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DETERMINANTS OF INTELLECTUAL CAPITAL ON BANK PROFITABILITY

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ABSTRACT

Purpose: The aim is to investigate the determinants of intellectual capital on bank profitability. The objectives are to assess the contribution of VAIC to the profitability of listed banks in Ghana, and to examine the various components of IC's contribution to firms' profitability.

Design/Methodology/Approach: Secondary data from eight listed banks on the Ghana Stock Exchange (GSE) for the period 2012-2021 were utilised for the analysis. The panel regression technique with random effects was employed for the data analysis.

Research Limitations: The study's shortcomings include its limited scope and the authors' inability to utilise other IC measures, such as the Tobin's Q ratio, the balanced scorecard, and the market-to-book ratio models.

Findings: The findings reveal a significant and positive relationship between structural capital and firm performance, while a negative and significant relationship was observed between capital employed (CE) and firm performance. The study results again suggested that human capital (HC) has a positive and significant impact on firm performance.

Practical Implications: Banks should invest more in their intellectual capital, since it could be a strategic asset for competition in Ghana.

Social Implications: Understanding the role of IC on banks' performance will be helpful to prospective investors, shareholders, financial analysts and other users of financial information as IC factors will be considered in their investment decisions.

Originality/Value: The use of the valued-added intellectual capital model (VAIC) in an emerging economy (VAIC) as a measure of the variables and the significant contribution of SCE demonstrates the newness of this research.

Keywords: *Banking. capital. firm. profitability. shareholders*

INTRODUCTION

Knowledge-based resources have been a significant topic of discussion over the past two decades, mainly due to the competitive, dynamic, and complex nature of the global economy (Mollay & Rouf, 2022). Recent corporate scandals and the global financial crisis of 2007–2008 have prompted bank regulators to reassess their approach to performance management in several ways.

In emerging nations, banks are regarded as the backbone of the financial system, controlling the majority of the financial markets (Mollay & Rouf, 2022; Ozkan et al., 2016; ElBannan, 2015). Because banks play a vital role in supplying financial resources, guaranteeing the safety of deposits, and boosting a country's economy, emerging nations such as Ghana should devote more attention to the banking industry.

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Intellectual capital (IC) has been widely explored as a valuable research topic in contemporary knowledge-based resource management to create a sustained competitive advantage. In the current socioeconomic context, intellectual capital has been regarded as a primary source of sustainable competitive advantage (Magoma et al., 2022; Bueno, Salmador, & Merino, 2008). Intellectual capital refers to the intangible assets, including specific technologies, customer information, brand names, reputation, and corporate culture, that are valuable to a firm's competitive power (Chen, Goh, & Pek, 2005; Edvinsson & Sullivan, 1997).

The relationship between intellectual capital and the financial performance of banks remains a subject of concern to researchers and management within the banking sector globally (Ozkan et al., 2016; Nawaz & Haniffa, 2017).

Banks' values largely depend on IC, which supports the bank to gain a competitive advantage by leveraging production levels (Nawaz & Haniffa, 2017; Rouf & Hossain, 2018). The dominant literature suggests that IC plays a significant role in creating corporate value (Maji & Goswami, 2016; Al-Musali & Ismail, 2011).

Moreover, it remains problematic establishing a relationship between IC and bank performance (Clarke et al., 2011; Joshi et al., 2010). Both past and recent scholars posit that the problem of establishing a relationship between IC and bank performance emanates from the lack of a universally acknowledged and accepted technique for measuring IC. Therefore, the myriad of quantitative techniques employed in measuring the relationship between IC and bank performance is saddled with a plethora of challenges (Rouf & Hossan, 2020; Zambon, 2004).

As a result, very few studies can bring to the fore the effects of IC on banks' performance. However, in sub-Saharan Africa, scholarly discussion on the effects of IC on banks' performance remained inconclusive. In addition, scant scientific research has been produced on the aforesaid subject matter in the Global South, including Ghana. Studies in Ghana related to IC include a study by Abdul Latif and Nicholas (2015), which analysed the data of 18 banks from 2003 to 2011 to determine the connection between intellectual capital and the output of emerging-nation banks. The authors conclude that, unlike technological advancements, changes in efficiency are what primarily drive productivity development.

