

Intellectual capital efficiency and economic value added: The Nigerian banking industry perspective

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ABSTRACT

This study investigates the effect of intellectual capital on economic value added of listed banks in Nigeria. The data for the data were secondary derived from the annual reports of these banks and Nigeria Stock Exchange fact books. The research design adopted is *ex post facto* research and the study covered a period of four years from 2015 to 2018. The sample size of 12 banks is selected using Cochran model. Intellectual capital is measured using Value Added Intellectual Coefficient (VAIC) developed by Pulic. Data are analyzed using descriptive statistics and ordinary least square regression technique. The results obtained show that human capital efficiency, structural capital efficiency and capital employed efficiency significantly influence economic value added of listed banks in Nigeria. The study therefore concludes that IC efficiency is positively associated with economic value added of banks in Nigeria. Thus, this study recommends that the apex bank and other regulatory agencies should strengthen the enforcement of policies and measures that will promote intellectual capital development, as this will in turn enhance economic value added of these banks.

keywords: Intellectual capital, economic value added, human capital efficiency, structural capital efficiency, capital employed efficiency

INTRODUCTION

The importance of intellectual capital (IC) as a vital instrument for determining corporate values cannot be underestimated. Currently, economies of the world are shifting towards knowledge-oriented economy in which companies' competitiveness and sustainability are increasingly dependent on intellectual capital. The advent of the knowledge economy combined with globalization, market liberalization and increased competition has pushed many firms to invest in innovation and in value creation activities, such as research and development, manpower training, new technology acquisition or advertisement, in order to sustain their leadership in the market. However, these major value creating resources are most at times not given preeminence in the financial

statement because of stringent recognition criteria imposed by the international financial reporting standards on intangible assets. Given the role of value creation by intellectual capital and the relative lack of accounting recognition, the financial statement lost some of their values for shareholders and other stakeholders alike. Intellectual resources are important strategic asset of the company and as such should be communicated to the stakeholders.

Intellectual capital has been seen as an indispensable resource particularly in environments where the source of competitive advantage is strongly based on knowledge and intangible resource. Knowledge and information are considered most influential element in value creation of the company. In this

wise, corporate performance does not only depend on tangible asset but also intangible asset which intellectual capital is a major component. A study made by [1] shows that companies' tangible assets can represent 20% of market value and the remaining 80% is intangible asset. Hence the market and economic value of a firm is highly influenced by the information relating to intellectual capital. In addition company's competitive position to a greater extent is dependent on the strategic management of intellectual capital. Negligence in this context can cause irreparable damages on the procedure of capital market indices, because intellectual capital is shaping economic environment in the countries.

The goal of all companies is to create value for the shareholders. In addition, [2] states that, when long-term EVA is maximized, the company will be maximizing its own value. EVA can be used to set goals, evaluate performance, determine bonuses, communicate with

investors and budget for capital expenditure. In today's knowledge oriented economy, it is quite necessary for companies to seek, generate, manage, develop and exploit IC optimally to create economic value added and improve corporate performance and as such enhance shareholders' value. There are numerous prior studies related to intellectual capital and even have similar variables, but the empirical results are varying. More so, none of these researches studied the effect of IC on economic value added of companies, though other related performance measures are used. Also most of the researches on intellectual capital are done in more developed economies with sophisticated capital structure and different legal frameworks, hence, the need for such research in Nigeria. Thus this research studies the effect of IC on EVA using Value added Intellectual Coefficient (VAIC) as a measure of intellectual capital.

LITERATURE REVIEW

Intellectual capital

[3] define IC as intellectual material that has been formalized, captured and leveraged to produce a higher order asset. IC has also been defined in financial terms to mean the difference between market value and the shareholders capital [4]. This can be supported by the fact that firms in the past have been acquired for amounts far in excess of market capitalization. [5] defines IC as comprising all immaterial resources that could be considered as assets with some kind of assignable capitalized value. All the above definitions have a convergence in the sense that they refer to assets that are important to the company but are not captured by the traditional accounting methods or techniques. They are therefore the total sum of "hidden assets" of an entity and these assets are not physical.). One of the most workable definitions however is that offered by the

Organization for Economic Co-operation and Development (OECD) (1999) which describes IC as "the economic value of two categories of intangible assets of a company: organizational capital; and human capital.

