Effect of Intellectual Capital Costs on Financial Performance of Listed Commercial Banks in Nigeria.

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Abstract
The study investigated effect of Intellectual Capital Costs on Financial Performance of listed Commercial Banks in Nigeria during the period 2007 to 2016. The choice of the period was predicated on establishing the relationship of the variables during the Sub-Sector's post consolidation era in Nigeria. It employed ex post facto research design and extracted data from cross section of three banks from ten (10) years annual report. The data were purposively selected based on availability of data. The study adapted the Value Added Intellectual Capital Coefficient Model as proxy for Intellectual Capital Costs while Return on Equity was adopted as proxy for Financial Performance. Engaging the Ordinary Least Squares based balanced Panel data regression technique in a longitudinal data framework of thirty (30) observations, the results established how Intellectual Capital Costs affect Return on Equity of the selected Banks in line with a priori expectation. It provided evidence that 52.8% of the total variation on Return on Equity of listed Banks on Nigeria Stock Exchange is attributable to variations in Intellectual Capital Costs proxies included in the model. The study proved that individually, Human Capital Efficiency has positive significant relationship with Return on Equity while Structural Capital Efficiency and Capital Employed Efficiency individually, has positive but insignificant relationship with Return on Equity. The study therefore substantiated that Intellectual Capital Costs significantly affect Return on Equity and therefore concludes that Intellectual Capital Costs has significant effect on Financial Performance of listed Commercial Banks in Nigeria. It recommends that regulatory authorities should set benchmark of training standards for staff of banks so as to enhance skills not just in banking operations and earnings generation but also in effective and efficient relationship management.

Key Words: *Intellectual Capital Costs, Return on Equity, Balanced Panel Data Regression, Listed Commercial Banks, Nigeria.*

1. Introduction

It is incontrovertible that information is pivotal to corporate development and what enhances business success is the capability of firms to be innovative, adaptive to changes in technology and, improvements in employee skills and knowledge to meet challenges in the dynamic business environment. What therefore distinguishes flourishing companies from those that flounder is the intellectual capital. Sullivan (1999) described intellectual capital as the conversion of knowledge to profit by utilizing the non-financial and non-physical resources of a firm.

Organization for Economic Cooperation and Development (2008) defines intellectual capital as the economic value of an organization's capital. It noted that businesses improve employee

skills through training, research and development and also invest in customer-supplier relations, technology and information system for value creation.
Kristand and Bontis (2007) posited that intellectual capital is a portfolio of strategic firm's resources that enable it to create sustainable value.
In knowledge-based economy, modern and high tech enterprises not only focus on innovation of new products, services, and marketing, research and development activities but also devote particular attention to the development and management of organization intellectual capital (Mohtar, Rahman & Abbas, 2015).
In today's fast moving economy with rapid growth in knowledge and technological innovation, the goals of organization has changed in order to cope with the changing environment. With notable changes in the global economy, intellectual capital has become the hub for organizations to sustain the competitive operating business environment and to create more values (Bontis, 2001).

Intellectual capital has been widely acknowledged as that innate attribute usually acquired by a firm which drives it on the wheel of value creation, value addition and value sustainability. Onyekwelue, Okoh and Iyidiobi (2017) opined that value created by intangibles are not always reflected in financial statements and forward looking companies have realized that these are an integral part of fully understanding the performance of their business.
Foray (2004) noted that in the knowledge based economy, the contribution of intangible asset is greater than tangible assets; adding that in knowledge based economy, intellectual capital is the most critical asset of the organization that enhances value and performance.
Intellectual capital is the group of knowledge assets that are attributed to an organization and most significantly contribute and improved the competitive edge of the organization by adding value to defined key stakeholders (Marr & Schiuma, 2001).
Consequently, the framework of intellectual capital for value addition, generation of profits and wealth maximization has cost implications. It is on this backdrop that the study investigates whether intellectual capital cost has effect on financial performance specifically, return on equity of listed commercial banks in Nigeria. The study therefore hypothesized that intellectual capital costs have no significant effect on return on equity of listed commercial banks in Nigeria.

