Nazari & Herremans 2007; Andrikopoulos, 2005). The widespread acceptance of intellectual capital (IC) as a source of competitive advantage led to the development of appropriate methods of its measurement since traditional financial tools are not able to capture all of its aspects (Campisi & Costa, 2008; Nazari & Herremans, 2007).

The search for the most appropriate method of measuring Intellectual Capital led Public Ante to develop the most popular method that measures the efficiency of value added by corporate intellectual ability (Value Added Intellectual Coefficient – VAIC) (Public Public, 2000b, 2000a, 1998). The VAIC method measures the efficiency of three types of inputs: capital employed (physical and financial), human capital, and structural

capital (Firer & Williams, 2003; Montequin, Fernandez, Cabal, & Gutierrez, 2006; Public, 1998, 2000a, 2000b; Puntilo 2009).

Despite the shift towards a human capital-intensive economy, traditional accounting has continued to focus more on the physical assets in their financial statement to the exclusion of the more important assets- the Human assets (Armstrong, 2006). Fortunately, human assets belong to a group of assets classified as intangible assets because they represent those innate qualities of people which cannot be seen or touched but are indispensable for organisational success and survival (Michael, 2013). Notwithstanding that there are accounting treatments for acquired intangible assets in the statement of financial position, current financial accounting treats human resource-related costs as expenses which reduce profit on the income statement only in the current accounting periods rather than being reported as assets on the statement of financial positions. As a consequence of the above, management is denied relevant and timely quantitative data, which enables her to take vital decisions regarding her human resources, especially the cost implication of certain decisions. This often results in wrong decisions or no decisions at all concerning workers especially as it affects their welfare and entitlements thereby causing industrial unrest. Thus, this studyinvestigated the relationship between intellectual capital, physical capital and the financial performance of deposit money banks in Nigeria. This is to ascertain whether intellectual capital and physical capital can significantly and positively influence their financial performance. The choice of the banking sector is because, in every country, it plays a pivotal role in setting the economy in motion as well as its developmental processes. According to Kamath (2010), the banking sector is an ideal area for intellectual capital research because the sector is "intellectually" intensive and its employees are (intellectually) more homogeneous than those in other economic sectors. Empirical evidence on the understanding and development of intellectual capital (IC) concepts in developing economies is still at its infant stage (Firer & Williams, 2003) and because developing economies contribute significantly to the success and stability of the world economy, there is a need to establish a relationship between intellectual capital and financial performance of banks in these economies with more emphasis in Nigeria.

STATEMENT OF THE PROBLEM

The difference observed between the market value and book value of Nigerian banks attracted the attention of this study by investigating the reason for the differences in figures and the value missing from the financial statements. Intellectual Capital (IC) therefore is perceived to be the hidden value that is missing from the financial statements which are what leads organisations to obtain a competitive advantage.

While a firm's market and book values have rarely been the same, remarkable attention has been drawn because the gap is increasing over the past decades. It is perceived that the growing gap between market value and financial performance is not captured by the production value of material goods, but by the creation and utilisation of intangibles such as intellectual capital which is the source of economic value.

Commercial banks require reliable and adequate measures of financial performance which objectively include the intrinsic components of intellectual capital to

show its' true effect on the company's value. The absence of intellectual capital information in the financial statement is of great concern to the reliability and adequacy of traditional accounting methods used by firms in the presentation of accounting information in this current age. The task of measuring the financial performance of intellectual capital in an organisation becomes a major step in investigating the reasons for the low or high performance of workers. Hence, the measurement of corporate performance needs to include the firm's total resources (physical and intellectual).

Wealth maximisation is the main objective of every business entity. This can only be achieved through the banks' financial performance concerning the efficient use of both physical and intellectual capital. The financial performance which is proxied by Return on Asset was the measurement indicator used in this study. Noteworthy, is the dearth of study in this field in Nigeria and other developing countries, as most literature in this area was foreign-based with not muchfocus on the Nigerianbanking sector. Findings from most studies done in advanced economies were mixed and inconclusive thus, the need for further research in this area of study to further substantiates existing findings using country-specific data.

OBJECTIVES OF THE STUDY

This study examines the effect of intellectual capital on the financial performance of Deposit Money Banks in Nigeria with special attention on the effect of Value Added Human Capital on Return on Asset; the effect of Structural CapitalValue Addedon Return on Asset and the effect of Value Added Capital Employedon Return on Asset of Deposit Money Banks in Nigeria.

Financial performance in this study is proxied by several economic indicators-profitability (Return on Equity, Return on Asset, Asset turnovers), employee productivity, and growth in revenues are used as proxies to appraise the contributions of the intellectual capital of Nigerian banks.

Hypotheses

The following null hypotheses are proposed:

H_{01}: *Value Added Human Capital has no significant effect on the Return on Assets of Deposit Money Banks in Nigeria.*

H_{02}: *Structural Capital Value Added has no significant effect on the Return on Asset of Deposit Money Banks in Nigeria.*

H_{03}: *Value Added Capital Employed has no significant effect on the Return on Asset of Deposit Money Banks in Nigeria.*

The period covered by the study was 2010-2019 because the NASB announced a stage implementation of IFRS for uniform reporting and comparability of accounting information across nations while 2019 year is the year with the currently available data on banks. The study adopted the Value Added Intellectual Coefficient (VAIC) model as a basis for measuring Intellectual Capital since it is the most widely accepted and used measurement method as it is consistent with previous work (Yang & Lin, 2009; Firer & Williams 2003; Kamath, 2010; Ahangar 2011).