A study by Mohammed-Sani et al. (2012) examined the performance of West African software companies in terms of intellectual capital. The survey's findings indicate a strong correlation between organisations' competitive capabilities and performance, as well as between intellectual capital components and those capabilities.

Nicholas et al. (2013) examined the disclosure of intellectual capital in Ghana, utilising evidence from listed firms. The authors examined 25 listed companies through their corporate filings on the Ghana Stock Exchange for a five-year period (2006–2010).

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Current studies elsewhere and the few in Ghana that examined the nexus between IC and banks' financial success have not been able to bring to the fore that IC influences banks' performance. This study thus fills this gap by assessing the influence of intellectual capital on the financial success of listed banks and provides recommendations to stakeholders in the industry.

The study analysed the data of eight listed banks using the value-added intellectual capital (VAIC) model and panel regression models from 2012 to 2021. The overall objective of the study is to assess the effect of intellectual capital on the performance of listed banks on the Ghana Stock Exchange. Specifically, the study aims to answer the following research objectives: to assess the contribution of VAIC to the profitability of listed banks in Ghana, and to examine the various components of IC's contribution to firms' profitability.

Understanding the role of IC on banks' performance will be helpful to stakeholders such as prospective investors, shareholders, financial analysts and other users of financial information. Shareholders and other users of accounting information should be able to understand the variables of IC and how the elements could influence the profitability of commercial banks' output in Ghana. As a result, this may help decision-makers make more informed decisions regarding their investments.

The study's findings will help corporate bodies better understand which elements of IC identified in the study best support companies in limiting their profit management strategies and raising standards. To appease shareholders and draw in new ones, these corporate entities will frequently adhere to sound management of the factors of IC principles. Consequently, shareholders respond more favourably to financial performance metrics when they have access to accurate information about a company's profitability factors.

LITERATURE REVIEW

Banks Profitability

The banking industry is considered the lifeblood of modern trade and commerce because banks are the primary source of funding. Profitability is essential for a bank to sustain ongoing operations and for its shareholders to receive fair returns. To measure the profitability of a bank, every manager, shareholder, or investor is interested in profitability indicators, as profits are the ultimate goal of banks (Carl, 2022). The profit a bank makes is also a matter of key interest for managers and investors when making strategic decisions. All strategies designed and the activities implemented are aimed at realising bank profitability. Carl (2022) conceived performance as how well an individual, plant, etc. does a piece of work or activity. Furthermore, performance refers to how well a bank sustainably executes the financial intermediation process to achieve the objectives of its stakeholders.

The profitability of banks is assessed from different perspectives, using both financial and non-financial indicators. Hughes and Mester (2015) identify two broad approaches in measuring the performance of banks, i.e. non-structural and structural approaches. Non-structural approaches utilise various performance measures (e.g., ROA, net interest margins, including the Tobin's Q-

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ratio). In contrast, structural approaches are based on theoretical models of banking behaviour, such as efficient and profit frontiers. Banking efficiency measures how well a bank performs over other banks in the industry in the process of converting inputs into outputs. Banks differ from other business entities, as they function as intermediaries between depositors and borrowers. Therefore, the profitability of banks has to be measured considering the financial intermediation process. Ultimately, the overall long-term financial performance of banks has a direct impact on their financial stability.

Furthermore, financial ratios are the quantitative metrics used in most studies to measure a firm's performance across all business sectors, including banking (Ferrouhi, 2018). The return on assets (ROA) and/or the return on equity (ROE) are measures of a bank's profitability, as reported by the bank. This is usually expressed as a function of internal and external determinants (Sufian & Habibullah, 2008). Internal determinants are factors primarily influenced by a bank's management decisions and policy objectives. Profitability determinants are the level of liquidity, provision of policy, capital adequacy, expense management, and bank size. On the other hand, external determinants relate to industrial conditions, which are variables that reflect the economic and legal environments where the financial institution operates (Sufian & Habibullah, 2008). Thus, understanding banks' performance will assist stakeholders within the industry to implement appropriate strategies to maximise banks' output.