In this study intellectual capital is measured using Pulic model. Intellectual capital according to him is measured using value added which is created by human capital, structural capital and physical capital (capital employed). The combination of these three values is symbolized by the name Value Added Intellectual Coefficient (VAIC) developed by [6]. The efficiency levels to be calculated in this model are human capital efficiency (HCE), structural capital efficiency (SCE) and capital employed efficiency (CEE). VAIC is considered as a "universal indicator showing abilities of a company in value creation and representing a measure for business

Efficiency in a knowledge-based economy" [7]. According to [8] the purest measure to produce economic value in a knowledge-based company is the value added per individual's contribution. As suggested by [9], this monetary measuring system could be useful in providing objective information to stakeholders about company's real value and performance. In addition, it allows comparison and future predictability in respect of the companies' Intellectual Capital performance [10].

Components of intellectual capital efficiency

Human capital refers to knowledge, skills and experiences that employees take them with themselves when they leave the organization. The contributions of the Human Capital of an organization is very important because it's the skills, competency and knowledge possessed by the Human Capital, and the efficient management of such, that will determine how other resources of the organization will be utilized to achieve organizational goals and objectives. Therefore, the human element is very crucial in determining corporate performance. [11] defined Human Capital "as employee's competence in creating both tangible and intangible assets by contributing in the continuous generation of knowledge and ideas". Human capital efficiency (HCE) is one of the three components of value added intellectual coefficients as postulated by [12]. Human capital efficiency measures the value added by the human resources of an organization. Human capital efficiency is computed as the ratio of value added (specifically by the human assets) to human costs (which indicates personnel expenses salaries and benefits for company).

Structural capital efficiency

Structural capital includes all non-human resources of knowledge in the organization which consists of databases, organizational charts, procedures and

administrative processes, strategies and generally consist of everything that create higher value for the organization rather than its physical aspect. Structural capital is computed as the difference between value added and human capital while human capital efficiency is calculated as the ratio between structural capital and value added

Capital Employed Efficiency (CEE)

This is the third component of value added intellectual coefficient. Capital employed is the tangible assets parts of capital and contain both physical and financial assets. The physical parts represent fixed and raw materials, while the financial part includes other existing assets after employees leave. According to [13], CE refers to physical and financial capital like book value of net assets. In this study capital employed is the difference between total assets and intangible assets while CEE is calculated as the ratio of value added to capital employed.

Economic value added (EVA)

The concept of EVA was propounded by Stewart & Co at the beginning of the 1990s. It is an estimate of a firm's economic profit - being the value created in excess of the required return of the company's investors (being shareholders and debt holders). It is the performance measure most straightforwardly connected to the creation of shareholders wealth over time [14]. The methodology is "the one measure that properly accounts for all the complex trade-offs involved in creating value" and therefore, "the right measure to use for setting goals, evaluating performance, determining bonuses, communicating with investors, and for capital budgeting and valuations of all sorts" [15].

Nonetheless, EVA is different from other traditional performance measuring tools because most measures mostly depend on accounting information. The problem with these kinds of tools is that

accounting earnings fail to measure changes in the economic value of the firm, and some of the reasons which according to [16] is that the link between economic profit and shareholder value is transparent unlike accounting profit. With time value of money taken into account, the net present value of the firm is equal

THEORETICAL FRAMEWORK

Human capital theory and resourced based view theory are the two major theories supporting this work. The human capital theory is attributed to [17]. The significance of the human capital theory is that it regards people as assets and stresses that investment by organizations in people will generate worthwhile returns. It proposes that sustainable competitive advantage is attained when the firm has a human resource pool that cannot be imitated or substituted by its rivals [18]. The concept views workers as key resource managers used to achieve competitive advantage for their companies. The resource based view theory is traced to [19]. Resource - based view gained attention of strategic thinkers only after the contribution by prominent authors such as [20]. This theory links a firm's internal capability (what it does best) to its external industry environment (what market demands and what competitors offer). Capabilities have proven more difficult to delineate and are often termed as intangible assets [21] or intermediate goods.

