Ranking Bank Performances using VAIC^{TM} Model

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Abstract

This study is aimed to examine the intellectual capital performance of Ethiopian conventional banks. It also aimed to examine the performance relationship among various constituents of IC. In this research, the value-added intellectual coefficient (VAIC^{TM}) ranking was used to determine the intellectual capital performance of banks. The required data was obtained from published annual reports of commercial banks and the National Bank of Ethiopia. Comparison was made between VAIC and traditional performance rankings. The study reveals that VAIC has a significant relation with human costs in the value addition. The research reveals a relatively higher human capital efficiency compared to capital employed efficiency or structural capital efficiency. The size of banks in terms of total assets and total shareholders' equity has little or no impact on the intellectual capital performance of banks. These findings may serve as useful input for bankers to apply knowledge management in their institutions so as to maximize value creation. Further, the outcome can be used as a performance benchmark for banks. Last but not least, the result of this study provides information to stakeholders and potential investors about the value-creation capabilities of banks.

Keywords: Intellectual Capital, VAIC, Bank performance, Human capital efficiency, Capital efficiency, Structural capital efficiency

1. Introduction

1.1. Background

For decades, researchers emphasized the power of knowledge in human activity (Rechberg & Syed, 2013). Later, the concept became popular in the field of business and management by the works of Drucker (1969). According to Powell & Snellman (2004), knowledge economy refers to products and services emanating from knowledge-intensive activities that contribute to scientific advances. It is argued that knowledge is a worthwhile strategic asset and one of the critical resources of firms (Khalique et al., 2013). With the shift towards the knowledge economy, therefore, the source of economic value is no longer limited to the production of tangible goods but also to the creation of intangible assets (OECD, 1966). Due to this, today's economy is changing with the greater help of intellectual capital (IC) as a driver. It is evidenced that IC contributes to organizational growth more than other resources (Foray, 2004). On the other hand,

the intensification of the knowledge economy increased the importance and understanding of intellectual capital (Cabrita & Vaz, 2006).

Although human knowledge is such a critical asset across all sectors, its impact is pronounced more in the service industry than in others. Among the service sectors, the banking industry is highly knowledge-intensive and operates in a highly dynamic and competitive environment (Mavridis, 2004) with knowledgeable personnel (Mavridis, 2004, p. 93). Further, due to their proximity to customers, bank employees are expected to be innovators (Githaiga, 2022). Thus, efficient utilization of IC is critical for the success of a bank; and IC capitalization is becoming a necessity to remain competitive in the banking business (Khalique et al., 2013, p. 77).

There are numerous researches conducted on the impacts of IC on bank performance. Since the concept is versatile, dynamic, and contemporary, the research outcomes are mixed, inconclusive, and unsettled (Bellucci et al., 2021; Faraji et al., 2022). Some argue that such inconsistency is the result of unclear measurements of IC (Soewarno & Tjahjadi, 2020). Many researchers found a positive association between IC efficiency and financial bank performance (Majumder et al., 2023; Akkas & Asutay, 2022; Githaiga, 2022; Mollah & Rouf, 2022) while a few others showed no relationship between performance measures and VAIC (Maditinos et al., 2011).

Since most research outcomes indicate some form of association between IC and bank performance, one could argue that this intangible asset does impact the performance of banks. As a result, company stakeholders, academia, and practitioners are greatly interested in the measurement of IC. However, due to the measurement inaccuracy of traditional methods, companies with greater intellectual assets might look less relevant (Petty & Guthrie, 2000); and thereby losing their comparative advantage in the market (Ruta, 2009; Yang & Lin, 2009).

1.2. Objectives and Significances of the Research

The quest for bank performance is the focus of recent many IC researches which have got policy, practice, and research implications (Faraji et al., 2022, p. 11). In this regard, as to the author's knowledge, there is no study done to investigate the IC performances in Ethiopian Banks. Thus, the current study is expected to fill this gap. Specifically, this study aimed to examine the level of performance of commercial banks; and to investigate the relationship between the attributes of IC and performance of commercial banks. In addition, the study aimed to highlight the current strength of human capital investment in banks and identify future policy needs.

The research will assist managers to evaluate their performances. Further, the outcomes of the study will help investors in making investment choices and in designing bank investment strategies. In the same token, the study will help analysts in designing policy & strategy in the value creation process. As Ethiopia is preparing to liberalize (foreign operator entry) the banking sector, the study could be used as a benchmark for bank performance before liberalization. Researchers argue that foreign bank will have overall positive effect and it will specifically enhance domestic bank efficiency (Goh, 2005; Pohl, 2010). In this connection, this paper will help to validate such assertions after liberalization performances.

