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Determinants of Intellectual Capital Performance of Banks in Africa: Evidence from Ghana, Nigeria, South Africa and Kenya

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Abstract
In public lectures, managers usually sing the chorus that employees are their most valued asset, however, the value of these same employees are not captured on their statement of financial position arguing that finding an appropriate measure to recognise intellectual capital has always been a herculean task. As this subject matter is crucial in re-echoing the importance of human capital to companies, the study seeks to examine determinants of intellectual capital performance of banks in the Sub-Saharan Africa from 2016 to 2020. Adopting the multiple regression technique in analysing the data sourced from the individual banks financial reports revealed that bank profitability and efficiency of human capital investment are positively related to intellectual capital performance. However, the impact of bank size on intellectual capital performance was negative. Aside these, all the other variables were not significant in explaining banks intellectual capital performance. It is therefore, recommended that the human capital of banks be evaluated to identify those which are underperforming to either retrained or replaced. Most importantly, top managers who suffer from the "peter principle" should be identified and replaced with high performing managers to efficiently coordinate the tangible and the intangible resources in order to achieve greater value.
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1. Introduction

According to Nazir, Tan and Nazir (2020) economies around the globe are gradually shifting from placing more emphasis on physical assets such as machinery and factories to the know-how and capabilities of peoples in the organisations. Intellectual capital (IC) in today's knowledge based economy is considered a critical factor for companies to attain their desired value. The effective implementation of the intellectual capital components such as human capital, structural capital and relational capital will go a long way of helping an organisation attain sustainable competitive advantage over its competitors (Asiaei *et al*., 2020).

Intellectual capital although a relatively new topic has sparked up debate among scholars and human resource practitioners across the globe with each group having different view on the subject (Pourkiani *et al*., 2014). Smes and Ibrahim (1943) argued that intellectual capital can be defined by taking cognisance of its components that comprise; human capital, relational capital and structural capital. To these researchers, Intellectual Capital is an important resource that propels economic growth and social prosperity.

Adding to this, Haris *et al.* (2019) emphasised that, individuals, companies, regions and countries have gained significant wealth due to their stock of high intellectual capital resource. Intellectual capital has become a topical issue among many HR practitioners, scholars and researchers due to its significance and relative newness (El-Bannany, 2008). Countries and organisations with superior intellectual capital enjoy competitive advantage by witnessing higher economic growth and improved social welfare over their competitors without it (Shahabadi and Samari, 2013). Due to this reason, many empirical studies have been carried out aiming at the determinants of intellectual capital performance as a paradigm shift from the traditional tangible assets (Afshari and Hadian Nasab, 2021).

On the financial front especially banking, substantial research works have been conducted across many developed countries to unravel the key variables that affect the performance of intellectual capital. Meressa (2016) assessed the determining factors of intellectual capital performance of banks in Egypt from 2007 to 2010. The researcher attributed the intellectual capital performance of the Egyptian banks to global financial crisis, structure of the country's banking system, bank size, profitability of bank and age of bank.

Again, adopting the Value Added Intellectual Coefficient (VAIC), El-Bannany (2012) analysed the performance of intellectual capital of listed banks across the Arab Gulf Cooperation Council (GCC). He concluded that banks within the zone do not necessary improve their human capital performance by just introducing board diversity. He emphasised that generally, diversity of banks' corporate boards does not affect the performance of banks Intellectual Capital. Asare *et al.* (2017) veered into the insurance industry and assessed the relationship between intellectual capital and financial performance of insurance firms in Ghana. The human capital efficiency component of intellectual capital was found to largely dictates the intellectual capital performance of the insurance sub-sector in Ghana.

Clearly, mixed results have been reported by researchers on key factors that determine Intellectual Capital performance across industries. More importantly, researchers and scholars have given limited consideration to examining intellectual capital practices in organisations within developing countries compared to developed economies (Al-Hamadeen and Suwaidan, 2014). In Ghana, Duho and Onumah (2019) suggested various variations in intellectual capital performance across the banking sector. Accordingly, the present study seeks to extend this area of analysis by examining the bank specific determinants of Intellectual Capital performance in Sub-Saharan Africa with emphasis on Ghana, Nigeria, South Africa and Kenya.

2. Literature Review

Skandia, a large Swedish organisation is argued to be the first company to introduce the concept of intellectual capital in 1991, however, the root of the term could be traced to the economist John ConGalberot in 1969 (Sefidgar *et al*., 2015). Intellectual capital has been defined differently in literature by many scholars and researchers. According to Mavridis (2005) intellectual capital is an intangible asset that has the capability to create value for organisations and society in general. On their part, Uluma *et al*. (2020) described Intellectual capital as intangible asset which comprises patents, intellectual property rights, copyrights as well as franchises that could create value addition for companies.

Mondal and Ghosh (2014) defined structural capital as the stock of knowledge that are brought into an organisation by employees but are left behind even when the employees leave for their various homes. According to the researchers, this knowledge is imbedded in the structures of the company, its processes, culture and systems. Nazir *et al*. (2020) also defined structural capital as the knowledge that companies formed overtime which can never be detached from their activities. Relational capital, on the other hand is described as the intangible assets such as customer brand loyalty, education and training of employees, and strategic distribution channel (Maleki and Serkani, 2014).