REVIEW OF RELATED LITERATURE

Conceptual review

Intellectual capital has always existed in human societies. However, it has particularly been considered an important asset in the last few decades. Galbraith (1996) sees intellectual capitalas a form of knowledge, intellect, and brain activity which uses knowledge as a source of value creation. Stewart (2020) defines intellectual capital as the total stocks of collective knowledge, information, technologies, intellectual property rights, experience, organisational learning and competence, team communication systems, customer relations, and brands that can create value for a firm. Similarly,intellectual capital is seen as the group of knowledge assets that are attributed to an organisation and most significantly contribute to an improved competitive position of this organisation by adding value to defined stakeholders. Roos and Roos (2021) define intellectual capital as the hidden assets of the company not fully captured on the statement of financial position; while Chokri and Zehri (2012) define it as the intangibles such as patents, intellectual property rights, copyrights and franchises. (Isanzua 2015, Fatima and Ousama, 2015, Demissie 2016; Poh (2018) defined intellectual capital as a residual being the difference between the book value of the firm and its market value.

The limitations on financial statements in explaining firm value underline the fact that the source of economic value is no longer the production of material goods, but the creation of intellectual capital (Chen et al., 2005).Intellectual capital includes human capital and structural capital wrapped up in customers, processes, databases, brands, and systems; Edvinsson and Malone, (1997), and has been playing an increasingly important role in creating corporate sustainable competitive advantages (Kaplan and Norton, 2004).

Among Intangible assets especially Knowledge is gaining more prominence than ever before as a matter of survival and of achieving competitive advantage (Latif, Malik, & Aslam 2012), as new skills and technology will continue to be successful and intellectual capital has become a critical driver for sustainability (Bontis, 2001).

Intellectual capital cannot be complete without adjoining human capital, relational capital and structural capital components; (Al-Musali and Ismail 2014). According to Chokri and Zehri (2012), IC from a managerial perspective can be defined as the knowledge, applied experience, organisational technology, relationships, and professional skills that provide a competitive edge in the market. 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.

Intellectual capital is not typically used effectively and may cost businesses lost revenue in millions of dollars/naira. Instead of directly measuring deposit money banks' intellectual capital, Purtilo (2000) proposed a measure of the efficiency of value added by corporate intellectual ability (Value Added Intellectual Coefficient (VAIC)).

The major components of VAIC can be viewed from a firm's resource base – physical capital, human capital, and structural capital. VAIC is being increasingly used in business (Public, 1998, 2000) and academic applications (Firer & Williams, 2003).

Value Human Capital and Financial Performance

The financial performance of HC connotes notable actions or achievements which accrue to an enterprise as a result of its measurement and application. Traditional monetary bookkeeping is unable to look at the real value of the firm where it only measures physical assets Lina, (2014). Prior studies maintained that HC makes value for the organisation (Fathi, Farahmand, Khorasani, 2013). Gan and Saleh (2008) examined the relationship in the middle of HC and firm execution, and they found that HC significantly affected the profitability and productivity of the firm. In the same vein, the study by Al-Musali and Ismail (2014) investigated HC and its consequence on the financial performance of Saudi Arabian banks where the result revealed that HC was positively connected with banks' financial performance. Furthermore, Chen et al. (2005) found that HC had a significant influence on profitability.

Structural capital and financial performance

Structural capital is competitive intelligence, formulas, information system, patents, policies and others which resulted from products or systems that the company has created over some time (Meressa (2016). Bontis (2001) conducted a study on IC and business performance and revealed that IC had a positive association with business execution regardless of industry. Nazari and Herremans (2007) conducted a study to validate the findings of Bontis (2001), the findings also revealed a positive relationship between structural capital and firm performance,(Avci and Nassa 2007).

Capital Employed and Financial Performance

Capital utilised is regarded as the strongest predictor of execution accordingly to Lina (2014), there is a strong linkage between capital utilized backings that information tied up in relationship mong representatives, customers, suppliers, cooperation accomplices and so forth tends to prompt process and create developments, better critical thinking which tends to increase generation and administration conveyance effectiveness and in addition customer satisfaction. Njuguna (2014) also established a positive relationship between capital employed and capital gains on shares of listed deposit money banks in the Thailand stock market. Also, Khalique (2012) researched the relationship between IC and the organisational performance of commercial banks in Islamabad, Pakistan. The results showed that capital employed has a positive relationship with organisational performance. Though many studies found the relationship between capital employed and business performance the result is mixed and inconclusive. This component of IC still makes up a reasonable linkage with business performance.

Financial Performance and DMBs in Nigeria

The financial Performance of the banking sector is a major subject that has received much attention in recent years. Many studies have evaluated the financial performance of banks under various operating parameters, thus; better quality management of resources is the main factor contributing to bank performance, as evidenced by numerous studies on the U.S. banking system and otherwestern

developed countries (Gan and Saleh, 2008, Stewart, 2020).