2.0 Review of Related Literature

2.1 Conceptual Framework

2.1.1 Intellectual capital as knowledge assets

The changing trends from traditional economy (land, labor and finance) to knowledge intensive economy during the last two centuries have made service based industries take the major share in the value creation process especially in developed societies. Intellectual Capital(IC) has been widely acknowledged as that innate attribute usually acquired by a firm which drives it on the wheel of value creation, value addition and value sustainability. To this end, many definitions have been propounded by different scholars and researchers. The concept generally emanated from describing the 'dynamic effects of individuals: the 'Intellect' (Sveiby, 1998).
This dynamic nature of IC means that its individual components are often not valuable by themselves but work only as a system. In other words, it is the intellectual capital elements interacting that generates value for companies (Onyekwelu,& okoh, 2017) . For example, a company may have good programming skills that enable it to build software. However, they might be worth little unless accompanied by a strong distribution network, loyalty and commitment from its employees and a powerful brand name. This dynamic combination of intangibles is often the recipe for success in companies such as Microsoft, where the value of its intellectual capital is more than the sum of its individual parts. Intellectual capital and

Knowledge Management (KM) should not be confused. It is essential for all companies to maintain and grow their IC stocks –rather than simply measure them – and knowledge management is one way of helping them to do this. But the two are quite distinct: KM is a process within a company, whereas IC covers its whole operations (Khalique, 2011).

2.1.2 Components of intellectual capital

In recent years many authors, researchers, journalists and business people (i.e. Edvinsson & Malone, 1997; Rastogi, 2000; Stewart, 2001; Sveiby, 1997) have formed a general definition of intellectual capital. All these people had one thing in common: which is, how to increase the competitiveness and performance of organizations. Intellectual capital is mainly based on human capital, relational (customer) capital, and structural capital.

2.1.2.1 Human capital

The resources of a business otherwise called the 4-ms including men. Men in this context refer to human asset employed in the production of goods and services. The success or failure of every enterprise is based on the effective utilization of the entity's resources (Obara & Gabriel, 2013). Micah, Ofurum and Ihendinihu (2013) noted that Human Resources (HR) are the energies, skills, talents and knowledge of people which are or which potentially can be applied to the production of goods or rendering useful service.

Human capital can be described as the competencies and capabilities of employees (Bontis, 1998; Edvinsson & Malone, 1997; Sveiby, 2000).

By looking at human capital's description above, one could agree that in a learning organization, human capital increases and that an organisation therefore "owns" this asset. This, however, is not necessarily the case, as pointed out by Edvinsson & Malone (1997), who notes that in a free society an organisation cannot own, but only rents its human capital. Sveiby (2000) reiterates Edvinsson et.al (1997) statement by arguing that all tangible and intangible assets in an organisation depend on people for their continued existence. This dependency on people highlights the fact that human capital cannot be owned by an organisation but is actually "owned" by the minds of people that entertain their thoughts. It is therefore extremely important for organisations to retain their human capital to prevent them from being uncompetitive in the knowledge economy. This is also referred to as preventing the "brain drain", which is one of the major challenges facing Africa in the knowledge economy.

In the words of Rahin, Atan and Kamaluddin (2017), Human capital is the most important asset that exists within a firm. It represents the human factor in an organization where by combination of intelligence, skills, knowledge, aptitudes and expertise that gives the organization its distinctive character which those traits contributing to production and profitability, thus improve organizational performance. Additionally, Yusuf (2013) argued that the ability of a corporate organization to successfully implement business strategies solely depends on efficient use of intangible assets, particularly human capital.

2.1.2.2 Structural capital

Structural capital is the business infrastructure. It comprises the systems and tools that augment the customer and human capital on which a company is built. It has two purposes. First, it takes what exists inside your brain and turns it into a transformable form. These are your best practices that can be purchased and repurposed. The second purpose is to capture the knowledge assets in the company, converting that mental process into company property and make it transferable. It is What enables your team to do the things that make them so special, allows them to meet and exceed customers' expectations and enables them to build and sustain lasting and recurring relationships.

Bontis *et al*. (2000); Wu and Tsai (2005) stated that Structure capital (SC) of organization represent all the non-human storehouses of knowledge including database, organizational chart, strategies routines, process manuals and policies. Therefore, structural capital is "what remains in the company when employees go home for the night" (Roos et al., 1998).