2.1 Intellectual Capital Performance

There have been various attempts to quantify Intellectual Capital by employing quantitative models. These attempts have generated more than eight different IC valuation approaches including the value-added, value creation index, value-based, Tobin's q, measured intangible value, Baruch Lev method, human resource accounting and most importantly the Value Added Intellectual Capital coefficient (VAIC). The difficulty in measuring intellectual capital (IC) stems from its inability to meeting the recognition criteria of assets per accounting standards (Bayraktaroglu and Baskak, 2019). Again, IC is context specific, meaning depending on the context one wants to look at it, it can be measured best in that way (Dohu and Onumah, 2018).

The VAIC model has been used extensively because it is on the assumption of the resource-based view that provides easy and interpretable results, calculated using audited financial statements, and its ability to cover the three essential elements of IC (Yusuf, 2013). In a vast number of banking studies, the model has been employed owing to the fact that the earlier development of the model was based on data from the banking sector (Kamukama *et al*., 2011)

2.1.1 Determinants of Intellectual Capital Performance

With regards to the present study, bank riskiness, investment in information and technology, bank profitability, operational efficiency, barrier to banking sector entry, bank size, ratio of staff cost to total income are presumed to affect the performance of intellectual capital base on empirical literature. Profitable organisations are normally expected to perform well in the area of intellectual capital performance than organisations with negative financial performance (Saleh *et al.,* 2009; Suseno *et al*., 2019).

To Mondal and Ghosh (2014), profitability of banks correlates positively with intellectual capital. Bidaki and Hejazi (2014) were absolutely right when they posited that profitability can spur the relational capital of an organisation and in the long-run increase the contribution to aggregate performance of intellectual capital. Soheili and Pakdel (2012) were of the opinion that managements of financial institutions may not be able to embark on the required activities that could boost intellectual capital when they use significant time investigating the factors that accounted for their banks' financial losses.

Therefore, improved financial performance may be a catalyst in motivating managements and other officials to encourage employees to improve their performance (El-Bannany, 2008). Companies ICT infrastructure could be deployed to the advantage of managers as an internal system whereas on the external environment, ICT may be seen as a capital to companies. In the ever changing banking environment, electronic banking operation is very essential in improving the organisational relational capital. This means that improvement in the amount spent on information communication and technology systems is likely to improve the intellectual capital performance of banks (El-Bannany, 2008). Consequently, the adoption of new technology that focuses on electronic banking services could help create value addition so as to efficiently manage customer relations.

With regards to bank size, Dewi *et al*. (2014) argued that the level of the total assets controlled by an

organisation determines how big the company operations are. In most cases, the bigger the size of a bank operations, the higher its level of performance in the area of intellectual capital. It is highly probable that superior internal management information system could improve businesses performance of internally generated intellectual capital (Ferreira *et al.,* 2012). Again, organisations with improved internal information systems are seen as being more futuristic and with innovative drive which normally results to improved financial performance (Mondal and Ghosh, 2014). Contrary to the positive impact of bank size on intellectual capital performance assertion, Joshi *et al*. (2010) concluded that no significant relationship exists between bank size and IC performance in the Australian banking sector.

An organisation that continue in business for a long time effectively incorporate knowledge into its human capital policies. This means that, companies that imbed know-how and capabilities acquired over time into their operations improve their intellectual capital performance (Dewi *et al.,* 2014). Focusing on the impact of the global financial crises in 2007 on intellectual capital performance, El-Bannany (2012) discovered that banks that have been operating for quite a long time enjoy high and stable intellectual capital performance. In adopting the multiple regression technique, he demonstrated that age of bank significantly determines the movement of banks intellectual capital performance in the UAE zone. One sure way of raising the level of employees' motivation in a bank is by increasing the staff cost relative to total earnings. The motivation policy when properly implemented has the potential of activating and improving the innovation capability of employees (Soheili and Pakdel, 2012).

According to Musalli and Ismail (2012) customers are likely to leave banks of which they doubt their operational activities and join those which are exposed to relatively lower risk in their operations. Under this circumstance, it is highly probable that the bank's relationship with customers will be badly affected leading to lost customer loyalty. Ultimately, intellectual capital performance of those banks will be negatively affected. It is argued that monopolist companies possess large resources and with this they could afford to hire employees who have the requisite skills, knowledge and experience given those companies the competitive edge over other entities (Al-Musalli and Ismail, 2012). High market concentration is an indication of absence of healthy competition in the determination of price for bank services. The higher market concentration, the more monopolistic power exists in the banking sector, and also the higher the performance of banks' intellectual capital (Abduh and Idrees, 2013).

2.2 Hypothesis Formulation

Investment in information technology (IT), bank efficiency, barrier to entry, intellectual capital investment efficiency, profitability of bank, bank size as well as bank riskiness are considered under the present study as the bank specific determinants of intellectual capital performance.

2.2.1 Investment in Information Technology (IT) Systems

Companies IT infrastructure could be categorised into two distinct groups (Gho, 2005). According to Suseno *et al*. (2019) either of the IT system pose a serious threat to employees, especially the unskilled ones and therefore, argued that investment in Information Technology could make employees redundant as management may fire a number of them when the IT infrastructure of the company improves. For example, Investment in ATMs by Major British Banks Group (MBBG) over the period 1976 to1996 contributed to a huge reduction in the number of employees of the bank (Chiucchi *et al.,* 2018; Gho, 2005).

H1: There is a positive relationship between levels of investment in IT and intellectual capital performance.