Intellectual capital

Until now, there has not been a uniform or generally accepted definition or classification of intellectual capital (Zeghal & Maaloul, 2010; Hang Chan, 2009a; Nadeem et al., 2018; Rouf & Haniffa, 2020). This may be because the field is still in its infancy, since attempts to define and classify IC only began in the 1990s (Zeghal & Maaloul, 2010). Andriessen (2004) argues that the problem with intangible resources is that they are intangible; therefore, a key problem is how to identify something that is hidden or non-material. As a result, a generally accepted definition of IC remained elusive (Ho & Williams, 2003). However, the definition of IC is not significantly different among researchers (Ozkan et al., 2016) since most of the definitions contain the exact words: knowledge, employees' experience and skills, employees satisfaction and loyalty, customer satisfaction and loyalty, firm reputation, organizational routines, procedures systems, cultures, information technology and value creation (see for example, Edvinsson, 1997; Brooking, 1996; Edvinsson & Maalol, 2010; Yalama & Coskun, 2007; Kamath, 2008).

For instance, Goh (2005) defines intellectual capital as intangible assets, which include specific technologies, customer information, brand names, reputation, and corporate culture that are valuable to a firm's competitive power. Edvinsson (1997) defines IC as knowledge that can be converted into value. Edvinsson and Maalol (2010) continue with the definition of IC as the possession of knowledge, applied experience, organisational technology, customer relationship and professional skills that provide a company with a competitive edge in the market. Similarly, Zeghal and Maaloul (2010) define IC as the sum of all knowledge a firm can utilise in the process of conducting business to create value for the company.

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Intellectual capital is classified into three categories: human capital, structural capital, and relational capital (Kamath, 2008; Ling & Lean, 2009). There are other classifications of intellectual capital, but the most widely used is human capital and structural capital (Zghal & Maaloul, 2010), which this study adopted. Relational capital refers to the knowledge of market channels, the structural relationships between the firm and its customers, suppliers, the firm's image and reputation, as well as customer satisfaction and loyalty (Ling & Lean, 2009).

Value-added intellectual capital (VAIC) and bank profitability.

The value-added intellectual capital model is widely used to measure the three variables identified by Pulic (1998) as a measure of firms' profitability. This model is also perceived as credible for measuring the profitability of listed banks on the Ghana Stock Exchange. Accordingly, a wide range of studies have utilised this model and its variables to investigate the impact of intellectual capital on the performance of firms worldwide (Al-Musalli & Ismail, 2011). While some studies (Chen et al., 2005; Kamath, 2008; Pal & Soriya, 2012) have indicated that intellectual capital has a positive association with firms' performance, others (Hang Chan, 2009a, 2009b; Ghosh & Mondal, 2009) have not produced evidence showing this positive relationship.

The available literature has indicated that the majority of studies conducted using this model focus on the banking industry (Ismail & Al-Musalli, 2011). Pulic and Bornemnn (2004) offered valuable information on the efficiency of intellectual capital held by 24 major banks operating in Austria between 1993 and 1995. They opined that increasing the efficiency of intellectual capital is the cheapest and safest way to ensure the sustainable functioning of banks.

Capital employed and the bank's profitability

For this work, capital employed refers to the physical capital and financial capital of a firm (Pulic, 1998). It is the value of all physical and financial assets employed by the firm and is calculated by dividing the total value created by the firm by capital employed: $CEE_i = \frac{VAi}{CEi}$.

Here, VAi is the total value created by the firm, and CEi is the capital employed by the firm. A study by Chu et al. (2011) highlights the importance of capital employed among the VAIC variables. The findings of the aforementioned study show that intellectual capital, as measured by VAIC, has a positive correlation with the performance of listed Chinese firms. The study employed four performance indicators: market valuation, return on assets, return on equity, and asset turnover. In their study, capital employed (CE), as explained above, is identified as the most important predictor of all four performance indicators.

Human capital and banks' profitability

Following the work of Abdulai (2012) and Ozkan et al. (2016) and the emergence of the "endogenous growth theory", human capital has been perceived as the most essential asset responsible for performance differences among financial institutions and countries. It has been described as the "engine of growth" (Ehrlich, 1990, as cited by Abdulai, 2012) and as the ultimate determinant of a country's economic and social development (Gosh, 2005). The importance of its

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critical role spans many industries, including the banking sector, as empirical studies have shown it to be the most important corporate asset (Ozkan et al., 2006).