Edvinson *et al.* (1997) Structural capital is everything that is left, after the employees have left. For this reason Edvinson (1997) defines structural capital as the result of all intellectual activities that were captured in data and knowledge bases, documents, models and drawings. Knowledge is thus rooted in things such as data and knowledge bases, documents, models and drawings. All this embedded knowledge makes structural capital identifiable in an organization and provides the means to measure and build intellectual capital in an organization. It is argued by Bontis (1998) that an organization with strong structural capital will create an environment where individuals can try new things, make mistakes, learn from these mistakes and try again and be innovative. Innovation will therefore ensure that the organization stays competitive in the knowledge economy. It is, however, extremely important that these efforts be captured in order to prevent making the same mistakes over and over again. In order to ensure that employees have easy and fast access to captured knowledge in the knowledge economy, structural capital systems must make provision for access to information on three levels, as noted by (Lank ,1997). These information levels include: Referencing, Expertise and Networking.

2.1.2.3 Relational / customer capital

Customer capital (CC), otherwise referred to as Relational capital is one of the most important components of intellectual capital. It is pointed out based on knowledge embedded in the marketing channels and customer relations with organizations that develops in conducting business (Bontis, Chua & Richardson, 2000). However, customer capital is mainly based on the relationship between the organization and its customers (Edvinsson & Malone, 1997) as cited in (Shahimi, Intan, Mazhar &Virkus, 2015, Shaari *et al*., 2010 and Tai-Ning *et al*., 2011). Even though, relationship with customers is very important for organization because customers buy products or services from the enterprises; customers are the main source for revenue generation of organization and it is very important for organizations to satisfy their customer needs (Shahimi et. al, 2015). Therefore, customer capital is an important component of intellectual capital and it is based on customer satisfaction, loyalty and engagement.

Virkus (2014) illustrated that if an organisation wishes to thrive and survive in the knowledge economy, i.e. become more strategic innovative, its structure, systems, people and culture need to be realigned. This will allow the organisation to be competitive at the following levels: price, quality, flexibility and product innovation. It was illustrated that an organisation needs to adopt a structure of networking, i.e. relationship building, and its culture needs to be highly customer focused. Duffy (2000) in Virkus (2014) supports this view by arguing that organisations today are challenged to get to know their customers intimately. Organizations do not just need to know about their customers but they need to assess what contribution the relationships with their customers are making towards the achievement of the overall goals.

From Bontis (1998) perspective, the main resource of customer capital is the knowledge of marketing channels and customer relationships. He further states that managers often forget that they can tap into a wealth of knowledge from their own customers; noting that customer capital gets more valuable over time and that it is more expensive to retain a customer than to get a new one. This is because the customer is much closer to the organization today than in the past. A very important point that Bontis (1998) makes, especially for the purpose of this study, is that the knowledge workers who look after these customers need special attention.

2.1.3 The Relationship between intellectual capital components

As stated above, the components of intellectual capital collective create value for an organization, thus making an organization more knowledge productive. There is therefore a strong relationship between these components. Trek Consulting (2005) adopted from the work of Virkus (2014), summarizes these relationships as seen below:

- *"People to create innovation. People are the source of the thinking that creates breakthrough ideas as well as the incremental improvements that lead to continuous improvement",* i.e. human capital.
- *"Mechanisms to record and share these ideas in the form of instructions, formulas and processes. Sharing ideas enables their value to be replicated throughout an organization—raising the level of everyone's performance. It also increases the potential for future improvement as more minds are focusing on the same issues",* i.e. structural capital.
- *"Customers to inspire. Value is only created if there is a willing customer for your ideas. But the relationship with customers in a knowledge company is often more interactive. Instead of being the source of current value, customer needs can be an inspiration for future innovation",* i.e. relationship capital.
- *"Partners to complement and expand your capabilities. Partners can be suppliers, distributors or service providers. As companies develop a greater understanding of their strongest competencies, many make a choice to outsource non-core functions to other organizations",* i.e. relationship capital.