2.2.2 Efficiency of Investment in Intellectual Capital

It can be argued that human capital plays an important role in reducing bank's production costs; gaining cost advantage or gaining competitive advantage, both of which should reflect in the bank's quest of increasing its market share as it becomes more attracted to many customers. If banks efficiency is linked to human capital, there should be a positive relationship between human capital performance and bank market shares (Pastore, 2015; Alhassan and Asare, 2016).

H2: There is a positive relationship between efficiency of investment in IC and IC performance.

2.2.3 Bank Profitability

Companies may see adverse financial performance as unexpected financial results; therefore, managements exercise caution when dealing with financial losses. When managers spend ample time in investigating the cause of those losses, they will have less time to embark on productive businesses (Meressa, 2016). Profits, on the other hand, may be viewed as favourable financial performance, freeing up management to go into productivities activities of the firm, such as encouraging employees to innovate in order to boost profit. As a result, positive impact of bank profitability on human capital performance is reasonable (Meressa, 2016; Mondal and Ghosh, 2014; El-Bannany, 2008).

H3: There is a positive relationship between bank profitability and IC performance.

2.2.4 Bank Risk

It is generally accepted that the degree of risk and the rate of return on investment have positive relationship.

This is because the future success of every company depends largely on the proportion of its risky assets (Patton and Zelenka, 1997). Improvement in the proportion of intangibles gives the impression that human capital is very important in contributing to the company's success and as such employees of the company will be motivated to continue their innovative drive (El-Bannany 2012, 2008).

H4: There is a positive relationship between bank risk and IC performance.

2.2.5 Bank Size

The large asset composition for a company generates more benefits and hence, its ability to encourage the human capital to pursue innovation in serving customers. Mondal and Ghosh (2014) observed a positive but insignificant relationship between firm size and intellectual capital disclosures in India. Although, Dohu and Onumah (2018) observed a negative relationship between bank size and human capital performance in the Ghanaian banking sector, they attributed their results to the fact that management may be inefficient in coordinating the large asset portfolio of the banks to realise the required human capital performance.

H5: There is a positive relationship between bank size and intellectual capital performance

2.2.6 Barrier of entry

Managers of firms which operate in industries with stringent barriers of entry feel reluctant to embark on policies that gear towards encouraging the workforce to innovate and as such, human capital performance is negatively affected (Sefidgar *et al*., 2015). El-Bannany (2008) observed a negative relationship between barriers to the UK's banking sector and intellectual capital performance. However, the opposite is expected in the banking sectors across Africa.

H6: There is a positive relationship between barrier to entry and IC performance.

3. Methodology

The positivist paradigm is the underlining basis for this study. This is because, positivists study problems that are commonly deterministic under which causes determine effects (Creswell, 2009). The correlational explanatory research design is adopted using panel data from the selected banks' annual reports. This design is an arrangement of secondary data collection, quantitative approach and deductive method of inquiry. The Econometric Views (EVIEWS) is employed to analyse the data. A quantitative approach is appropriate as far as it incorporates statistics and bases on comparative methodology with mathematical models in making inferences and testing hypothesis (Creswell, 2012).

3.1 Population of the study

A study's population according to Mugenda and Mugenda (2003) is the set of objects, entities or cases that exhibit similar characteristics of which they are studied collectively. On his part, Brooks (2008) asserted that the population of a study is the entire collection of people or things which are to be studied. The population of the present study comprises all commercial banks in Ghana, Nigeria, Kenya and South Africa. These countries were considered suitable for the study because of their seeming stable banking sectors as argued by Meressa (2016), that strong financial institutions essentially require the intellectual capital asset to gain competitive advantage. The 104 commercial banks registered in Ghana, Nigeria, Kenya and South Africa form the basis for the sample of twenty (20) banks.

3.2 Sampling and Sampling Technique

The purposive sampling entails the identification and selection of objects or group of individuals who are proficient in providing the needed responses (Etikan *et al.*, 2016). Therefore, to be able to collect the desired data, five commercial banks were purposively sampled from each of the four countries (Ghana, Nigeria, South Africa and Kenya). Again, to ensure balanced data, banks which have being in operations for the past 10 years were selected. Based on this exclusion, 20 banks were sampled from the population to investigate the determinants of intellectual capital performance of banks in Sub-Saharan Africa.

Table 1: Sampled Banks

Ghana	Nigeria	South Africa	Kenya
GCB Bank	Access Bank	Capital Bank	Absa
Ecobank	FBN Bank	FirstRand Bank	Cooperative Bank
Prudential Bank Ltd.	Fidelity Bank	Investec Bank	Diamond Bank
Standard Chartered	GT Bank	Nedbank	Equity
Stanbic Bank	Zenith Bank	Standard Bank	Family Bank

3.3 Definition of Research Variables

In measuring the dependent variable, VAIC is adopted. This technique assumes that intellectual capital is an important factor for creating value addition for firms (Alhassan and Asare, 2016).

Value Added Relational Capital Coefficient (VARC) = VA / RC 1

where; VA is value added and RC depicts relational capital.

Value Added Human Capital Coefficient (VAHC) = VA / HC 2

where; HC is personnel cost, VAHC is the value created by a unit of human capital investment.

Value Added Structural Capital Coefficient (STVA) = SC / VA 3

where; SC is VA – HC and STVA is the % of Value Added contributed by the structural capital.