Empirical framework

[22] studied the impact of IC on organizational performance in British firms. They employed multiple linear regression, a quantitative method, to analyze the data collected from 300 UK companies publicly listed on London Stock Exchange (LSE) and available in the "Value Added Scoreboard" database. The sample was selected mostly from the following industries: high-tech, services, and traditional manufacturing. The researchers measured Intellectual Capital

to the discounted stream of expected economic value added generated by its current and future assets. Resource based theory of the firm support intellectual capital framework and it directly corresponds to the logic behind the economic value added as a performance measure.

using the VAIC model. It was also found that RCE had a significant positive effect on the market value ($\beta = 0.550$; $p < 0.05$), but the aggregated HCE-SCE did not. Based on the findings, the study concluded that IC has a significant positive impact on firm performance [23] investigated the rapport amid intellectual capital and performance pointers of firms. The statistical methods used were correlation analysis and regression pooled least squares by SPSS 23 software. The outcomes presented that there is an expressive association amid intellectual capital and Return Stock, Tobin's Q and market to booking value (MTB). [24] examined the relationship between IC and organizational performance in two Indian industries: the pharmaceutical and the textile. The authors employed the VAIC model to measure IC and its efficiency indicators: HCE, SCE, and RCE, ATO for productivity and market value for stock performance as the indicators of business performance. The results showed that IC did not significantly affect either ATO or market value of either industry. Based on the findings of the insignificant effect of IC on both the productivity and stock performance in both the industries, the authors provided an explanation that Indian firms, like those in other emerging economies, still mainly focused on making short-term profits.

[25] empirically assess the impact of IC and its components on corporate performance in Romanian firms. The author collected data by accessing the yearly reports of 72 corporations publicly

listed on Bucharest Stock Exchange. Morariu employed the VAIC model to measure IC and its efficiency indicators: HCE, SCE, and CEE. The researcher also chose ROE, ATO, and market value as the indicators of business performance. The results revealed that IC does not have effect on any of the performance indicators. Similarly, there was no significant positive relationship between any IC efficiency element (HCE, SCE, CEE) and any business performance indicator.

[26] examined the relationship between IC and business performance in the Indian textile sector. To collect data for the research, the authors accessed the annual reports of 100 textile firms publicly listed in both the Indian stock exchanges: NSE (National Stock Exchange) and BSE (Bombay Stock Exchange). [27] employed the VAIC method to amount IC and its efficiency indicators: HCE, SCE, and RCE. The results indicated that IC, represented by VAIC, had a significant positive impact on ROA (FEM: $\beta = 0.013$; $p < 0.01$; REM: $\beta = 0.012$; $p < 0.01$). As per the findings, IC had a significant positive influence on profitability (represented by ROA), but it did not have any significant role in impacting either productivity (represented by ATO) or market performance (represented by the market value) in Indian textile companies. [28] analyzed the relationship

between IC and business performance in the oil and gas industry of Pakistan. The authors accessed the annual reports of the firms publicly listed on Karachi Stock Exchange and collected data for a total of 78 observations. The study used the VAIC model to measure IC and its efficiency elements (HCE, SCE, and RCE). The results showed that IC had a significant positive impact on market value ($\beta = 0.248$; $p < 0.05$). The significant positive impact of IC on the market value could suggest that knowledge resources potentially create great long-term value for these companies.

[28] examined the relationship between intellectual capital accounting and business performance. The study focused on pharmaceutical firms in Kenya. Primary data were therefore collected from 31 pharmaceutical companies. The results showed that intellectual capital accounting had positive relationship with business performance.

From these reviews, it could be observed that most of this studies are done in developed countries as well as emerging economies such as India. Studies conducted in Africa in general and Nigeria in particular are scanty and this paucity of local studies form a contextual knowledge gap, thus this study was instigated as a result of this gap.