Structural capital and bank profitability

Structural capital can be explained as the intellectual value that an organisation accumulates as a result of the products or systems it has created over a given period. It encompasses internal processes, patents, policies, infrastructure (such as information technology and systems), and organisational culture and strategies that support its core competence (Edvinsson, 1997, as cited by Abdulai, 2012). It is the supportive infrastructure that enables human capital to function; hence, it includes the content part of the firm's knowledge resources, the intellectual investment made in physical, technical, and organisational culture, and the infrastructure that collaborates with its activities (Abdulai, 2012). The impact of structural capital on banks' profitability has been adequately documented (Pulic, 1998; Al-Musalli & Ismail, 2011; Abdulai, 2012; Ozkan et al., 2016).

Conceptual Framework

The conceptual framework (Figure 1) is based on the work of Al-Musalli and Ismail (2011) and Ozkan et al. (2016). From Figure 1, it can be observed that the components of the VAIC variables (CEE, HCE, and SCE) are related to firms' performance measures, ROA and ROE. This is done to observe the effect of VAIC (the independent variables together) and firm profitability. Then, VAIC was decomposed to observe the relationship between the individual variables and the firm performance measure, ROA. This is also done to observe the effect of each variable on firm profitability. Some variables are controlled (natural log of total assets and bank leverage) in line with past empirical studies (Alipour, 2012; Mondal & Ghosh, 2012; Yalama, 2013; Ozkan et al., 2016).

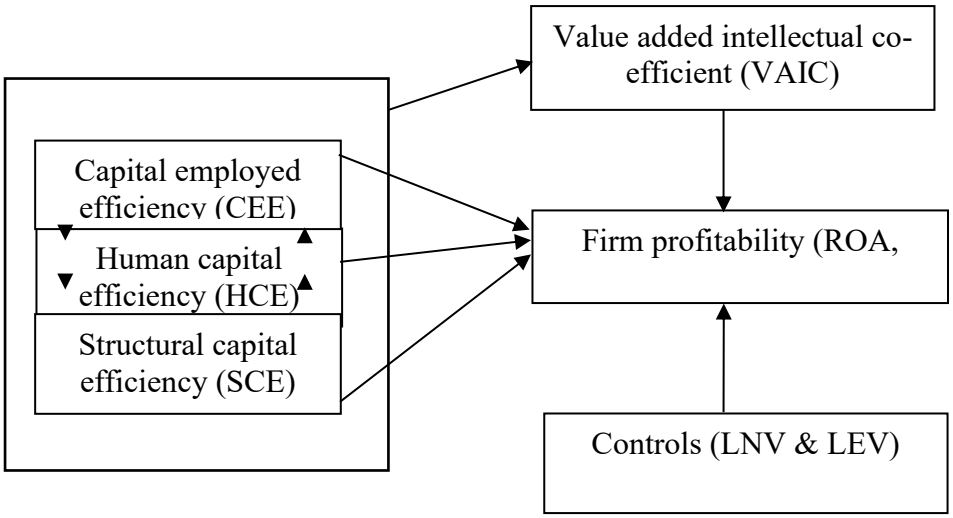

Figure 1: Conceptual Framework
Source: Author's work, 2024

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Overview of The Banking Industry in Ghana

Banks form a key and sensitive part of every economy and therefore serve as catalysts for economic growth. Thus, the banking sector is the lifeblood of every economy, as it mobilises the necessary resources for the players in a nation's economy. The various sectors of the economy utilise these resources mobilised by the banking industry for expansion and growth. Until the passage of the Universal Banking Law in Ghana, banking was conducted within a restricted scope, encompassing commercial, developmental, and merchant banking (Hinson, 2004, cited in Alhassan and Asare, 2016).

The expansion of the banking industry has led to heightened competition, resulting in the development of new products in diverse areas, including international funds transfer, consumer/hire purchase loans, travellers' cheques, negotiable certificates of deposit, school fees loans, and car loans (Hinson et al., 2006). The two significant developments in the industry over the past few decades are the Payment System Act 2003 (Act 662) and the Credit Reporting Act 2007 (Act 726), which have resulted in the e-zwich payment system and credit reference bureaus, respectively. Currently, Ghana has 27 deposit money banks, which operate as universal banks, comprising 15 foreign-owned banks and 12 domestic-owned banks (Alhassan & Asare, 2016).