Therefore, VAIC = VARC + VAHC + STVA 4

Table 2: Variables measurements and Relationship

Variable	Definition	Symbol	Expected Signs
Intellectual Capital		VAIC	
Investment in information and technology.	Natural log of total expenses on hardware and software of computer systems	LOGITI	-
Barriers of Entry	PPE divided by bank total assets	Entry	-
Efficiency of Investment in Intellectual Capital	Staff costs divided by total revenue	HCInv	+
Cost Efficiency	Bank assets divided by total banking market assets	CE	+
Operational Risk	15% of 3 years average gross income divided by total equity	OR	+
Return on Asset	Return on asset	ROA	+
Size of Bank	Logarithm of total assets	Size	+

4. Results and Discussion

4.1 Descriptive Statistics

The mean generally depicts the average values of the variables whiles the standard deviation measures how far the values in the dataset disperse from their mean values.

Table 3: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Median	Max	Min
VAIC	100	5.1303	4.2798	3.6300	25.3400	0.5700
LOGITIN	100	9.9109	1.6636	9.7935	13.4179	6.4754
ENTRY	100	0.0268	0.0228	0.0230	0.1240	0.0010
HCINV	100	0.2286	0.0981	0.2400	0.4300	0.0170
CE	100	58.5970	23.8895	64.7150	109.7200	0.1200
OR	100	6.7403	2.8421	6.5050	16.1300	0.6300
ROA	100	3.3399	2.9762	2.9000	14.2000	-1.3800
LOGTA	100	6.1484	0.8421	6.1765	7.8116	2.9251

Table 3 summarises the dependent variable, that is intellectual capital performance (VAIC) and the seven independent variables. To avoid the problem of different reporting currencies of the sampled banks, the absolute values of investment in IT and total asset were converted to US dollars using the average yearly USD rate to the local currencies over the span of the study.

VAIC has a mean value of 5.13. This is good as it is quite high (Laing *et al*., 2010). This means that generally, managements of the banks have been efficient in utilizing the value creation prospects of the banks. VAIC also has a standard deviation of 4.28, this means that variations in the intellectual capital performance are not widely dispersed from the mean value.

The mean value of investment in IT as reported on Table 3 above is 9.91. However, since it is in the log form its antilog is USD20,131. This means that on an average, the banks over the period of the study invested USD20,131 in information and technology every year. This is quite small juxtaposing this to the conscious effort by many banks across the continent to move away from the brick and mortar banking system to electronic banking. Depreciation of the local currencies could be a key factor for the recorded low investment in the IT. The standard deviation of investment in IT is 1.66 with an antilog of USD5.00. This shows that the banks investment in IT over the span of the study are so different from one another.

Again, from Table 3, barrier of entry (ENTRY) which represents the easiness of getting into the banking sector as a new entrant has a mean value of 0.028. This suggests that the banking sectors of the selected countries are well regularized. ENTRY also has a standard deviation of 0.023 indicating that the ease or difficulty of entry into a banking sector is dependent on the individual country's asset requirements for the banking sectors.

Also, efficiency of Investment in Human Capital (HCINV) has a mean value of 0.23 or 23%. This indicates that on the average the banks expenditure that goes into developing the knowledge and the technical knowhow of their staff on yearly basis over the span of the study contributes 23% of their operating income. This suggests that the other 77% of the banks operating income is driven by their physical assets. With a standard deviation of 0.10, the efficiency of the investment in human capital is evenly spread across the banks.

With regards to cost efficiency (CE), the mean value is 58.6% which suggests that on average the banks on yearly basis spend about 59% of their operational income on operational expenses. This is good as about 40% of their earning is available for taxation subsequent to their profitability. This suggests that managements of the banks have been efficient in maximizing their shareholders' wealth. With a standard deviation of 23.9%, it could be averred that the variations in the non-interest expenses to operational income are not widely dispersed.

The operational risk (OR) has a mean value of 6.74%. This is good for the banking industry as it is lower than the 15% benchmark outline by the Basel Committee on Banking Supervision (BCBS). This therefore, means that the banks are well capitalized with good capital adequacy ratios to mitigate any unforeseen circumstances that may befall the banking sectors. The standard deviation of 2.84% of operational risk (OR) shows that the preparedness of the sampled banks in meeting the unforeseen disturbances in their operations is evenly spread.

From Table 3, Return on Asset, a major profitability measure has a mean of 3.34%. A return on asset (ROA) of 3% is not that bad for banking sectors with huge non-current assets, however, more could be done to generate substantial amount of profit. The standard deviation of 3% for ROA suggests that most of the sampled banks have similar return on asset values for the period under consideration with few outliers.

Last but not the least, from Table 3, logarithm of total asset which is the proxy for bank size has a mean of 6.15 with an antilog of USD1,412,538. This value represents the yearly average total asset of the considered banks. This is a clear manifestation of a strong banking systems across the countries with significant assets to support the economic activities in the individual countries. The standard deviation of bank size is 0.84 with an antilog of USD7.00. This means that although on average the assets of the considered banks are huge, the standard deviation points to huge differences in the total assets of the individual banks over the span of the study.

4.2 Multi-collinearity Test

Whenever there is an absolute relationship between the independent variables, the significance of the individual variables in the regression model and their collective power of influencing the explained variable are put into jeopardy (Gujarati, 2004). There are diametrically opposed views among scholars on the level of correlation coefficient that could be considered appropriate. Kennedy (2008) argued that any correlation coefficient among explanatory variables which is higher than 0.7 has the tendency of producing unreliable results. The problem of multi-collinearity will only arise when the correlation coefficients are found to be more than 0.8 (Cooper and Schindler, 2003).