The paper is organized into six sections. Section two is about the literature review and followed by the third section on the Ethiopian banking industry. The fourth section presents methodology and data matters. The fifth section discusses the IC performance of commercial banks and finally, the conclusion of the study is presented in section six.

2. Literature Review

2.1 The Concept of Intellectual Capital

Although its root goes back to the period of Adam Smith (Angrist et al., 2019), the word "Intellectual Capital" or IC, in short, came into academia in the 1960s in the application of the human behavior process (Galbraith, 1967). The term has several names such as "human capital" and "resources embedded in people" (World Bank, 1999); "intangible assets" and "intangibles" (Kujansivu, 2005); "knowledge assets", "intangible resources", and "intangible goods" (Kujansivu & Lönnqvist, 2007). Later, IC is identified as the driver of business performance by researchers (Edvinsson & Malone, 1997; Pulic, 2004). IC is also becoming the subject of information disclosure in financial and non-financial reports (Birindelli et al., 2020). Due to this, IC has become a vibrant topic in management and accounting research (Faraji et al., 2022).

Although the importance of IC is discussed in many research papers, there is no agreed definition of the concept (El-Bannany, 2012). However, most authors agree that it is an intangible resource that encompasses knowledge, experience, management philosophy, brands, business culture, systems, and human resources used to support the creation of value (Edvinsson & Malone, 1997; Stewart, 1997). Lev (2001), however, summarizes the concept of IC as non-physical sources of value generated by innovation, unique organizational designs, and human resource practices.

The value of IC is the aggregate sum of its components. However, the number and type of components vary greatly. Choong (2008) classified IC into Human Capital (HC), Structural Capital (SC), Customer Capital (CC), and Property Rights Capital (PRC). Pulic (2004) & Edvinsson (1997), on the other hand, grouped the IC into HC and SC. Stewart (1997) and Riahi-Belkaoui (2003) further extended the classification into three: Customer Capital, Human Capital, and Structure Capital. But, Bontis (1998), and Kujansivu (2009) claimed that IC should not be built only on the three elements but should also consist of other intangible resources such as skills, brand name, organizational structure, knowledge, customer relations, and employee competence. Mollah & Rouf (2022), and Majumder et al., (2023) apply Human Capital (HC), Structural Capital (SC), and Capital Employed (CE) classifications in their research. Daum (2003) used the terminology "Relational Capital", instead of "Capital Employed", as a measure of the relationship between a firm and its external stakeholders. Hanif et al., (2019) extended the components of IC by adding "Spiritual Capital" which is related to Islamic Finance terminology called "Zacat" (Charity).

As can be inferred from the above review, many researchers consider IC in three factors: HC, SC, and EC. This paper, too, followed the three-component technique as it is widely applied in IC research (Wisetsri et al., 2021, p. 1922). Descriptions of each component are given below:

2.1.1 Human Capital

Jin and Wang (2020) define human capital as the increased value of employees' skills, productivity, and efficiency through training and skill development. According to Iazzolino et al., (2014), human capital is not a set of characteristics held by employees, but the amount of capital invested in the knowledge nourishment of workers. In this connection, employee training and development cost is considered as human capital investment. It includes both tacit and explicit knowledge of employees (Buallay et al., 2019). Similarly, Roslender & Fincham (2004) underlined that human capital is the most critical component of IC.

2.1.2 Structural Capital

Structural capital refers to the non-human intangible assets such as patents, databases, culture, routine processes, rules, formulas, policies, procedures, copyrights, trademarks, competitive landscape, databases (Khalique et al., 2011; Wasim-ul-Rehman et al., 2013); and the organizational philosophy that provides a supportive infrastructure to the functioning of human capital (Yang & Lin, 2009; Daum, 2003). According to Goh (2005), structural capital is the knowledge of a firm that remains in business. It is a firm's capacity to withstand both internal and external challenges (Cabrita & Vaz, 2006).

2.1.3 Capital Employed (Relational Capital)

This term has alternative names by different authors such as "customer capital", "relational capital" and "external capital" (Wisetsri et al., 2021). It is a measure of the longevity of service (Bontis, 2002), and it helps to convert intellectual capital into market value (Matinfard & Khavaria, 2015).

2.2 Intellectual Capital and Bank Performance

Due to the failure of the standard financial reporting to capture the IC value in the knowledge economy (Lev, 2004; Kujansivu, 2005; Lajili & Zeghal, 2005), several methods of performance measurement have been designed and applied (Pike and Ross, 2004). For instance, Andriessen (2004) listed 30 methods while Chan (2009) enumerated 34 methods. Further, others crafted a modified version of the former models (Buallay et. al., 2019; Nadeem et al., 2018).