METHODOLOGY

The research design used in this study was ex post facto research design. This research design was adopted because the data used was historical data generated from annual reports and accounts of these banks as well as Nigerian Stock Exchange fact book. The secondary data covered a study period of four (4) years i.e. 2015 to 2018. The population of this study comprised all listed commercial banks on the Nigerian Stock Exchange as at 2018 financial year and currently, there are 13 listed commercial banks. The sample size of this study was ascertained using Cochran model;

$$n = \frac{\frac{z^2 \times p \times q}{d^2}}{1 + \frac{1}{N} \left(\frac{z^2 \times q \times -1}{d^2} \right)}$$

n=12

A simple random sampling technique was adopted to select the 12 banks and this technique

was chosen because all the banks have equal chance of being selected. Descriptive statistics, correlation analysis and ordinary least square regression technique were the analytical techniques used and SPSS version 23 was the statistical software used.

3.1 Model specification

The model used in this work is specified below:

$EVA = f(\text{intellectual capital efficiency})$

$EVA = a_0 + d_1 HCE_{it} + d_2 SCE_{it} + d_3 CEE_{it} + e_0$

where;

a_0 = constant

EVA = Economic value added

HCE = Human capital efficiency

SCE = Structural capital efficiency

CEE = Capitalemployed efficiency

$d_1 - d_3$ = unknown coefficient of variables.

it is expected that $d_1 - d_3 < 0$

e_0 = stochastic error.

EVA is derived mathematically thus;

$EVA = PAT - (\text{capital employed} \times WACC)$.

Capital employed is the sum of equity and and non-current liabilities and WACC is weighted average cost of capital. This is given as

$$WACC = \frac{MVe \times Ke + MVd \times Kd}{MV_{total}}$$

where,

MVe = market value of equity

Ke = cost of equity = d/Mve

Kd = cost of debt = $i(1-t)/Mvd$

Mvd = market value of debt

Mv_{total} = total market value of both debt and equity

i = interest rate

t = tax rate

1 = one (constant)

Component of Intellectual capital is derived using value added intellectual coefficient (VAIC). VAIC is the sum of human capital efficiency, structural capital efficiency and capital employed efficiency.

$VAIC = HCE + SCE + CEE$

$HCE = VA/HC$

$SCE = SC/VA$

$CEE = VA/CE$

Where,

VA = Value Added = $OP + EC + D + A$

HC = total payroll cost

OP = operating profit

EC = payroll cost

D = depreciation

A = amortization

CE = capital employed (total assets - intangible assets)

SC = $VA - HC$

DATA PRESENTATION

Table 1: Economic value added and intellectual capital components of listed Nigerian banks for 2015 financial year

Bank	Eva (N/m)	HCE	SCE	CEE
Access	237367	23.73	13.05	20.11
Ecobank	380596	83.18	49.87	40.61
Firstbank	334815	36.32	9.64	22.31
FCMB	77140	8.94	18.42	43.86
Fidelity	2419543	12.61	17.22	32.16
GTB	9570223	12.39	12.51	30.12
Stanbic IBTC	712578	24.16	20.13	21.32
Sterling	187352	13.65	21.99	49.42
Union	1153295	20.16	11.81	28.12
UBA	271629	42.75	10.27	16.12
Zenith	194649	11.12	21.31	18.22
Wema	243982	22.35	12.37	13.22

Source: Annual report and account of the selected banks (2016)

Table 2: Economic value added and intellectual capital components of listed Nigerian banks for 2016 financial year

Bank	Eva (N/m)	HCE	SCE	CEE
Access	792496	12.10	11.65	28.28
Ecobank	283967	70.30	51.99	42.02
Firstbank	288149	26.49	9.43	30.26
FCMB	530389	5.19	36.18	42.21
Fidelity	1042578	12.45	12.83	30.21
GTB	2015886	12.24	22.71	28.61
Stanbic IBTC	334746	24.46	20.48	32.61
Sterling	16223	12.84	98.14	51.81
Union	296403	24.11	14.92	30.51
UBA	168987	17.85	24.22	31.11
Zenith	265274	13.21	24.22	21.11
Wema	305345	27.35	21.22	21.21

Source: Annual report and account of the selected banks (2016)

Table 3: Economic value added and intellectual capital components of Nigerian banks for 2017 financial year