However, Hair (2006) disproves those assertions and espoused that the possibility of any correlation coefficient lower than 0.9 causing multi-collinearity problem is very low for researchers to be worried about. The position of Kennedy (2008) is adopted and therefore, the problem of multi-collinearity is only detected when the correlation coefficient is higher than 0.7. In assessing the problem of multi-collinearity, Pearson correlation matrix and Variance Inflation Factor (VIF) are employed.

4.2.1 Correlation Matrix

The correlation matrix is among the techniques used to measure the relationship between variables. However, it must be noted that correlation just indicates the relationship between variables without indicating whether an increase in one variable is as a result of the movement of the other variable. Variables could be correlated positively or negatively depending on the sign of the correlation coefficient. A positive correlation coefficient suggests that the two variables moves in the same direction whereas a negative correlation coefficient indicates that the two variables move in opposite directions. Numerically, correlation coefficient ranges from -1 to 1 where a coefficient closer to 1 means a strong relationship between the variables, a coefficient below 0.5 shows a weak relationship and a coefficient of zero (0) signifies no relationship between the variables.

Table 4: Correlation Matrix

Correlation Probability	ROA	OR	LOGTA	LOGITN	HCINV	ENTRY	CE
ROA	1.0000						
OR	-0.1556	1.0000					
	0.1221						
LOGTA	0.0844	0.2627	1.0000				
	0.4040	0.0083					
LOGITN	0.1599	-0.2152	0.0192	1.0000			
	0.1120	0.0315	0.8499				
HCINV	-0.5581	0.2744	-0.2399	-0.0763	1.0000		
	0.0000	0.0057	0.0162	0.4506			
ENTRY	0.0439	0.1993	-0.0031	0.0023	0.0785	1.0000	
	0.6644	0.0469	0.9757	0.9817	0.4378		
CE	-0.6580	0.4187	0.0215	0.0263	0.5174	0.2839	1.0000
	0.0000	0.0000	0.8314	0.7951	0.0000	0.0042	

From Table 4, there exist weak positive relationship between ROA and LOGTA as the coefficient reported is 0.08. However, the positive relationship between the two variables could be considered insignificant as the probability value (p-value) of the coefficient, 0.4 falls off the significant level of 0.05. There exist a positive but weak relationship between LOGTA and OR as the coefficient observed is 0.26. The relationship is significant as the p-value of 0.008 falls within the significance threshold of 5%.

Also, a weak positive but insignificant relationship between investment in Information Technology (LOGITN) and ROA is reported owing to a correlation coefficient of 0.16 and a probability value of 0.11 which falls outside the 0.05 significance level. This suggests that investment in IT and ROA move in the same direction. With regards to investment in Information Technology and operational risk (OR), the relationship is negative with a correlation coefficient of -0.22. This is significant since the p-value of 0.03 is within the 0.05 significance level. From Table 4, there is a positive but weak relationship between investment in IT (LOGITN) and total assets (LOGTA) per the correlation coefficient of 0.02. The relationship is not significant as the p-value (0.85) is higher than 0.05. This suggests that when there is an improvement in assets, an improvement is investment in IT is likely.

With efficiency of Intellectual capital investment (HCINV) as against return on assets (ROA), bank size (LOGTA) and investment in IT (LOGITIN), the relationships are negative with coefficient of -0.55, -0.24 and -0.08 for ROA, LOGTA and LOGITIN respectively. The relationships of HCINV with LOGTA and LOGITIN are weak whereas that with ROA could be considered moderate. The relationship with ROA and LOGTA are significant because the p-values of 0.00 and 0.02 respectively are within the 5% significance level. However, the relationship between efficiency of intellectual capital investment (HCINV) and investment in IT is not significant. ENTRY has positive but weak relationship with ROA, OR, LOGITIN and HCINV with coefficients of 0.044, 0.199, 0.003 and 0.078 respectively.

Lastly, the correlation coefficient of -0.67 indicates that cost efficiency (CE) has a negative but strong relationship with ROA. The p-value of the correlation coefficient of 0.0000 indicates that the relationship between the variables is significant at 5% significant level. However, only the relationship with HCINV is moderate, all the other relationships are weak due to the correlation coefficients of 0.42, 0.02, 0.03 and 0.28 for OR, LOGTA, LOGITIN and ENTRY respectively.

4.2.2 Variance Inflation Factor (VIF)

The VIF is another key mechanism for detecting the presence of multi-collinearity in variables (Ahsan *et al*., 2009). The general rule is that multi-collinearity is present in the data when the value of any individual variable and the mean value of the VIF exceed ten (10).

Table 5: Variance Inflation Factor (VIF)

Variable	VIF	Variable	VIF
LOGTA	1.2301	ENTRY	1.2256
LOGITN	1.1820	ROA	2.5025
CE	2.7909	OR	1.5739
HCINV	1.7562	**MEAN**	**1.7516**

From Table 5, it can be concluded that multi-collinearity is non-existent in the variables as none of the individual variables have a value greater than ten (10). Again, the 1.75158 mean for VIF is lower than ten (10). This confirms the assertion made under the correlation matrix.