2.1.4 Intellectual capital (IC) and financial performance

There are so many methods available to measure the success of physical capital and assess its impact on financial performance. For measuring the effectiveness or efficiency of the use of the physical capital the well-known conventional tools like profit, return on investments (ROI), return on equity (ROE), and return on assets (ROA) can be used. Tan *et al.* (2007) reported a positive association between intellectual capital of firms and their financial performances. The study of Riahi-Belkaoui (2003) found a positive relationship between Intellectual Capital (IC) and financial performance, while Bontis *et al.* (2000) concluded that, regardless of industry, the development of structural capital has a positive impact on business performance. On the other hand, Firer and Williams (2003) examined the relationship between IC and traditional measures of firm performance (ROA, ROE) and failed to find any relationship, while Chen *et al* (2005), using the same methodology, concluded that IC has an significant impact on profitability.

2.1.5 Return on Equity (ROE)

Return on equity ratio measures firm's profitability by revealing how much profit a company generates with the money shareholders have invested. ROE = earnings after tax scaled/company's capital employed during the year X 100/1.

2.0 Theoretical Framework

2.1 Value Added Intellectual Coefficient (VAIC^{TM}) model

Value Added Intellectual Coefficient (VAIC): it is referred to as the value added of intellectual capital as a result of the combination and or summation of the two sub-indicators of intellectual capital which is capital employed efficiency and Intellectual Capital Efficiency which is sub divided in (human capital efficiency and structural capital efficiency) used as a measure for the valuation of intellectual capital.

Value added: is the extra amount on the cost for intellectual capital. It is the enhancement/ increase the bank gives to its products or services before offering the product to customers.

The two sub-components of VAIC form the independent variables in this study. Equation (1) formalizes the VAIC relationship algebraically:

VAIC = CEE + HCE + SCE---------- [Equation (1)]

Where:

VAIC = VA intellectual coefficient of the banks,

CEE = capital employed efficiency coefficient of the banks,

HCE = human capital efficiency coefficient of the bank and

SCE = structural capital efficiency of the banks.

VA = Value Added by each year for the banks.

Pulic (1998) states 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 algebraic equation:

VA = I + DP + D + T + M + R + WS ---------- [Equation (2)]

Where: VA(value added) for the banks are computed as the sum of interest expenses (I); depreciation expenses (DP); dividends (D); corporate taxes (T); equity of minority shareholders in net income of subsidiaries (M); and profits retained for the year (R) wages and salaries. Pulic (1998) 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 assets.

2.1.1 Capital employed efficiency (CEE)

Capital employed efficiency is a measure of the value added of Relational capital which is the third component of intellectual capital. It measure the value added as a result of the inter relationship between the organizations employees and its customers.

The equation below presents the CEE relationship algebraically:

CEE=VA/CE

Where: CEE = capital employed efficiency coefficient of the banks,

VA = VA of the banks; and

CE = book value of the net assets of the banks. (ie total assets less intangible assets less current liability). The other sub component ICE is sub divided in to Human capital Efficiency and Structural capital efficiency.

2.1.2 Human capital efficiency (HCE):

It is the major component/indicator of intellectual capital. It measures the value added by the human resource of an organization.

Consistent with views of other leading Intellectual Capital researchers (for example, Edvinsson, 1997; Sveiby, 2001), Pulic (1998) argues total salary and wage costs are an indicator of a firm's human capital (HC).

HCE, therefore, is calculated as the ratio of total VA divided by the total salary and wages spent by the firm on its employees. HCE relationship is expressed algebraically as follows:

HCE = VA/HC

Where: HCE = human capital efficiency coefficient of the banks,

VA = VA of the banks. And

HC = total salary and wage costs of the banks employees.

2.1.3 Structural capital efficiency (SCE)

This is the measure of value added of the component of intellectual capital that is left in the organization after employees return home at night (structural capital).