The industry has been highly dependent on revenue from traditional banking activities, particularly lending, over the past decade. Available studies indicate that approximately two-thirds of a bank's revenue is generated from interest income on loans and advances, compared to non-traditional activities such as fees and commissions (Alhassan & Asare, 2016; Onumah & Duho, 2018; Nadeem et al., 2018; Hermewan et al., 2020).

METHODOLOGY

Research Design

This is an archival study using secondary financial data analysed through panel regression methodology to examine intellectual capital performance across all listed banks in Ghana over a decade-long period.

The eight banks listed on the Ghana Security and Exchange Commission (GSEC) provided secondary data for the current study. The data that was used covered a ten-year period, from 2012 to 2021. All of these banks' audited financial statements were obtained via their websites, where they were then mined using Pulic's (2004) VAIC approach and examined using a panel data regression model.

Variables calculations

Dependent variables

The study used return on assets (ROA) and return on equity (ROE) to represent the financial performance of banks. ROA and ROE are the key measures of bank profitability and have been utilised in similar studies (Joshi et al., 2013; Yalama, 2013; Mahbubul, 2020). ROA is calculated

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by dividing the net profit (loss) for the current year by total assets, while ROE is measured by dividing the net profit (loss) for the current year by equity capital.

Independent variables

The components of the VAIC model are used as independent variables in this study. VAIC is calculated as follows (Ghosh & Mondal, 2009; Pulic, 1998, 2004; Yalama, 2013):

VAICi = CEEi + HCEi + SCEi…….(1)

Where,
VAIC =Value added intellectual capital,
SCE = Structural capital efficiency for bank 'i'
HCE = Human capital efficiency for bank 'i'
CEE = Employed capital efficiency for bank 'i'

To determine each of the variables, the total value added (VA) created by banks needs to be calculated. The total VA is calculated as follows, according to Al-Musalli and Ismail (2011), Alipour (2012), Chu et al. (2011) and Pulic (2004).

VA= OP + EC + A…….(2)

Where,
VA = Total value added created by banks
OP = Operating profit of the banks
EC = Employment cost of the banks
A = amortisation and depreciation of the banks
CEE = VA÷CE……(3)

Here, CE = Capital employed (Book value of assets) of the banks
The next step is to calculate the value added efficiency of human capital (HCE) by dividing the total value created by banks by the cost of human capital (employees).

HCE = VA÷HC……..(4)

The last step in determining the values of the independent variables is to calculate the value added efficiency of structural capital contribution to firms value creation; hence, structural capital is determined by subtracting HC from VA according to Pulic (2004) as shown below .
SC = VA-HC).

Control variables

As in other studies (e.g. Alipour, 2012; Mondal & Ghosh, 2012; Yalama, 2013), bank size (LNTV- Natural Log of total assets), leverages (LEV- Ratio of long term debt to total assets), market share of banks (MKTS- Total banks assets divided by the individual banks' assets), board size of banks (the number of board members), banks deposits (LNdeposit- Natural log of total deposits of banks) and gross domestic product (LNGDP-Natural log of gross domestic product of Ghana) were included in the Panel data regression model as control variables.

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Panel data Regression model

The models to be tested in the study as demonstrated in Table 1. Model-1 in Table 1 tests the relationship between the financial performance measures (ROA_t and ROE_t) and VAIC. Models 2, 3 and 4 examine the relationship between ROA and the components of VAIC (CEE, HCE and SCE). The control variables are included in all the models. The panel data regression technique was used since all the variables considered in the study are not constant and therefore can change depending on the economic conditions of the particular year. The study, therefore, employed the random effects model for its analysis. The illustration in Table 1 below was used for the study analysis.

Table 1: study model for analysis

Model	regression equation
1	ROAit = ß0+ ß1VAICit + ß2LNTVit + ß3LEVit + ß4MKTS+ ß5Bsize+ ß6LNdeposit+ ß7LNGDP+ ß8INFL+ Ɛi
2. a	**ROAit** = δ0 + δ1CEEit + δ2LNTVit + δ3LEVit + ß4MKTS+ ß5Bsize+ ß6LNdeposit+ ß7LNGDP+ ß8INFL+ Φit
2. b	**ROAit** = ά0 + ά1HCEit + ά2LNTVit + ά3LEVit + ß4MKTS+ ß5Bsize+ ß6LNdeposit+ ß7LNGDP+ ß8INFL +πit
2. c	ROAit = α0 + α1SCEit + α4LNTVit + α5LEVit + ß4MKTS+ ß5Bsize+ ß6LNdeposit+ ß7LNGDP+ ß8INFL +ηit