Despite the availability of numerous methods, there is no widely accepted single method of IC measurement. However, among the proposed methods, the Value-Added Intellectual Coefficient (VAIC^{TM}) is widely used to measure bank performances (Pulic, 2000; Cabrita & Vaz, 2006; Chen et al., 2005; Firer & Williams, 2003; Kujansivu & Lonnqvist, 2007). Also, the model has been applied to measure non-bank firm performances as well (Iazzolino et al., 2014; Chouaibi & Kouaib, 2015, and Chu et al., 2011).

The model has been employed to study bank performances in Australia (Joshi et al., 2010), the UK (El-Bannany, 2008), Greece (Mavridis & Kyrmizoglou, 2005), Taiwan (Chen et al., 2005 and

Wang, 2011), China (Zou & Huan, 2011), Croatia (Pulic, 2001), India (Kamath, 2007), Turkey (Nassar, 2018), Japan (Mavridis, 2004), Malaysia (Goh, 2005), Ghana (Alhassan & Asware, 2016), Pakistan (Wisetsri et al., 2021), Uganda (Kamukama, 2013), Nigeria (Oko et al., 2018), UAE (El-Bannany, 2012), Italy (Birindelli et al., 2020), the USA (Jin & Wang, 2020; Shahzad et al., 2022) and others. Further, the model helped to study comparisons between Islamic and Conventional banks (Latif et al., 2012; Hasan et al., 2017); and regional and cross-country bank performances such as GCC (Ousama et al., 2020; Akkas & Asutay, 2022), Baltic (Berzkalnea & Zelgalve, 2014), BRICS (Rehman et al., 2021), China and Pakistan (Xu et al., 2022), and East African Countries (Githaiga, 2022).

In addition, as documented by Joshi et al., (2010, p.157), the VAIC^{TM} model has several benefits. The results of the model can easily be quantified and understood; it can be employed for any firm size; and enhance the utility of traditional financial statements; it is simple and easy to calculate; it is useful to compare different entities; it uses consistent inputs/outputs and its data input is publicly available.

However, as it is based on accounting data, its problem (historical data) will have a spillover effect on the model results. Further, Bank performance is a function of many variables such as outputs, costs (inputs), and efficiency such as scale efficiency, scope efficiency, and X-efficiency which are not captured in the model (Chatzoglou et al., 2010). Hence, defining bank performance by only the three variables may increase the limitation of the model.

A large body of empirical evidence is available measuring bank performances using the VAIC model (Ovechkin et al., 2021; Buallay et al., 2020; Ousama et al., 2020). Nevertheless, most of these studies are conducted in developed nations, and empirical evidence for emerging countries is limited (Albulescu, 2015; Vera-Gilces et al., 2020). In this study, the author addressed the issue in the context of Ethiopia, one of the fastest-growing economies in sub–Saharan Africa, with huge bank market potential.

3. The Ethiopian Banking Sector

Banks are among the notable service sectors driven by human knowledge. Research show that IC increases the productivity and profitability of banks; and of all, human capital is a critical resource for banks (Yao et al., 2019; Oppong & Pattanayak, 2019). It is true that a resilient banking sector contributes to the stability of a financial system and the eventual development of the economy (Vera-Gilces et al., 2020). There is also a positive relationship between better bank sector performance and economic development (Graff, 2003).

Ethiopia introduced a modern banking system in 1905. Since then, the sector passed a number of ups and downs in its course of development. The nationalization of private banks during the Socialist Regime skewed the banking sector. Later, the banking business reemerged in 1994 when the new Regime allowed the reestablishment of private banks. On June 30, 2023, the total number of banks reached 31; two of them were government-owned (NBE, 2023). In addition, during the reported period, four of the private banks were Islamic banks. All these banks were operating in

11,281 branches (80% private). As can be seen from Table 1, the Ethiopian banks are young; and 52% of them have less than 10 years' experience in the industry.

Table 1: Establishment of Banks

Year of establishment	Gov.	Pvt.	Total	Aver. Year of service up to 2022
Before 1994	2	0	2	> 75 years
1994-2000	0	6	6	26.5 years
2001-2010	0	7	7	23.0 Years
2011-2020	0	4	4	9.3 years
2021-2023	0	12	12	1.1 years
Total	2	31	31	

Source: National Bank of Ethiopia and Banks Website

The total equity capital of the 31 banks was around US$3.75 billion (64% private) as of June 30, 2023[1]. During the same year, these banks had US$ 41.65 (51% private) billion and US$37.52 billion (51% private) deposits, loans & advances, respectively. Thus, the market share of private banks was around 51%.