In order to calculate SCE, it is first necessary to determine the value of a firm's structural capital (SC). Pulic (1998) proposes a firm's total VA less its human capital is an appropriate proxy of a firm's SC. That is:
SC = VA – HC
Where: SC = Structural capital of the banks,
VA = VA of the banks and
HC = total salary and wage expenditure of the banks.
SCE = SC/ VA
Where: SCE = structural capital efficiency coefficient VA of the banks,
SC = Structural capital of the banks; and
VA = VA of the banks.
Recently, VAIC method gain popularity among researchers to measure intellectual ability of companies. Schneider (1999) as cited in Ekwe (2013, 2014) supports the adoption of this technique as an effective method of measuring intellectual capital efficiency because:
(a) VAIC places an emphasis on the value of employees, a key component of intellectual capital;
(b) VAIC enabled the collection of evidence of intellectual capital leverage to key success processes;
(c) VAIC was easy to calculate using information already accounted for by a firm and reported in annual reports thus minimizing any additional costs to the preparer and stakeholder;
(d) The methodology used in the calculation of VAIC is relative straight forward that enable greater understanding.

2.3 Empirical Review

The empirical literature reveals that intellectual capital (IC) encourages business performance of organizations. Ofurum and Aliyu (2018) revealed a mixed result on some of the components of IC were not significantly related to growth in revenue and return on investment. It further depicted that Human Capital Efficiency Index significantly related to return on investment. This study concluded that intellectual capital has not fully related to the financial performance of quoted commercial banks in Nigeria. It is recommended that International Accounting Standards Board (IASBs) should incorporate intellectual capital elements in standards as capital investments instead of being merely expensed in income statement. The study also endorsed the implementation of the International Integrated Reporting Council (IIRC) for full disclosure of intellectual capital in financial statements so as to avoid misleading information and to enhance the quality of financial performance.

Allam (2018) undertook a study to determine intellectual capital and firm performance, differentiating between accounting based and market based performance. The study was conducted on 198 firms for two gulf cooperation council countries; Kingdom of Saudi Arabia and Kingdom of Bahrain for the period 2014 -2016. The VAIC model was adopted along with two performance measures: accounting based is return on asset and market based performance which is Tobin's Q. Random effect regression test was conducted and the findings revealed that there is a positive relationship between IC and accounting based performance but a negative association was found for IC and the market based performance.
Onyekwelu, Okoh and Iyidiobi (2017) carried out a study on Effect of intellectual capital on financial performance of banks in Nigeria. The study adopted an ex-pose facto research design and made use of the value Added Intellectual Coefficient (VAIC^{TM}) to ascertain the extent that intellectual capital indices affect financial performance of three Nigerian banks. Data were collected from the published annual reports and account of the selected banks and analyses using regression tools. The result of the study showed that Human capital has a positive and

significant effect on banks financial performance but CEE and SCE are not significant and further indicated that the banks with high IC also showed high financial performance. They recommended that banks in Nigeria should invest vigorously in development of their human capital which is the key driver of firm's performance.

Ogbodo, Amahalu and Abiahu (2017) investigated the impact of intellectual capital on financial performance of quoted deposit money banks in Nigeria from 2010-2015 to compare the performance of intellectual capital indices among firms in the banking sector. The employ the VAIC^{TM} model to measure the efficiency of value added of tangible and intangible assets used by the firm in its operations; data obtained were subjected to statistical analysis using Pearson coefficient of correlation, ordinary least square regression, hetroscedasticity test and Hausman test. Their findings revealed that the three components of intellectual capital are all significant at 5% level of significant. They recommend the recognition of intellectual capital as an important business resource.

Ali (2015) carried out a study to determine the effect of intellectual capital components on the financial performance of deposit money banks in Nigeria. The study adopted a descriptive statistic technique and employed the VAIC model. Secondary data was employed using a purposive sampling technique to select a sample of eight banks from the total population of banks listed on the NSE for a period of eight year spinning from 2006-2013. Correlation analysis and Multi-linear regression techniques were used for data analysis. The result revealed that intellectual capital component have positive and significant effect on the financial performance of deposit money banks in Nigeria.

Ekwe (2014) carried out a comparative assessment on the relationship between intellectual capital and financial performance indices of deposit money banks in Nigeria. The study adopted ex-post facto research design. It was systematically conducted using longitudinal time series data generated from the Nigeria Stock and from annual reports and accounts of the sampled banks spanning from 2000-2012. The Duncan Multiple Range Test (DMRT) of ANOVA was adopted to test for hypotheses. Result of the findings revealed that there were significant deviations in both the financial performance indicators and in the intellectual capital variables among the six banks studied. He further stated that banks with high intellectual capital records high financial performance and recommends that banks should embrace this new intellectual based technology in order to enhance their financial performances and returns to their different stakeholders as well as in their service delivery to their customers.