Where:

ROA_{it} correspond to the dependent variable.
$ß_0$, $δ_0$, $ά_0$ and $α_0$ interpret the intercept of model1, 2a, 2b and 2c respectively
$ß_1$, $ß_2$, $ß_3$, stand for the co-efficient of the independent variables of model-1
$δ_1$, $δ_2$, $δ_3$ stand for the co-efficient of the independent variables of model-2a
$ά_1$, $ά_2$, $ά_3$ stand for the co-efficient of the independent variables of model-2b
$α_1$, $α_4$, $α_5$ stand for the co-efficient of the independent variables of model-2c
$_i$ stands for cross section value
$_t$ stands for the time period (2012-2021).

Ɛ, Φ, π and η represent the errors term in model 1, 2a, 2b and 2c respectively.

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RESULTS AND DISCUSSION

Table 2: Average ranking of the listed Bank

Bank Name	CEEi	HCEi	SCEi	VAIC	ROA	LEV	LNTV	Position
Access Bank	0.1333	7.02912	0.686361	7.848773	0.033227	0.118009	6.431291	1st
Cal Bank	0.11871	6.40866	0.834912	7.362282	0.033991	0.115457	6.577082	2nd
Stand. Chart.	0.14716	5.24365	0.803412	6.194225	0.047246	0.076431	6.685677	3rd
ECOBANK	0.16047	5.18897	0.804422	6.153856	0.038799	0.053888	6.92222	4th
SG-SSB	0.16091	4.72982	0.784269	5.674997	0.027929	0.226679	9.411	5th
GCB	0.19822	4.43845	0.773717	5.410386	0.042436	3.418721	6.862532	6th
HFC/RepuBank	0.1443	3.9027	0.74193	4.788927	0.015907	0.21293	6.282677	7th
ADB	0.18514	3.31817	0.706113	4.209421	0.006676	0.088843	6.484805	8th
Total	**1.71944**	**67.55708**	**8.814563**	**78.81023**	**0.386375**	**0.956317**	**92.29255**	
Average	**0.143287**	**5.629757**	**0.734547**	**6.567519**	**0.032198**	**0.079693**	**7.691046**	

It is observed from the above table that, Access bank (7.848773), Cal Bank (7.362282) and Standard Chartered bank (6.194225) and Ecobank (6.153856) have the highest VAIC average values for the period.. The banks that were inefficient in VAIC value creation were ADB (4.209421), Republic Bank (4.788927) and GCB Bank (5.410386). Other regarding VAIC are shown in the table above.

Upon analysing the VAIC elements, it is realised that the most important factor for listed banks operating in Ghana is HC. The results are consistent with previous research, such as Gog (2005) and Ozkan et al. (2016). It is again observed that the overall total average value of the VAIC (6.567519**)** of all the listed banks operating in Ghana is less than the overall total VAIC average values of banks in the United Kingdom (10.80) and the United Arabs Emirates (7.94); however, it is greater than the overall average values of banks in Austria (3.67), Saudi Arabia (3.65) (see AlMuslli and Ismail, 2011).

A study by Al-Musalli and Ismail (2011), who anaylsed the data of 23 banks in the United Arab Emirates Stock Exchange indicated that the banks with the highest VAIC averages in the United Arab Emirates were Tamweel Bank (8.607) and First Gulf Bank (8.265) whereas their counterparts in the Ghana Stock Exchange have the lowest VAIC averages of 7.848773 (Access Bank) and 7.362282 (Cal Bank) The results indicate that efficiency in utilizing HC is the main reason for the high profitability demonstrated by Access Bank and other banks. Moreover, Cal Bank was the best-performing bank for SC. In general, banks in Ghana have relatively high HC as compared to CE and SC (as shown in Table 2). Furthermore, approximately 77% of the value

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created by all listed banks in Ghana is attributed to human capital. This is not surprising since the banking industry is a service sector where its customers depend heavily on human capital.

The VAIC model has partially addressed the research objectives. However, the study aims to assess and observe the behaviour of the independent variables on the dependent variable, considering that empirical studies indicate that the higher the average value, the higher the returns on value creation by the various bank variables. Additionally, this study aims to compare its results with those of the panel data regression model.