Return on Assets (ROA) and Its Relationship with Deposits (DMBs) in Nigeria

Firm performance can be measured through different tools based on the financial and non-financial aspects. Performance measurement tools can help businesses evaluate their resource allocation processes to determine how resources can be better managed and distributed to the appropriate channels (Chen et al, 2005).

Traditionally, many performance measures have been based around financial aspects, omitting important non-financial aspects including the importance of dynamic capability through accumulating research and development as well as marketing capability over time, to further enhance firm performance (Mondal&Ghosh, 2012). Besides that, the evaluation of the performance of banks, for example, usually employs financial indices, providing a simple description of the bank's financial performance alone is not enough for management to deal with the changing business environment.

Kurfi (2017) financial statements are a common measure of banks generally in terms of financial health over a given period and they can be used to compare similar banks across the same industry or to compare industries or sectors in aggregation. The performance can be measured by using various methods such as accounting-based techniques, which consist of Return on Asset (ROA) and Return on Equity (ROE)Meressa (2016). Another study by Poh(2018), shows that management researchers would prefer to use various accounting-based measures to measure performance. The most common variables are ROA and ROE. Isanzua (2016) in a study tried out several alternatives by gathering data on Return on Assets (ROA), Return on Equity (ROE), and Return on Investment (ROI).

THEORETICAL REVIEW

The theories that underpinned this study are based on; Intellectual Capital Theory and Knowledge-Based Theory. They are discussed below:

Intellectual Capital Theory

The theory of intellectual capital is a new prominent theory which has not only challenged large attention but already considerably promises an increase in business results in the future. The base of the theory lies in the fact that tangible assets (land, buildings, equipment and money) of today’s leading deposit money banks around the world have less value than intangible assets, which have not been quoted in their business balances.This hinges on the fact that: the wealth of an organisation is based on human capital, structural capital and consumer capital. Value creation happens when one kind of capital turns into another. The value has been created whenever the human ability (human capital) creates new business processes (structural capital) which result in better services for consumers and increase their loyalty (consumer capital) (Njuguna, 2014). In this study, the theory will help in elaborating intellectual capital and its role in organisational performance.

Resource Base Theory

According to the resource-based theory point of view, core competencies can be constructed from the organisational point of view, as many opine that intellectual capital is a core competence or power Njuguna, (2014). It confirms that an organisation's performance relies on a set of internal resources and capabilities, is made up of a heterogeneous set of tangible and intangible resources, (Demissie 2016) and is supportive (Njuguna 2014).

EMPIRICAL REVIEW

Isanzua (2015) investigated the intellectual capital of banks operating in Tanzania for the period of four years from 2010 to 2013. Annual reports, especially the profit and loss accounts and the statement of financial position of the selected banks were used to obtain the data.The study uses the Value Added Intellectual Capital model (VAICTM) in determining intellectual capital and its three major components like Human Capital Efficiency (HCE) Structural capital efficiency (SCE) and Capital Employed Efficiency (CEE). The results revealed that Intellectual capital has a positive relationship with the financial performance of banks operating in Tanzania also when the VAICTM was divided into its three components it was discovered that the financial performance is positively related to Human capital efficiency and Capital employed efficiency but is negatively related to Structural capital efficiency.

Joshi et al. (2013) investigated the relationship between intellectual capital and its components and financial performance in the Australian context for the time of 2006-2008. The results show that human capital efficiency, capital utilized efficiency and structural efficiency was important but, they differ in utilisation. It was found that intellectual capital was critical in connection with human efficiency and worth expansion of Australian banks. Human capital efficiency is higher than capital utilized efficiency and structural efficiency on Australian claimed banks.

Jalilian et al (2013) examined a case study to investigate the impact of intellectual capital on the financial and non-financial performance of West Cement Company of Kermanshah, Iran. The variables integrated were intellectual capital as measured by human capital, structural capital and relational capital, organisational learning capability and firm performance; which were measured through financial and nonfinancial performance. The result shows an inter-relation between all three components of intellectual capital with a direct correlation with organisational learning capability, financial and non-financial performance Meressa (2016) examined the relationship between intellectual capital and firm performance in Iran using Pulic's model. In this model, value-added intellectual coefficient is used to evaluate firms' intellectual capital. Also, the relationship between intellectual capital and firms' market value is examined. In addition to intellectual capital, the relationship between the components of intellectual capital that is, human and structural capital-and performance is also investigated. The empirical data is collected from 100 firms listed on Tehran Stock Exchange (TSE) during the period 2000-2006. The results support the hypothesis that human and intellectual capital is positively related to performance (Tobin's Q), and intellectual capital can be taken into consideration for improving the performance of Iranian firms. Also, value-added intellectual coefficient proves to be an effective tool that

can be used by current decision-makers in Iran's capital market. The findings and discussions provided in this paper can be of interest to managers and capital market stakeholders. Thus, intellectual capital is the main source of value creation in the modern economy.

Kurfi (2017) examined whether intellectual capital influenced the financial performance of banks in Bahrain during the period 2005 to 2007. Public Value Added Intellectual Coefficient (VAIC) was used as the efficiency measure of intellectual capital. Two regression models were constructed to test if the overall VAIC and each of its three components (capital employed efficiency, human capital efficiency and structural capital efficiency) affect banks' performance. The results support the hypothesis that intellectual capital has a positive impact on the financial performance of banks in Bahrain.