4.3 Model Selection (Hausman Test)

The fixed effect and the random effect models are the two major techniques used to estimate the results of a panel data. Under the fixed effect model, it is assumed that the slope of the estimates remains fixed and cross-sectional over time. Contrary to this, the intercepts under the random effect model is assumed to be constant over time (Brooks, 2008). The decision rule is to adopt the random effect model (null hypothesis) if the probability value is higher than the 5% significant level. However, when the p-value is lower than the 5%, the fixed effect model is appropriate.

Table 6: Correlated Random Effects - Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	13.9804	7	0.0415
Cross-section random effects test comparisons:			
Variable	Fixed	Random	Var(Diff.)	Prob.
LOGITN	0.0343	0.0593	0.0286	0.8728
ENTRY	-1.7433	-9.9537	12.9215	0.0224
HCINV	3.3562	0.6548	1.6341	0.0346
CE	0.0064	0.0019	0.0001	0.5980
ROA	0.8457	0.6741	0.0134	0.1375
OR	-0.0978	-0.1398	0.0019	0.3329
LOGTA	-0.9381	-1.1774	0.0131	0.0363

From Table 6, the Hausman test conducted shows that the fixed effect model is the appropriate model for the regression analysis. This is because the reported probability value of 0.0415 is within the 0.05 significance level. Therefore, the alternative hypothesis which proposes the fixed effect model for the regression analysis is accepted whereas the null hypothesis indicating the appropriateness of the random effect model for the regression analysis is rejected.

4.4 Regression Analysis and Interpretation

Table 7: Regression Results (Fixed Effect)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.2951	3.9379	1.8525	0.0680
LOGITN	0.0343	0.2945	0.1166	0.9075
ENTRY	-1.7433	11.9461	-0.1459	0.8844
HCINV	4.7145	2.1775	2.1651	0.0377
OR	-0.0978	0.1207	-0.8105	0.4203
ROA	0.8457	0.2012	4.2037	0.0001
CE	0.0064	0.0202	0.3176	0.7517
LOGTA	-0.9381	0.3353	-2.7974	0.0066
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.8841	Mean dependent var	5.1303	
Adjusted R-squared	0.8429	S.D. dependent var	4.2798	
S.E. of regression	1.6965	Akaike info criterion	4.1204	
Sum squared resid	210.1144	Schwarz criterion	4.8238	
F-statistic	21.4240	Durbin-Watson stat	2.2050	
Prob(F-statistic)	0.0000			

From Table 7, the R-squared which shows the collective power of the explanatory variables in explaining the movement of the dependent variable has a value of 0.88. This means that 88% of the variations in intellectual capital performance (VAIC) is explained by the explanatory variables whereas the remaining 18% variation is explained by variables not considered. The adjusted R squared has a value of 0.84 meaning 84% of variations in VAIC is explained by the independent variables whereas the remaining 16% is explained by factors not considered. The F-statistic and the probability of F-statistic have values 21.42398 and 0.000000 respectively.

This indicates that the null hypothesis of no significant relationship between the explained variable and the explanatory variables should be rejected. This means that the movements in intellectual capital performance in the banks could be attributed to the collective power of the explanatory variables (i.e. $P < 0.05$).

4.4.1 Regression Equation

$$VAIC_{it} = \beta_0 + \beta_1 LOGITIN_{it} + \beta_2 Entry_{it} + \beta_3 HCInv_{it} + \beta_4 CE_{it} + \beta_5 OR_{it} + \beta_6 ROA_{it} + \beta_7 Size_{it} + e_{it.} \quad 5$$

From Table 7 above, the regression coefficients are slotted into the equation to obtain:

VAIC = 7.295 + 0.034LOGITIN – 1.743Entry + 4.714HCINV + 0.006CE – 0.098OR + 0.846ROA – 0.938 LOGTA

Taking antilog of both total assets and IT investment gives:

VAIC = 7.295 + 1.035ITIN – 1.743Entry + 4.714HCINV + 0.006CE – 0.098OR + 0.846ROA – 8.670TA

As observed from the regression equation above, holding all the explanatory variables constant, the value of intellectual capital performance (VAIC) will be 7.295. Also, a USD100.00 increase in the amount of money spent on information technology will lead to value addition of USD103.5 all other things being equal. With regards to barrier of entry, 10% improvement in barriers into the banking sector will bring a decrease of 0.17% in VAIC and vice versa holding all other variables constant. A 10% increase in staff cost to total earning will increase the human capital performance by 0.47% all other things being equal. When cost efficiency (CE) increased by 10%, a corresponding 0.0006% will be observed in the human capital performance index and vice versa.

When operational risk (OR) increases by 10%, a reduction of 0.0098% will occur in the human capital performance of the banks when all other variables are held constant. On the other hand, when profitability of the banks improves by 10%, the human capital performance will also improve by 0.0098% and vice versa. Holding all other variables constant, when total assets of the banks which proxy bank size improve by say USD10,000.00, the value addition of the bank will fall by UDS86,700.00 and vice versa.

4.2.2 Bank Specific Determinants of Human Capital Performance

This section looks at whether or not the explanatory variables are significant enough in determining the variations in the banks human capital performance juxtaposing it with previous empirical research works.

4.4.2.1 Return on Asset (ROA) and Human Capital Performance

The t-statistic and the probability of t-statistic which are the key determinants of whether the hypothesis of significant relationship between ROA and Human Capital Performance should be accepted or rejected are 4.203729 and 0.0001 respectively. Thus, the p-value of 0.0001 and a positive coefficient shows that a significant positive relationship exists between ROA and human capital performance at a significance level of 5%. This positive relationship is as expected and it means that when banks are making good profits directors of the banks will be emboldened to motivate staff (human capital) to improve their performance.