In the new knowledge economy, where intellectual capital plays a key role in the value-creating processes (Guthrie et al, 2012; OCDE, 2008; Zeghal & Maaloul, 2011), some studies focus on the voluntary information regarding this hiden capital. Singh and Van der Zahn (2007) examine empirically the association between underpricing and intellectual capital disclosures using a sample 334 Singapore IPO prospectuses between 1997 and 2004. Contrary to theoretical predictions, they find a positive association between underpricing and the extent of intellectual capital disclosure.
In other study, Bontis (2013) performed a study using data from 200 banks from Belgium and Luxembourg the empirical results found that human capital was both a direct and an indirect contributor to business performance. Structural and relational capitals were found to be positively related to business performance; however results suggested statistically insignificant relationship. Consistent results were found by Mohiuddin, Najibullah & Shahid, (2006) in the study of 17 sampled commercial banks operating in Bangladesh for the period from 2002 to 2004. Similarily, Mavridis (2004) found that Japanese banks with the greatest performance

were those who were most efficient in the use of their Human capital, whereas efficiency in physical assets utilization was less important.

3.0 Methodology

3.1 Research Design

Plili and Dibua (2009) define ex-pose facto research as a research that is undertaken after the events have taken place. The research design adopted in the study is *ex-post-facto* research design. The choice of using the design is informed by the fact that the data is already in existence and the researcher starts with the observation of a dependent variable and then studying the independent variable in retrospect for the possible relationships and effect on the dependent variable (Fraid, 1973). The design of this study is geared towards the attainment of the broad objectives of the study which hopes to determine the effect on intellectual capital cost on financial performance of listed commercial banks in Nigeria.

3.2 Method of Data Collection

The researchers extracted relevant data from annual reports of a cross section of 3 commercial banks from 2007 to 2016. The choice of the cut-off period is based on determining the relationship of the variables during the post consolidation era in the banking sector. The sector was selected in view of the stiff competition that requires the high utilization of intellectual capital to create value and enhance performance.

3.3 Method of Data Estimation

The longitudinal nature of the data extracted made the study to adopt balanced panel data regression. The study therefore conducted the fixed effect, random effect and the diagnostic Hausman test. Hausman test helps in selection of the regression between fixed and random effect depending on the Chi square probability value. The fixed effect is favored if the Hausman test result is significant at 5% level of significance.

3.4 Model Specification

The study adapted Pulic (1998) Value Added Intellectual Coefficient (VAIC) model as proxy for intellectual capital cost. We therefore specify our model as follows:

ROE=*f* (HCE, SCE, CEE)… (1)

Where:

ROE=Return on Equity

HCE= Human Capital Efficiency of Intellectual Capital

SCE= Structural Capital Efficiency of Intellectual Capital

CEE= Capital Employed Efficiency of Intellectual Capital

The above model is presented in econometric form as:

$ROE_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + e_{it}$… (2)

Where:

β_0= constant or Intercept term

β_1- β_3= Slope coefficients

e = Stochastic disturbance term

t=Time period of data

i=Cross section of banks

4.0 Results and Discussion

4.1 Effect of Intellectual Capital Costs on Return on Equity

The study conducted the fixed and random effect regression and also the Hausman test. The Hausman test result indicates Chi square coefficient of 4.876 with probability value of 0.1811

which is not significant. This confirms that the random effect regression is favored. The random effect result as shown on table 2 of the appendix has intercept coefficient of -0.128. This means that it is the average change in return on equity when intellectual capital cost proxies included in the model are data sets equal to zero. The t statistic coefficient is however not significant.
Human capital efficiency has positive slope coefficient of 0.0314. This is the change in return on equity per unit change in human capital efficiency holding the values of structural capital efficiency and capital employed efficient in the model constant. It has t statistic coefficient of 3.4576 with probability value of 0.0019 or 0.19%. This implies that human capital efficiency has positive significant relationship with return on equity of the listed commercial banks studied.