Njuguna (2014) investigate the relationship between intellectual capital and the financial performance of deposit money banks in the biotechnological production of Iran. The study population consisted of all the deposit money banks that produce biotech products. A random sampling of 80 deposit money banks was selected based on Cochran's sampling formula. The instrument is a questionnaire and methods of using structural equations are causal. The results indicate that aspects of intellectual capital (human capital, relational capital, structural capital) have an impact on the financial performance of deposit money banks and biotech products.

Ikelegbe (2020) examined the impact of intellectual capital on the financial performance of the listed Nigerian oil marketing deposit money banks for a period of 10 years(2007 – 2016). Intellectual capital was measured by the market-to-book value ratio (MB), Value Added intellectual coefficient (VAIC), and monetary model of Tobin's Q (MMQR) while the financial performance was measured by return on asset (ROA). The ex-post facto research design was adopted while data was extracted from the deposit money banks' financial statements. Multiple regression analysis was used to ascertain the impact of intellectual capital on financial performance. From the result, it was discovered that market-to-book value has a negative significant impact on return on assets. The monetary model of Q Tobin's has an insignificant impact on the return on the asset while Value added intellectual coefficient also has an insignificant impact on the return on the asset. The study, therefore, recommended that the listed Nigerian oil marketing deposit money banks should strive to boost the value of their intellectual assets for its ultimate effect on ROA through maximization of their market value, maximization of Intellectual Capital return and more investment in Intellectual Capital components, human, structural and relational capital.Al-Musali and Ku Ismail (2014) examined the intellectual capital (IC) performance of listed banks in Saudi Arabia using the value-added intellectual coefficient (VAIC) methodology and investigates the impact of IC on financial performance. It identifies the IC components that may be the drivers of the traditional indicators of bank success. The results of a survey of a sample of all listed banks from 2008 to 2010 show that the IC performance of Saudi banks is low and is positively associated with bank financial performance indicators. However, when VAIC is split into its components, the relationships between these components and bank financial performance indicators vary.

Solikhaha et.al. (2015) investigated the influence of the Intellectual Capital of a firm on financial performance. The Value Added Intellectual Coefficient (VAICTM) method is used to measure Intellectual Capital. The sample of 116 manufacturing deposit money banks was selected using the purposive sampling method. Panel data for Indonesian Stock Exchange deposit money banks over the period 2006-2008 are analysed using Partial Least Square (PLS). The findings indicate that three indicators VAICTM, value added of employee (VAHU) have the highest value in creating competitive advantage. High VAHU can give meaning that the greatest contribution to the creation of the company is derived from the value of employees. This condition occurs in Indonesia, Makete (2015) and South Africa (2003). Based on the finding of the outer test using PLS showed that ATO and ROI are significant in constructing the financial performance variable, while CR, DER and ROE are not significant. The results support the hypothesis that Intellectual Capital influences positively financial performance.

Meles (2016) analysed the effect of intellectual capital on Return on Equity (ROE) contained in the mining sector deposit money banks listed on the Indonesia Stock Exchange from 2011 - 2015. The method used in measuring intellectual capital is the Value-Added Intellectual Coefficient (VAIC) model Public consists of three components, namely Value-Added Capital Employed (VACA), Value Added Human Capital (VAHC) and Structural Capital Value Added (SCVA), while the measurement of company's financial performance using Return on Equity (ROE). The data used are annual financial statements, especially balance sheets and income statements from 2011 - 2016. The results indicate that the VACA has a significantly positive effect on ROE, VAHU has a significantly positive effect on ROE, and STVA has a significantly positive effect on ROE. This means that all three variables have a direct relationship. And simultaneous research results of three components of intellectual capital that is VACA, VAHU and STVA have a significant effect on ROE. This result is in tandem with Ahangar (2011).

Mondal and Ghosh (2012) explored the relationship between IC and performance in terms of ROA, ROE and asset turnover ratio for 65 Indian banks from 1999-2008. The findings highlighted significant relation between IC and ROA and ROE and asset turnover ratio. The study also found that human capital has a major effect on banks' performance. These findings are parallel with Kamath, (2007) that indicates that foreign banks show perfect use of HC to create value, whereas public banks rely on CE to achieve good performance.

Avci and Nassa (2017) investigated the relationship between intellectual capital and the financial performance of financial deposit money banks listed in Borsa Istanbul, using data from 44 listed deposit money banks from 2004-2015. VAIC method is used as a measure of IC. An OLS regression is utilized to examine the impact of IC; HCE, SCE, and CEE on market performance, financial performance, and productivity performance. The findings show that HCE has a positive significant relation with ROA. SCE show a positive significant relation to ROE and a negative significant association with market-to-book ratio. Regarding CEE, the results show that it has only a positive significant impact on the market-to-book ratio and a negative significant influence on the asset turnover ratio.

Chokri and Zehri, (2012), examined the relationship between IC and business performance from the standpoint of financial performance, the marketplace and economics. The researchers used a sample of 25 commercial banks listed on the stock market in Tunisia by using a panel's data. The result confirmed that components of intellectual capital have a positive and significant impact on firm performance.