Bank	Eva (N/m)	HCE	SCE	CEE
Access	337237	16.53	17.32	50.03
Ecobank	240109	69.21	54.31	20.81
Firstbank	361120	14.00	11.81	20.22
FCMB	517565	23.33	24.81	28.22
Fidelity	8929046	21.34	15.86	35.21
GTB	1923720	9.49	26.42	16.21
Stanbic IBTC	107767	37.08	19.86	38.42
Sterling	172434	11.43	10.62	40.81
Union	299998	16.38	12.32	22.91
UBA	346014	21.05	38.41	20.12
Zenith	103435	25.18	22.22	21.31
Wema	662431	31.15	38.41	10.22

Source: Annual report and account of the selected banks (2017)

Table 4: Economic value added and intellectual capital components of listed Nigerian banks for 2018 financial year

Bank	Eva (N/m)	HCE	SCE	RCE
Access	430080	32.21	18.28	23.16
Ecobank	330092	54.10	68.19	30.61
Firstbank	340210	20.22	8.43	42.11
FCMB	263807	21.19	8.61	31.42
Fidelity	9829046	23.82	16.18	29.43
GTB	6717605	21.76	21.10	22.01
Stanbic IBTC	124173	27.08	14.29	39.41
Sterling	100317	12.28	10.31	43.61
Union	823085	14.22	13.02	32.11
UBA	361019	17.39	11.14	16.21
Zenith	142932	21.12	23.12	22.21
Wema	557507	16.29	10.16	13.21

Source: Annual report and account of the selected banks (2018)

Table 5: Combined Average of the Selected Banks Value Added (EVA), Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) (2015-2018)

Year	EVA (₦, M)	HCE	SCE	CEE
2015	10023982	102.35	136.33	123.12
2016	21436345	207.35	131.22	111.20
2017	53535431	131.23	138.31	110.02
2018	87822207	142.23	104.12	136.11

Source: Annual report and account of the selected banks (2015-2018)

Table 6: Regression result of effect of intellectual capital efficiency on economic value added of banks in Nigeria (2015-2018)

Dependent variable: EVA

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	30251.0	813198.1	0.372007	0.7129
HCE	0.641	0.036	7.181	0.000
SCE	1.013	0.041	11.418	0.000
CEE	0.865	0.041	14.561	0.000
R-squared	0.671			
Adjusted R ²	0.642			
S.E of Regression	2735516			
F-statistic	62.2342			
Durbin Watson	1.893233			

Source: Researcher's estimation, (2019)

Table 7 Regression result for Human Capital Efficiency and Economic Value Added

Dependent variable: EVA

Variable	Estimated coefficient	Std. error	t-value	Sign.
C	0.319	0.106	3.211	0.000
HCE	0.641	0.036	7.181	0.000
R	0.861			
R ²	0.671			
Adjusted R ²	0.642			
F-statistic	162.712			

Source: SPSS result printout (see appendix), 2019

Table 8 Regression result for Structural Capital Efficiency and Economic Value Added

Dependent variable: EVA

Variable	Estimated coefficient	Std. error	t-value	Sign.
C	0.778	0.312	3.192	0.000
SCE	1.013	0.041	11.418	0.000
R	0.764			
R ²	0.543			
Adjusted R ²	0.532			
F-statistic	86.164			

Source: SPSS result printout (see appendix), 2019

Table 9 Regression result for Capital Employed Efficiency and Economic Valued Added
Dependent variable: EVA

Variable	Estimated coefficient	Std. error	t-value	Sign.
C	0734	0.181	5.861	0.000
RCE	0.865	0.041	14.561	0.000
R	0.781			
R ²	0.645			
Adjusted R ²	0.641			
F-statistic	174.690			

Source: SPSS result printout (see appendix), 2019.

ANALYSIS OF DATA

Tables 1-4 show the economic value added, human capital efficiency, structural capital efficiency, and capital employed efficiency of the studied banks. These tables show the priorities these banks give to their intellectual capital efficiency components and the calculated EVA of these banks. Table 5 shows the combined average of the selected banks from 2015 to 2018 and this reveals that banks in Nigeria have a positive human resource policy and ensure that workers are treated fairly, and it has led to increase economic value added of the selected banks.