Structural capital efficiency has coefficient of 0.934 which suggests that it is the change in return on equity per unit change in structural capital efficiency holding the values of human capital efficiency and capital employed efficiency in the model constant. The probability of the t statistic coefficient indicates that there is insignificant positive relationship between structural capital efficiency and return on equity.
The result further revealed that capital employed efficiency has positive insignificant relationship with return on equity based on the t statistic probability. The slope coefficient of 0.0865 is the change in return on equity per unit change in structural capital efficiency holding the values of human capital efficiency and structural capital efficiency in the model constant.
Though only human capital efficiency was found to significantly affect return on equity on a positive note, the model used is well specified and had best of fit with an adjusted R squared of 52.8%. It implies that 52.8% of the total variation in return on equity is attributable to changes in intellectual capital costs of the banks studied.
The Durbin Watson d statistic of 0.657 is low compared with the lower and upper bounds of 1.214 and 1.650 of the d statistic table where k = 3 and n = 30 at 5% level of significance. The value is an indication of positive first order serial correlation in the variables. However, this could be as a result of the diversities in the selected listed commercial banks.

4.2 Test of Hypothesis

Ho: Intellectual capital costs have no significant effect on return on equity of listed commercial banks in Nigeria.
To test the hypothesis that:
Ho: $\beta_1 = \beta_2 = \beta_3 = 0$ (All slope coefficients are simultaneously equal to zero)
H_1: $\beta_1 = \beta_2 = \beta_3 = 0$ (All slope coefficients are simultaneously not equal to zero)
The F statistic probability was adopted to test the overall significance of the model. The random effect regression has F statistic coefficient of 11.82 with probability value of 0.00% which is sufficiently low at 5% level of significance. We therefore not accept the null hypothesis and conclude that Intellectual capital costs have significant effect on return on equity of listed commercial banks in Nigeria. The result is in agreement with the works of Onyekwelu *et al*. (2017), Ogbodo *et..al* (2017) and Ali (2015). However, it is contrary to the work of Firer and Williams (2003).

4.3 Discussion of Findings

The findings revealed that intellectual capital costs significantly affect return on equity of the banks studied. It indicated that 52.8% of total variation in return on assets is attributable to variations in intellectual capital proxies included in the model. This means that the model is well specified.
It is instructive to state that intellectual capital is the hub and key critical success factor as reflected on the negative constant coefficient of -0.218. The coefficient explains that without

intellectual capital, there would be a negative return on equity of the banks. It implies that banks should effectively exploit its total resources to create value, generate profits and ensure sustainable growth for the benefit of stakeholders.
The results established that only human capital efficiency has positive significant effect on return on equity. This suggests that, from the banks total resources it is only the employees that had added value significantly to boost return on equity positively. It infers that employee of banks have sufficient training, skill and knowledge that has impacted on their operations to enhance return on equity. It could be as a result of the level of competition in the industry. This result is in line with a priori expectation.

The findings also revealed that banks are not very innovative in the utilization of their facilities or perhaps that there is under-utilization of their facilities to its full potential in a manner that would significantly influence return on equity. This must have accounted for the observed positive but insignificant effect of structural capital efficiency on return on equity.
Based on the result obtained for capital employed efficiency, it infers that the banker-customer relationship in the banks studied is not at a sustainable level sufficient enough to affect return on equity. The study found this worrisome as maintaining a mutually beneficial banker-customer relationship is fundamental to the success and sustainable growth of a bank. However, the reasons for this might be occasioned by the diversities of the selected banks and the period covered.

5.0 Conclusion and Recommendations

5.1 Conclusion

The findings have implications for management of banks, shareholders, regulatory authorities and depositors. Collectively, the result substantiated that intellectual capital proxies significantly affect return on equity of the selected commercial banks but the individual variables had differing influence.
The slope coefficients for human capital efficiency, structural capital efficiency and capital employed efficiency indicates positive relationship with return on equity but only human capital efficiency has positive significant relationship. The study therefore infers that there was capacity under-utilization of their facilities and the banker-customer relationship was insufficient to significantly affect return on equity.
Nontheless, it was identified that the gradient for human capital efficiency of 0.0314 is lower than that of 0.0934 and 0.0865 for structural capital efficiency and capital employed efficiency respectively. The reason for the insignificant nature of these proxies may be due to the individual gradients of the selected banks on return on equity. However, in view of the consistent F statistic coefficient and adjusted R squared, the study concludes that intellectual capital costs have significant effect on return on equity of listed commercial banks in Nigeria.