Jones and Nye (2012) investigated the relationship between the IC indices (HSE, SCE and CEE) and the growth in revenue of selected banks using VAIC. The study adopted the ex-post facto research design and was systematically conducted using longitudinal time series data generated and computed from the annual reports and accounts of the selected banks in Nigeria spanning from the year 2000 to 2011. The multiple regression analysis results showed that there was a positive and significant relationship between components of VAIC and the growth in revenue of the banks in Nigeria.

Njuguna (2014) aimed to determine how intellectual capital affects the financial performance of Kenyan state corporations. The study adopted a descriptive research design used primary data which was collected through self-administered questionnaires and employed multiple regression analysis techniques. The findings of the study indicate that the company culture which contains valuable practices for conducting business is the major benefit resulting from organizational intellectual capital. The findings also indicated that an employee being very highly skilled in their jobs is the major way for human capital to improve the firm's performance.

Kurfi (2017) examined the impact of IC on the financial performance of listed Nigerian food products deposit money banks from 2010 to 2014 by adopting the VAIC model. The Regression results show that there was a positive significant influence of IC on financial performance. Specifically, the results showed that structural capital and capital employed to influence the financial performance of Nigerian food products deposit money banks. Based on the resource-based theory, the results prove that deposit money banks can enhance financial performance by emphasizing IC.

Ogbodo, Nestor and Mary-Fidelis (2017) examined the effect of IC on the financial performance of 15 quoted commercial banks in Nigeria using the VAIC model through a panel data analysis for six years from 2010 to 2015. The results revealed that there is a positive and statistically significant relationship between Intellectual Capital and the financial performance of deposit money banks in Nigeria at a 5% level of significance.

Mekete (2015) examined the Effects of intellectual capital on innovations in Ethiopian commercial banks specifically the mediating role of knowledge management via primary data (questionnaire). Empirical findings of the study showed that human, social and customer capital have a positive and direct effect on knowledge management. Knowledge management has a positive effect on the product, process and organisational innovations. Social capital has a positive and direct effect on organizational innovation but doesn't affect product and process innovations. Customer capital has a direct effect on product and process innovations but not on organizational innovation. Human capital has a negative and direct effect on product innovation.

Demissie (2016) assesses the direct and indirect effect of intellectual capital on

innovations considering organisational capital as a mediator in the Ethiopian commercial banking sector through primary data using a 5-item Likert Scaled questionnaire. The results revealed that intellectual capital does not have a significant direct effect on product innovation except organisational capital. Organisational capital mediates the relationship between intellectual capital and innovations. Human, organisational and customer capital have a positive direct effect on process innovation while social capital has a negative direct effect. Human, customer and social capital do not have a significant direct effect on the Ethiopian banking sector's product innovation.

Meressa (2016) examine the determinants of the intellectual capital of Ethiopia banks by considering bank age, bank size, investment in information and technology, bank risk, profitability, the ratio of staff cost to total income and bank concentration as an explanatory variable. With the arrangement of secondary data, short panel, quantitative approach and deductive method of inquiry, the fixed effect linear regression analysis revealed that bank profitability, the ratio of staff cost, investment in information and technology and bank concentration have a statistically significant positive effect on intellectual capital performance. In addition, bank risk and age have significant negative effects on intellectual capital performance, while bank size has an insignificant negative relationship with intellectual capital performance.

Mention & Bontis (2013) analysed the relationship between IC and its components with banks' performance in Luxembourg and Belgium. The findings show that human capital affects banks' performance directly and indirectly, whereas structural capital and relational capital both presented insignificant positive effects on banks' performance.

Fatima and Ousama, (2015), measure the value-added intellectual coefficient (VAICTM) for corporate efficiency performance of the Islamic banking sector in Malaysia and examine the relationship between IC efficiency and financial performance. The secondary data collected from annual reports for the years 2008, 2009 and 2010 revealed that human capital efficiency is higher than the structural capital and capital employed efficiencies. The study found that IC efficiency influences the profitability of Islamic banks and also provided empirical evidence that the optimal utilization of IC and resources leads to higher bank profitability.

In the US, Meles et al, (2016) examined the impact of intellectual capital on financial performance using a large sample of 5,749 commercial banks, covering over 40,000 observations over the time window 2005-2012. The study found that efficiency in the use of Intellectual Capital (IC) positively affects the financial performance of US banks. In addition, the results show that human capital (HC) efficiency, a subcomponent of IC efficiency, is found to have a larger impact on financial performance than other IC subcomponents. These findings suggest that the development of effective techniques of knowledge management, enabling banks to accumulate the IC necessary to adapt to a constantly changing environment, represents an effective tool for achieving the goals of both bank managers and policymakers.

METHODOLOGY

Research Design

The study employed a longitudinal research design. A longitudinal design involves repeated observations of the same variables over long periods, unlike the cross-sectional design which examines variables at a point in time.
The population of the study comprises all listed deposit money banks in the Nigerian Stock Exchange. As of December 31, 2020, there are 16 deposit money banks (NSE, Fact Book, 2021) covering the study period. However, a sample of twelve banks was used because these are those whose financial information was readily available. Secondary data was used for this study extracted from the Stock Exchange Group for the period 2010-2020under review.