Another possible reason may be that as profitability of the banks improves, conscious effort is made to provide quality services to customers by improving the capacity of staff which spurs the financial fortunes of the banks. This is in consonance with the findings of (Duho and Onumah, 2018; Meressa, 2016; Sefidgar *et al.,* 2015 and El-Bannany, 2008) who all observed positive and significant relationship between profitability and human capital performance.

4.4.2.2 Efficiency of Human Capital Investment and Human Capital Performance

Staff cost to total earnings which represents the efficiency of human capital investment of the banks has statistically significant positive relationship with human capital performance according to the positive coefficient of 4.714522 and probability value of the t-statistic of 0.0377. This relationship is statistically significant at 5% significant alpha. This suggests that as banks spend more of their revenue in developing the capacity of their staff, their human capital performance which measures the banks' value added capacity also improves.

The positive relationship is as expected meaning that the innovations in products development and service quality in the banks are largely due to the efforts of the staff and as such they are satisfactorily priced in the banking sector. Another reason is that huge investment has gone into the development of staff and thus empowering them to give off their best. The finding supports the position of (Meressa, 2016). However, it deviates from the positions of (Duho and Onumah, 2018; Sefidgar et al., 2016; Shahin and Abdollah, 2012 and El-Bannany, 2008) who reported negative relationship between cost to total earnings and human capital performance with Duho and Onumah (2018) attributing the negative relationship to the fact that bank staff may not necessary be the originators and executors of the innovative ideas in the banks and that the labour market of the Ghanaian banking sector may be over-priced.

4.4.2.3 Total Assets (Bank Size) and Human Capital Performance

Total assets have p-value of 0.0066 and a negative coefficient which indicate a significant negative relationship between bank size and VAIC at 5% significant alpha. This suggests that as banks improve their assets their performance relative to human capital index dwindles. This is not as expected but a possible reason could be the inefficiencies in handling many staff members, diverse customer base as well as complex business transactions. Although the banks' assets may be large, managing both the physical and the intangibles to realise the full

benefits becomes a challenge leading to lower human capital performance. This finding is in congruence with that of Duhu & Onumah (2018) but contrary to (Mondal & Ghosh 2014; Onumah *et al*., 2013) who observed a positive relationship between firm size and intellectual capital disclosure in India and Ghana respectively.

On the other hand, the other explanatory variables - cost efficiency (CE), investment in IT, operational risk (OR) and barrier to entry are statistically insignificant in determining the variations in banks human capital performance. Investment in IT and cost efficiency have positive although insignificant relationship with human capital performance. The insignificant positive relationship between cost efficiency and human capital performance supports the findings of (Duho & Onumah, 2018). Whereas the finding with regards to investment in IT and human capital performance contradicts that of (Meressa, 2016). However, barrier to entry and operational risk have negative but insignificant relationship with human capital performance with operational risk position contradicting the findings of (Duho & Onumah, 2018), whiles that of barrier to entry disagreeing with the findings of (El-Bannany, 2008).

4.4.3 Examining the trend of Intellectual capital performance

The mean value and the maximum values of human capital performance (VAIC) from Table 3 as well as the constant value from the regression equation are assessed. First and foremost, the mean of intellectual capital performance (VAIC) is 5.13. This relatively high VAIC value indicates that on the average the selected banks have been efficient in the creation of Valued Added in their banking operations. This observation is in consonant with the position of Asare *et al.* (2020), that on average banks in Ghana have positive human capital performance (VAIC).

Again, the constant value from the regression equation is 7.295, meaning if all variables are to remain same, the human capital performance of the banks will be 7.3. Also, the maximum value of VAIC over the period of the study is 25.43 pointing to a very high performance per Nikmah and Irsyahma (2016) assertion that firms with M-VAIC of over 3.5 are "top performers" in terms of human capital performance when they adopted the modified human capital performance (VAIC) measure proposed by Ulum in 2014.

5. Conclusion and recommendation

Indisputably, the study into the determinants of intellectual capital performance of banks in the Sub-Saharan Africa with data covering 2016 to 2020 (5 years) has confirmed the assertion that the financial sector generally has superior performance in terms of developing the human capital assets which in turn becomes the catalyst in their financial performance. In order to sustain this feat, management should focus on the variables which were highlighted as significant in propelling the intellectual capital performance; most importantly the intangible assets in their possession. It therefore, behoves on top managers to adopt effective and efficient strategies to coordinate the physical assets and the intangible assets in order to attain greater value added to subsequently improve shareholders' wealth. On the other hand, to address the negative impact of bank size on intellectual capital performance, the physical assets of the banks should be assessed to identify and dispose the aged assets which make the total assets large but are not making significant contribution to the value creation agenda of the banks.

References

Abduh, M. & Idrees, Y. (2013). Determinants of Islamic Banking Profitability in Malaysia. *Australian Journal of Basic and Applied Sciences,* 7(2), 204-210.

Afshari, L. & Hadian N. A. (2021). Enhancing organizational learning capability through managing talent: mediation effect of intellectual capital. *Human Resource Development International*, 24(1), 34.