The results obtained show that all explanatory variables have their correct expected sign, which comply with the aprior expectation. The positive sign of the co-efficient of human capital efficiency shows that there is a positive relationship between human capital efficiency and economic value added of the selected banks [29] [30]. This is consistent with the theoretical expectation showing that a 1billion naira increase in HCE will lead to an increase in EVA by 0.641billion naira, other things being equal. Similarly, the positive coefficient of structural capital efficiency shows that there is a positive relationship between SCE and economic value added of the selected banks. The result is in line with theoretical expectation, showing that an increase in structural capital efficiency will lead to an increase in EVA by

1.013billion naira. The examination of the result showed that there is a positive relationship between capitalemployed efficiency (CEE) and EVA..

From the result obtained, three variables (human capital efficiency, structural capital efficiency, capital employed efficiency) are statistically significant. This is seen in their t-statistic values calculated of 7.181, 11.418 and 14.516 respectively for human capital efficiency, structural capital efficiency, and capital employed efficiency and they are all 1 greater than the critical value of 4.303 at 5 percent level of significance. This results means that these three variables are significant in causing short-run changes in economic value added (EVA) of the selected banks in Nigeria. Adjusted R-squared of 0.642 shows that about 64.2% of the total variations in the dependent variable are explained by variations in the independent variables. The remaining 35.8% left unexplained is attributed to variation in other factors not captured in the model but represented by the disturbance term. The high value of the R-squared shows that the estimated model has a better goodness of fit.

The f-statistic value of 62.234 shows that the overall model is statistically significant at 5 percent level of significance. This means that the independent variables collectively have significant effect on EVA of the selected banks in Nigeria. The result confirms the

existence of linear relationship between the dependent variable and the independent variables in the model.

Table 7 present data for test of hypothesis one. The result reveals that calculated t-value of 7.181 is greater than t-table value of 4.303 when tested at 0.05 level of significance. Thus the null hypothesis was rejected meaning that human capital efficiency significantly affects economic valued added (EVA) of listed banks in Nigeria. Also, from this table, it is observed that the estimated coefficient for EVA is also positive which is consistent with economic theory. That is, there is a positive relationship between human capital efficiency and economic value added.

Table 8 reveals the relationship between structural capital efficiency and economic value added of listed banks in Nigeria. From the analysis of hypothesis two, the result reveals that the calculated t-value of (11.418) is greater than the critical t-table value of (4.303) when tested at 0.05 level of significance. The adjusted R² value of 53.2% means that 53.2 percent of the

SUMMARY AND CONCLUSION

The study examines the effect of intellectual capital efficiency on economic value added as a measure of organizational performance of listed banks in Nigeria. The findings from the study reveals that human capital efficiency, structural capital efficiency and capital employed efficiency have significant effect on economic value added of the selected banks in Nigeria. They study therefore concludes that intellectual capital efficiency has significant positive effect on the

variation' in EVA is explained by the explanatory variable, while the remaining 46.8% is accounted by factors which are not captured in the model. Therefore, the null hypothesis was rejected, while the alternative hypothesis was accepted. This means that structural capital efficiency significantly affects economic valued added (EVA) of listed banks in Nigeria.

Table 9 shows the relationship between capital employed efficiency and Economic value added of banks in Nigeria. The analysis of hypothesis three reveals that the calculated t-value of 14.561 is greater than the table value of 1.980 when tested at 0.05 level of significance. The Adjusted R² of 0.645 indicates that 64.5% of variation in EVA is caused by capital employed efficiency while the remaining 35.5% is caused by factors not captured in the model. Thus, the null hypothesis was rejected, while the alternative hypothesis was accepted. This means that capital employed efficiency significantly affects economic valued added (EVA) of listed banks in Nigeria.

economic value added of listed banks in Nigeria. Based on this, the study recommends that management of banks in Nigeria should invest in human capital in order to enjoy increase in their economic value added. In addition to this, the study also recommends that the apex bank and other regulatory agencies should strengthen the enforcement of policies and measures that will promote intellectual capital development, as this will in turn enhance economic value added of these banks.

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