Table 3: Pairwise correlations among the variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) ROA	1.000											
(2) VAIC	0.336*	1.000										
(3) CEEi	0.250*	-0.515*	1.000									
(4) HCEi	0.320*	1.000*	-0.530*	1.000								
(5) SCEi	0.488*	0.862*	-0.411*	0.862*	1.000							
(6) ROEi	0.681*	0.211	0.133	0.200	0.301*	1.000						
(7) LEV	0.097	-0.025	0.241*	-0.031	-0.014	0.019	1.000					
(8) LNTV	-0.031	0.016	-0.008	0.012	0.031	-0.090	-0.011	1.000				
(9) MKTS	-0.053	-0.078	0.055	-0.081	-0.041	-0.105	-0.032	0.940*	1.000			
(10) Bside	0.027	-0.284*	0.211	-0.287*	-0.307*	-0.064	0.117	0.058	0.037	1.000		
(11) LNDeposit	0.212	0.093	0.235*	0.086	0.151	0.364*	0.015	0.259*	0.157	-0.254*	1.000	
(12) LNGDP	-0.075	0.313*	-0.354*	0.318*	0.256*	-0.198	-0.040	0.209	-0.011	-0.056	-0.040	1.000

** shows significance at p<.05*

Table 3 presents the descriptive statistics of intellectual capital and its components as the dependent variable. The mean VAIC for all banks throughout the study period is 5.973, with a standard deviation of 1.561, which is somewhat in line with the figures reported by Goh (2005) for Malaysian banks (7.11). The average VAIC on firm performance of listed banks on the Ghana Stock Exchange is low compared to the findings by El-Bannany (2008) for UK banks (10.80), but it is better than the findings of Joshi et al. (2010) in Australia (3.80). The results also show that the averages of the VAIC components (CE, HC, and SC) are 0.156, 5.39, and 0.79, with their respective standard deviations are 0.036, 1.534, and 0.057. This indicates that both CE and SC are positive and moderately significant, while HC is highly significant. It could further be seen that the mean of the control variables LEV (0.539), LNTV (6.957), Boardsize (10.762), bank deposits (0.674) and GDP (1.777) are significant and therefore influence listed banks' profitability in Ghana.

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Table 4: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	80	.031	.021	-.037	.07
ROEi	80	.236	.231	-.237	1.356
VAIC	80	5.973	1.561	3.324	13.376
CEEi	80	.156	.036	.056	.262
HCEi	80	5.032	1.534	2.36	12.401
SCEi	80	.79	.057	.67	1
LEV	80	.539	3.721	.001	33.392
LNTV	80	6.957	.987	5.769	9.735
MKTS	80	.04	.106	0	.347
Bside	80	10.762	2.34	7	15
LNDeposit	80	.674	.142	.282	.887
LNGDP	80	1.777	.077	1.616	1.89

Pearson correlation results related to the variables used in the analysis are shown in Table 4 above. The results indicate a statistically significant moderate positive relationship between ROA and VAIC (0.336). A similar result was obtained for ROE and VAIC (0.681). The nexus between CEE and bank performance measure (ROA) demonstrates a weak correlation while indicating a strong relationship with HCE and SCE. In terms of the relationship among the independent variables, the Pearson correlation results indicate a perfect positive correlation between HCE and CEE (1) but show a strong positive nexus with SCE and CEE (0.862). It is observed that only CEE and HCE have a strong correlation among the independent variables. The result suggests, therefore, that the multicollinearity problem among the variables is weak and can be used for the study analysis.

Table 5: VAIC and banks' performance (Model 1)

VARIABLES	**(1) ROA**	**(2) ROEi**
VAIC	***0.0057******	***0.0412****
	(0.0013)	***(0.0161)***
LNTV	0.0347***	0.2019
	(0.0106)	(0.1336)
LEV	0.0004	-0.0007
	(0.0005)	(0.0061)
MKTS	-0.3096***	-2.0586*
	(0.0926)	(1.1667)
Bside	0.0007	0.0045
	(0.0009)	(0.0113)
LNDeposit	-0.0013	0.4155*
	(0.0168)	(0.2118)
LNGDP	0.1219***	0.1418
	(0.0439)	(0.5524)