Al-Hamadeen, R. & Suwaidan, M. (2014). Content and determinants of intellectual capital disclosure: Evidence from annual reports of the Jordanian industrial public listed companies. *International Journal of Business and Social Science*, 5(8), 165-175.

Alhassan A. L. & Asare, N. (2016). Intellectual capital and bank productivity in emerging markets: evidence from Ghana. *Management Decision,* 54(3), 589 – 609.

Al-Musalli, M. A. & Ismail, K. N. (2012). Corporate governance, bank specific characteristics, banking industry characteristics, and intellectual capital performance of banks in Arab Gulf Cooperation Council (GCC) Countries. *Asian Academy of Management Journal of Accounting and Finance,* 8(1), 115 – 135.

Asare, N., Alhassan, A. L., Asamoah, M. F. & Ntow-Gyamfi, M. (2017). Intellectual capital and profitability in an emerging insurance market. *Journal of Economic and Administrative Sciences,* 33(1), 2 – 19.

Asare, N., Laryea, M. M., Onumah, J. M. & Asamoah, M.E. (2020). Intellectual capital and asset quality in an emerging banking market. *Asian Journal of Accounting Research*, 6(1), 55 – 68.

Asiaei, K., Barani, O., Bontis, N. & Arabahmadi, M. (2020). Unpacking the black box. *Journal of Intellectual Capital*, 4(2), 1469 – 1930.

Bidaki, S. & Hejazi, R. (2014). Effects of profitability on the Intellectual capital disclosure in listed companies in Tehran Stock Exchange. *International Journal of Education and Applied Sciences*, 1(5), 248 – 255.

Brooks, C. (2008). Introductory econometrics for finance. Cambridge University Press, UK.

Cooper, D. R. & Schindler, P. S. (2003). Business Research Methods, 8th Edition, McGraw-Hill Irwin, Boston.

Duho, K. C. T. & Onumah, J.M. (2018). The Determinants of Intellectual Capital Performance of Banks in Ghana: An Empirical Approach. 4th International Research Conference of the College of Humanities, Accra, Ghana, University of Ghana.

Eftekhare, H., Asgaryan, N. & Seyyedy, S.A. (2014). Studying the effective factors in performance of intellectual capital in banks accepted in Tehran stock exchange. *Applied mathematics in engineering, management and technology,* 2(3), 145 – 150.

El-Bannany, M. (2008). A study of determinants of intellectual capital performance in banks: the UK case. *Journal of Intellectual Capital*, 9(3), 487 – 498.

El-Bannany, M. (2012). Global financial crisis and the intellectual capital performance of UAE banks. *Journal of Human Resource Costing & Accounting,* 16(1), 20 – 36.

Etikan, I., Musa, S. A & Alkassim R. S. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, 5, 1 – 4.

Goh, P. (2005). Intellectual capital performance of commercial banks in Malaysia. *Journal of Intellectual Capital*, 6(3), 385 – 96.

Gujarati, D. N. (2003). Basic Econometrics (4th ed.). McGraw-Hill / Irwin.

Kennedy, P. (2008). A guide to econometrics (6th ed.). Blackwell Publishing, US.

Lipunga, A. M. (2015). Intellectual capital performance of the commercial banking sector of Malawi. *International Journal of Business and Management,* 10(1), 210 – 222.

Maleki, S. & Serkani, S. Y. (2014). A study of the relationship between the determinants of intellectual capital and components of cash flow statement in the companies listed in Tehran Stock Exchange (TSE). *MAGNT Research Report*, 2(4), 4232 – 4244.

Meressa, H. A. (2016). Determinants of Intellectual Capital Performance: Empirical Evidence from Ethiopian Banks. *Research Journal of Finance and Accounting*, 7(13), 10 – 19.

Mondal, A. & Ghosh, S. K. (2014). Determinants of intellectual capital disclosure practices of Indian companies. *Journal of Commerce & Accounting Research*, 3(3), 25 – 36.

Nikmah, N. & Irsyahma, A. (2016). Intellectual Capital, Firm Value and Financial Performance. Malaysia Indonesia Int. Conference on Economic Management and Accounting.

Olarewaju, O. M. & Msomi, T. S. (2021). Intellectual capital and financial performance of South African development community's general insurance companies. *Heliyon*, 7(4).

Onumah J. M., Amidu, M. & Asare N. (2013). Determinants of intellectual capital disclosures: Evidence from Ghana. *University of Ghana Readers, Woeli Publishing Services, Business Series*, 1(1), 73 – 90.

Pourkiani, M., Sheikhy, A. & Daroneh, M. S. (2014). Importance and status of intellectual capital in knowledge economy. *Indian Journal of Fundamental and Applied Life Science,* 4(1), 512 – 518.

Pulic, A. (2000). VAICTM – an accounting tool for IC management. *International Journal Technology Management*, 20(1), 702 – 714

Sefidgar, M., Maleki, S. & Minouei, M. (2015). Studying factors that affect intellectual capital performance in listed banks in Tehran stock exchange. *Indian Journal of Fundamental and Applied Life Sciences*, 5(1), 769 – 776.

Soheili, S. & Pakdel, A. (2012). Intellectual capital performance: Evidence from Iranian banks. *Australian Journal of Basic and Applied Sciences*, 6(1), 146 – 152.

Smes, M. & Ibrahim, A. R. (1943). The Relationship of Intellectual Capital, Innovation and Organizational Performance. *International Journal of Management Innovation Systems*, 1(1), 209.