5.2 Recommendations

Based on the findings, we recommend that:

1. Regulatory authorities should set benchmark of training standards for banks employees so as to enhance skills and knowledge not just in banking operations and earnings generation but also in effective and efficient relationship management.
2. Banks should endeavor to explore and utilize the facilities to its potential in order to increase return on equity.

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APPENDIX

Table 1: Fixed Effect Regression of Intellectual Capital Cost and Return on Equity

Dependent Variable: ROE
Method: Panel Least Squares
Date: 10/07/18 Time: 01:01
Sample: 2007 2016
Periods included: 10
Cross-sections included: 3
Total panel (balanced) observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.233116	0.058256	4.001562	0.0005
HCE	0.003734	0.005351	0.697869	0.4920
SCE	-0.231054	0.091588	-2.522752	0.0187
CCE	0.254770	0.069675	3.656569	0.0012

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.934501	Mean dependent var	0.267667
Adjusted R-squared	0.920855	S.D. dependent var	0.180892
S.E. of regression	0.050890	Akaike info criterion	-2.941453
Sum squared resid	0.062154	Schwarz criterion	-2.661213
Log likelihood	50.12179	Hannan-Quinn criter.	-2.851802
F-statistic	68.48347	Durbin-Watson stat	2.206421
Prob(F-statistic)	0.000000		

Table 2: Random Effect Regression of Intellectual Capital Cost and Return on Equity

Dependent Variable: ROE
Method: Panel EGLS (Period random effects)
Date: 10/07/18 Time: 00:58
Sample: 2007 2016
Periods included: 10
Cross-sections included: 3
Total panel (balanced) observations: 30
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.128165	0.121692	-1.053194	0.3019
HCE	0.031392	0.009079	3.457578	0.0019
SCE	0.093367	0.223072	0.418553	0.6790
CCE	0.086544	0.154686	0.559481	0.5806

Effects Specification	S.D.	Rho
Period random	0.000000	0.0000

Idiosyncratic random		0.133012	1.0000

Weighted Statistics			
R-squared	0.577108	Mean dependent var	0.267667
Adjusted R-squared	0.528313	S.D. dependent var	0.180892
S.E. of regression	0.124236	Sum squared resid	0.401298
F-statistic	11.82713	Durbin-Watson stat	0.657299
Prob(F-statistic)	0.000045		

Unweighted Statistics			
R-squared	0.577108	Mean dependent var	0.267667
Sum squared resid	0.401298	Durbin-Watson stat	0.657299

Table 3: Hausman Test of Intellectual Capital and Return on Equity
Correlated Random Effects - Hausman Test
Equation: Untitled
Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	4.876331	3	0.1811

** WARNING: estimated period random effects variance is zero.

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
HCE	0.038594	0.031392	0.000055	0.3308
SCE	0.038961	0.093367	0.069915	0.8370
CCE	0.099310	0.086544	0.028236	0.9394

Period random effects test equation:
Dependent Variable: ROE
Method: Panel Least Squares
Date: 10/07/18 Time: 00:59
Sample: 2007 2016
Periods included: 10
Cross-sections included: 3
Total panel (balanced) observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.151735	0.147020	-1.032066	0.3165
HCE	0.038594	0.011716	3.294135	0.0043
SCE	0.038961	0.345943	0.112622	0.9116

CCE	0.099310	0.228394	0.434817	0.6692

Effects Specification
Period fixed (dummy variables)

R-squared	0.683046	Mean dependent var	0.267667
Adjusted R-squared	0.459313	S.D. dependent var	0.180892
S.E. of regression	0.133012	Akaike info criterion	-0.898065
Sum squared resid	0.300769	Schwarz criterion	-0.290879
Log likelihood	26.47097	Hannan-Quinn criter.	-0.703821
F-statistic	3.052959	Durbin-Watson stat	0.725075
Prob(F-statistic)	0.017783		