METHOD OF DATA ANALYSIS

Panel data regression is chosen because of the multidimensional nature of the data which has both time or periodic dimension and also a cross-sectional dimension since itcan take explicit account of individual-specific heterogeneity; combining data in two dimensions, panel produce less collinearity and more degrees of freedom; better in detecting and measuring the effects which cannot be observed in either cross-section or time-series data and finally can minimise the effects of aggregation bias, from aggregating firms into broad groups. The panel regression has both the fixed effects (FE) and the random effects (RE) estimation options. To determine the preferred estimation technique between the FE and RE, the Hausman specification test was employed as it is used to select between the fixed effect and random effect estimator in panel data analysis (Hausman, 1978; Wooldridge, 2000). The pooled OLS, random effects (RE) and fixed effects (FE) were estimated. To determine which model is better, an F-test for the FE model, the Breusch-Pagan Lagrange Multiplier (LM) test for RE and the Hausman test for both fixed and random models was conducted. Based on the results of these tests, a suitable model for this research was chosen.

Diagnostic Tests

The following regression diagnostic tests will also be conducted in the course of the study.

Normality

The normality test was used to establish the behaviour of the regression variable. It will help us determine if the regression variables follow the standard normal distribution. The Jarque-Bera test statistic is used to test the normality. If the residuals are distributed normally, the statistical histogram will assume a bell-shaped structure. In statistics, the Jarque-Bera test is a goodness-of-fit test where sample data have skewness and kurtosis matching a normal distribution. The test statistic *JB* is defined as

$$JB = \frac{n-k+1}{6}\left(S^2 + \frac{1}{4}(C-3)^2\right)$$

Where: *n* is the number of observations (or degrees of freedom in general); *S* is the sample skewness, *C* is the sample kurtosis, and k is the number of repressors.

Testing for Multicollinearity

Multicollinearity is a situation in which an exact or almost exact linear relationship exists between some or all the explanatory variables,as there are perfectly correlated (Iyoha, 2004). If this relationship exists, the parameter co-efficient will be indeterminate, and there will be large standard errors of the estimated coefficients. Various statistical methods such as using the magnitude of tolerance value and checking the significance of the t-ratio and f-statistic were put forward to test the degree of multicollinearity. However, the study used a covariance matrix to test for it.

Serial Correlation Test

Autocorrelation also called serial correlation refers to a situation where the statistic error term is correlated with itself over time. Thus, autocorrelation is present ifU_t =f(U_{t-1}). Where U_t = stochastic error term at time t. Thus, autocorrelation occurs when there is some degree of stochastic dependence between successive values of the disturbance term. In testing for autocorrelation, the conventional method is to use the Durbin-Watson statistic. This is a test of first-order serial correlation. It uses the statistic d, which is the weighted ratio of the sum of squared differences in successive residuals.
If e_t is the residual associated with the observation at time *t*, then the test statistic is

$$d = \frac{\sum_{t=2}^{T}(e_t - e_{t-1})^2}{\sum_{t=1}^{T} e_t^2},$$

where *T* is the number of observations. e_t is the residual associated with the observation at time *t*. The value of *d* always lies between 0 and 4. If the Durbin–Watson statistic is substantially less than 2, there is evidence of a positive serial correlation. To test for positive autocorrelation at significance *α*, the test statistic *d* is compared to lower and upper critical values ($d_{L,\alpha}$ and $d_{U,\alpha}$): If $d < d_{L,\alpha}$, there is statistical evidence that the error terms are positively autocorrelated.
If $d > d_{U,\alpha}$, there is no statistical evidence that the error terms are positively autocorrelated.
If $d_{L,\alpha} < d < d_{U,\alpha}$, the test is inconclusive.
The Breusch-Godfrey Lagrange Multiplier test of serial correlation was adopted in this study. The LM test is generally used to test the null hypothesis that the errors are serially independent, of the alternative hypothesis.

Cumulative Sum of Squares Test

The CUSUM of squares test as given by Brown, Durbin and Evans (1975) is based on the test statistic:

$$S_t = \sum_{r=k+1}^{t} w_r^2 \Big/ \sum_{r=k+1}^{T} w_r^2$$

The expected value under the hypothesis of parameter constancy is:$E(S_t) = (t-k)/(T-k)$ which goes from zero at t = k to unity at t = T. The significance of the departure of *S* from its expected value is assessed by a reference to a pair of parallel straight lines around the expected value. The CUSUM of squares test provides a plot of S_t against *t* and the pair of 5% critical lines. Any movement outside the critical lines is suggestive of parameter or variance instability. The cumulative sum of squares is generally within the

5% significance lines, suggesting that the residual variance is somewhat stable.