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Year	-0.0086***	-0.0483**
	(0.0015)	(0.0189)
Constant	16.9831***	95.4626**
	(2.9349)	(36.9737)
F_Stat.	7.84***	4.17***
Observations	80	80
R-squared	0.469	0.320

Model1
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The adjusted R^2 value for model-1 (0.469 & 0.320) is higher than the control variables added to the model. Furthermore, it is observed from the table that, there is an optismatic and significant nexus between VAIC and banks' performance (ROA and ROE) in Ghana for the study period. Regarding the contribution of the control variables to banks' performance in Ghana, MKTS has a negative but significant influence on both ROA and ROE of banks operating in Ghana, while LNGDP has a positive and significant influence on both performance measures. The results indicate that a positive and significant nexus exists between VAIC and the performance of listed banks in Ghana. Therefore, stakeholders in the banking industry should consider the recommendations of this study.

Table 6: Components of VAIC and bank performance (Model 2a, 2b, & 2c)

VARIABLES	**(1) ROA**	**(2) ROA**	**(3) ROA**
CEEi	***-0.0089***		
	(0.0725)		
HCEi		***0.0057******	
		(0.0013)	
SCEi			***0.1867******
			(0.0326)
LNTV	0.0389***	0.0353***	0.0310***
	(0.0121)	(0.0107)	(0.0100)
LEV	0.0004	0.0004	0.0003
	(0.0006)	(0.0005)	(0.0005)
MKTS	-0.3522***	-0.3153***	-0.2802***
	(0.1052)	(0.0931)	(0.0873)
Bside	-0.0004	0.0007	0.0011
	(0.0010)	(0.0009)	(0.0008)
LNDeposit	-0.0016	-0.0014	-0.0020
	(0.0194)	(0.0169)	(0.0158)
LNGDP	0.1441***	0.1223***	0.0937**
	(0.0498)	(0.0441)	(0.0418)
Year	-0.0087***	-0.0087***	-0.0074***
	(0.0018)	(0.0015)	(0.0014)

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Constant	17.0360***	17.1178***	14.4122***
	(3.5817)	(2.9541)	(2.7843)
F_Stat	4.13***	7.62***	10.14***
Observations	80	80	80
R-squared	0.317	0.462	0.533

Model (2a, 2b, & 2c)
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The adjusted R^2 values of models 2a and 2b are .0.317 and. 0.462, respectively, which are lower than the adjusted R^2 value of models 1 and 2c, which are 0.469and 0.533, respectively. The findings indicate that, in comparison to the VAIC as a whole, the components, especially HC and SC, of the VAIC are more effective at explaining the performance of banks (Chen et al., 2005and Ozkan et al., 2016).

The results of model 2a, 2b, and 2c, as indicated in Table 6 above, demonstrate that there is a statistically significant positive association between HC, SC and banks' profitability of listed banks operating in Ghana, while demonstrating a negative unfavourable relationship between SC and the measure of bank performance, ROA. The results corroborate earlier studies by Soriya (2012) and Al-Muslli and Ismail (2011). The results, however, also demonstrate a robust and favourable correlation between some of the control variables (LNTV and LNGDP) added to the model to assess their relevance to banks' profitability. The investigation's findings are consistent with a study conducted by Chu et al. (2011), which discovered a strong and favourable relationship between IC of Chinese manufacturing enterprises.

CONCLUSION

The overall aim of the study was to investigate the relationship between VAIC and the firm performance of listed banks in Ghana. The study decomposed the components of VAIC to assess their relationship with banks' profitability. The results indicate a statistically significant and positive relationship between VAIC and the performance of banks in Ghana.

The findings further suggest a positive and significant relationship between two of the components of the VAIC (HCE and SCE) and firm performance. At the same time, CEE shows a negative relationship with firm performance.

In terms of the practical implications of the findings, intellectual capital was shown to be extremely important to banks in Ghana and Sub-Saharan Africa. This suggests that banks require highly skilled human resources to operate effectively in a highly competitive banking market, such as Ghana.

Ghanaian banks are therefore urged to make comparatively larger investments in IC in order to develop human capital that satisfies the moral obligations that form the foundation of their moral

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business strategies. These investments could be in the form of recruiting highly skilled bank staff and organising refresher training for the existing staff of Ghanaian banks.

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