Panel Estimation Model

The fundamental advantage of a panel data set over a cross-section is that it will allowthe researcher great flexibility in modelling differences in behaviour across individuals.The basic framework for this discussion is a regression model of the form

$$y_{it} = \mathbf{x}_{it}'\boldsymbol{\beta} + \mathbf{z}_i'\boldsymbol{\alpha} + \varepsilon_{it}$$
$$= \mathbf{x}_{it}'\boldsymbol{\beta} + c_i + \varepsilon_{it}.$$

There are *K* regressors in x_{it}, *not including a constant term.* The heterogeneity orindividual effect is $z_i\alpha$ where $z_i$contains a constant term and a set of individual or group-specificvariables, which may be observed, If z_i is unobserved but correlated with x_{it}, then the least squares estimator of β is biased and inconsistent as a consequence of an omitted variable. However, in this instance, the model

$$y_{it} = \mathbf{x}_{it}'\boldsymbol{\beta} + \alpha_i + \varepsilon_{it},$$

Where $\alpha_i = z_i\alpha$, embodies all the observable effects and specifies an estimable conditionalmean. This fixed effect approach takes $\alpha_i$to be a group-specific constant termin the regression model. It should be noted that the term “fixed” as used here signifiesthe correlation of $c_i$and $x_{it,}$ not that $c_i$is non-stochastic.

If the unobserved individual heterogeneity, however, formulated, can be assumed to be uncorrelated with the included variables, then the model may be formulated as:

$$y_{it} = \mathbf{x}_{it}'\boldsymbol{\beta} + E[\mathbf{z}_i'\boldsymbol{\alpha}] + \{\mathbf{z}_i'\boldsymbol{\alpha} - E[\mathbf{z}_i'\boldsymbol{\alpha}]\} + \varepsilon_{it}$$
$$= \mathbf{x}_{it}'\boldsymbol{\beta} + \alpha + u_i + \varepsilon_{it},$$

that is, as a linear regression model with a compound disturbance that may be consistent, albeit inefficiently, estimated by least squares. This random effect approach specifies that u_i is a group-specific random element, similar to ε_{it}except that for eachgroup, there is but a single draw that enters the regression identically in each period.Hence the functional model below:

CFP=ƒ (IC) ---------- *(i)*
where: CFP= Corporate financial performance
IC= Intellectual capital
Decomposing the variables into their measures and specifying the econometric form and including control variables of firm size we have;

$ROE_{it} = \lambda_0 + \lambda_1 SCAP_{it} + \lambda_2 VACE_{it} + \lambda_3 VAHC_{it} + \lambda_4 FSIZE_{it} + u_{it}$ ----------(ii)

Where;
ROE= Return on equity measured as the ratio of Profit after tax to total equity
SCAP= Structural capital measured as the difference between profit after tax and equity.
VACE= Value added capital employed measured as the ratio of profit after tax to capital employed or equity
VAHC= Value added human capital measured as the ratio of profit after tax to human

capital expenditures
FSIZE= Firm size measured as the log of total assets

ANALYSIS AND DISCUSSION OF RESULTS

The panel regression analysis procedure is employed and the results are presented below;

Table 4.1 Regression Result

Variable	Aprori sign	FE-estimates Coefficient ( ) standard error { } p-values	RE-estimates Coefficient ( ) standard error { } p-values
C		0.0469* (0.0227) {0.0395}	0.0395 (0.033) {0.2358}
SCAP	+	0.0617* (0.0142) {0.000}	0.0183 (0.0620) {0.7670}
VACE	+	0.0298* (0.0146) {0.0408}	0.0082 (0.0352) {0.8156}
VAHC	+	0.0415* (0.0112) {0.000}	0.1338** (0.0764) {0.0803}
FSIZE	+	-0.0751* (0.0079) {0.000}	-0.1013* (0.0162) {0.0000}
Model Parameters			
R^2		0.641	0.085
Adjusted R^2		0.533	0.076
F-statistic		28.982	11.032
Prob(F-stat)		0.000	0.000
Durbin-Watson		1.93	1.46
		Model Diagnostics	
X^2_{Hetero} $X^2_{Serial/Corr}$ X^2_{Norm} $X^2_{Hausman}$		(0.284) (0.381) (0.670) (0.00)	

Source: Research compilation (2021) * sig @5%, ** sig @ 10%

Table 4.1 examines the estimation results for the impact of Intellectual capital on the financial performance of Deposit Money Banks in Nigeria. Specifically, the result examines the effect of Value Added Human Capital, Structural Capital and Value Added capital employed on the Return on Asset of Deposit Money Banks in Nigeria.The Hausman test statistic with p-value = 0.000, indicates that the fixed effects are the preferred model to the random effects indicating the presence of correlations between the errors and the explanatory variables which is the key assumption of the fixed effects (Hausman, 1998). The R^2 for the model stood at 0.641 which implies that the model explains 64.1% of systematic variations in the dependent variable with an adjusted value of 53.3%. The F-stat of 28.982 (p-value = 0.00) is significant at 5% and suggests that the hypothesis of a significant linear relationship between the dependent and independent variables cannot be rejected. It is also indicative of the joint statistical significance of the model. The analysis of coefficients reveals that structural capital (SCAP) estimated in its log form, has the expected positive effect (0.0617) effect on financial performance and is statistically significant at 5% (p=0.000). The result confirms that an increase in structural capital can improve financial performance significantly. The effect of value-added capital employed (VACE) is also positive (0.0298) and is statistically significant at 5% (p=0.0408). The result indicates that an increase in the valued added capital employed will significantly increase the firm financial performance. Value-added human capital (VAHC) has a positive effect (0.0415) on firm financial performance and is also statistically significant (p=0.000) at 5%. Looking at the control variable, FSIZE is significant at 5%.Examining closely the performance of the diagnostic tests, the results confirm the normality of the residuals ($\chi^2_{Norm} = 0.670$), the absence of stochastic dependence ($\chi^2_{Serial/Corr} = 0.381$) and heteroscedastic errors ($\chi^2_{Hetero} = 0.284$)

TEST OF HYPOTHESES

H_{01}: *Value Added Human Capital has no significant effect on the Return on Assets of Deposit Money Banks in Nigeria.*

From table 4.1 the analysis of coefficients reveals that value-added human capital (VAHC) has a positive effect (0.0415) on firm financial performance and is also statistically significant (p=0.000) at 5%. Hence the null hypothesis that Value Added Human Capital has no significant effect on the Return on Assets of Deposit Money Banks in Nigeria is rejected.

H_{02}: *Structural Capital Value Added has no significant effect on the Return on Assets of Deposit Money Banks in Nigeria.*

From table 4.4., the analysis of coefficients reveals that structural capital (SCAP) estimated in its log form, has the expected positive effect (0.0617) effect on financial performance and is statistically significant at 5% (p=0.000). The result thus confirms that an increase in structural capital can improve financial performance significantly. Therefore, the null hypothesis that Structural Capital Value Added has no significant effect on the Return on Assets of Deposit Money Banks in Nigeria is rejected.

H_{03}: *Value Added Capital Employed has no significant effect on the Return on Asset of Deposit Money Banks in Nigeria*.

The effect of value-added capital employed (VACE) is also positive (0.0298) and is statistically significant at 5% (p=0.0408). The result indicates that an increase in the valued added capital employed will significantly increase the firm financial performance. Therefore, the null hypothesis that Value Added Capital Employed has no significant effect on the Return on Asset of Deposit Money Banks in Nigeria is rejected.

DISCUSSION OF RESULTS

Based on the regression analysis showing the impact of intellectual capital variables on the performance of deposit money banks in Nigeria, the results show there is a positive relationship between intellectual capital measures (VACE, VAHC and SCAP) and firm performance. The findings of the study corroborate those of Bontis et al., (2001) who studied the effects of accounting IC components (HC, SC and relational capital) on the performance of Malaysian service and non service companies. They revealed that HC and relational capital have a positive impact on the service sector. A study conducted in Malaysia by Muhammad & Ismail (2014) examined the effect of IC efficiency on the performance of financial sectors. The results pointed out that the banking sector is depending on intellectual capital more than the brokerage and insurance sectors. Moreover, the findings showed a significant positive relation between IC and ROA. Goh (2005) documented similar results, where Malaysian banks have good financial performance, and thus have low intellectual financial coefficients. Our findings are also supported by those of Mondal & Ghosh (2012) who explored the relationship between IC and performance in terms of ROA, ROE and ATO for 65 Indian banks from 1999-2008. The findings highlighted a significant relationship between IC and firm profitability (ROA and ROE) and productivity performance (ATO). They also added that human capital has a major effect on banks' performance. These findings are parallel with Kamath, (2007) that indicates that foreign banks show perfect use of HC to create value, whereas public banks rely on CE to achieve good performance.

Thus, our study is also in tandem with Joshi et al,(2010) and which explored the relationship between IC (HC, SC, and CE) and banks' performance over the period 2005-2007 using the VAICTM model and Campisi and Costa (2008) who showed that human capital is an important part of IC that helps banks understand how employees can create value.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Intellectual Capital (IC) is defined as the knowledge-based equity of organisations and has attracted during the last decade, a significant amount of practical interest. There is now widespread acceptance of Intellectual Capital (IC) as a source of competitive advantage. Intellectual capital plays a significant role in value creation in today's economies and organisations, where organisations in knowledge-based economies have been depending on knowledge assets rather than tangible assets to enhance their competitive advantages. Intellectual capital (IC) can be defined as knowledge that can be converted into profit by exploiting the non-financial and nonphysical resources of the company. It should be noted the absence of intellectual

capital information in the financial statement is of great concern to scholars and researchers regarding the reliability and adequacy of traditional accounting methods used by firms in the presentation of accounting information in this current age. Intellectual capital is one of the human capital assets that boost banks' efficiency and financial performance hence an inefficient intellectual capital would decrease banks' financial performance. Our findings reveal that (i). Value Added Human Capital has a significant effect on the Return on Assets of Deposit Money Banks in Nigeria. (ii). Value Added Human Capital has a significant effect on the Return on Assets of Deposit Money Banks in Nigeria is rejected and (iii). Structural Capital Value Added has a significant effect on the Return on Assets of Deposit Money Banks in Nigeria.

RECOMMENDATIONS

Given the study findings, the key recommendation of the study is the need for companies to pay more attention to human and intellectual capital. A situation where human and intellectual capital is not been recognized in the financial statement is a huge anomaly given the critical role it plays in corporate performance. Intellectual capital plays a significant role in value creation in today's economies and organisations, where organisations in knowledge-based economies have been depending on knowledge assets rather than tangible assets to enhance their competitive advantages.

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