According to the GSMA report (2023), Ethiopia has lower levels of financial inclusion compared to its East African neighbors. Only about 50% of the adult population has a bank account. Cognizant of the low level of inclusion, the Government, in its revised National Financial Inclusion Strategy, has planned to increase financial inclusion from 46% to 70% by 2025; and its Digital Payments coverage from 20% (2020) to 49% by 2025. Expanding mobile money and opening the banking business to foreign operators will also increase the financial inclusion of the Nation. Recently, the Ethio-Telecom launched a mobile money service called Tele-Birr. And Safaricom, the first foreign private telecom operator, received a mobile money license in May 2023. So far, the banking business is not opened to foreign operators. However, according to Reuters (May, 2023), the Ethiopian Government is planning to issue up to five banking licenses for foreign investors in the next five years.

4. Study Design and Methodology

The study applied the VAIC[TM] Ranking methodology to analyze the intellectual capital performance of the Ethiopian banks.

4.1 Sample and Data
This paper used secondary data collected from the Banks' annual audited reports and the National Bank of Ethiopia (NBE) annual reports. Since all data are gathered from audited financial

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[1]National Bank of Ethiopia (NBE) data on 06/30/2023; Weighted average exchange rate: US$/Birr was Br. 51.9938

statements, it can be argued that the measurement is objective and verifiable (Joshi et al., 2010; Goh, 2005).

Although there are 31 banks during the sample period, not all banks are analyzed in this paper. One of these banks, which is Government owned, is a policy bank and not engaged in commercial banking activities. From the remaining 30 banks, only those banks who have been operating for, at least, one business cycle (average of 5 years), are chosen (Groth et al., 2013). It is argued that the strength of an institution is associated with length of stay in a given industry (El-Bannany, 2012). Accordingly, 13 banks are reduced from the sampling scope as they have below 5 years of existence in the market. Thus, analysis is made on the remaining 17 banks of which one of them is Government owned. All Islamic banks are not included in the sample as they have less than 5 years of existence in the market. The 17 banks represent 73% of the industry Equity capital and 95% of industry bank branches. Thus, sufficient industry coverage can be observed from the sampling. Table 2 depicts the profile of sample banks at the close of the 2022 fiscal year[2].

Table 2: Sample Bank Profiles (June 2022)

No	Name of Bank	No of Staff	Total Asset ($ '000)*	Total Equity ($ '000)*	ROA**	ROE**
1	Abay Bank	6,990	782,699	112,640	2.29%	15.94%
2	Addis International Bank	1,060	207,492	41,796	3.20%	15.87%
3	Awash Bank	17,393	3,527,172	402,955	2.91%	25.49%
4	Berhan Bank	6,278	635,935	85,856	1.45%	10.72%
5	Bank of Abyssinia	9,677	2,874,409	273,421	2.17%	22.76%
6	Buna Bank	2,932	655,916	97,420	2.58%	17.40%
7	Commercial Bank of Ethiopia	39,801	22,242,181	1,045,003	1.66%	35.38%
8	Cooperative Bank of Oromia	6,547	2,204,221	217,565	1.78%	18.08%
9	Dashen Bank	12,406	2,253,039	276,580	2.48%	20.20%
10	Debub Global Bank	2,332	270,910	42,092	1.97%	12.66%
11	Enat Bank	978	330,982	49,863	1.83%	12.12%
12	Hibret Bank	4,971	1,296,487	139,389	1.62%	15.06%
13	Lion International Bank	4,189	634,169	73,736	0.82%	7.01%
14	Nib International Bank	7,578	1,182,666	156,086	2.18%	16.49%
15	Oromia (Int'l) Bank	8,090	1,000,119	84,625	2.31%	27.27%
16	Wegagen Bank	4,824	829,362	107,976	1.28%	9.82%
17	Zemen Bank	1,325	675,461	120,339	4.20%	23.59%

Source: NBE and Banks Annual Reports (June 30, 2022) * NBE weighted average exchange rate: US$/Birr 51.9938 on June 30, 2022 **Computed from annual reports

Another sampling issue was deciding on the number of years to be covered in the study. The author did not find specific standard as how many years to be taken for IC performance study. In the

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[2] NBE weighted average exchange rate of Birr/US$ on 30 June 2022 was Br 51.9938 per US$.

literature survey samples range from Three (Joshi et al., 2010; Ousama, et.al, 2020) to Fourteen (Maji & Hussain, 2021) years of bank operation. The number of banks in the sample also vary ranging from 13 (Joshi et al., 2010) to 127 (Githaiga, 2022) banks. Accordingly, the number of bank-year observations does vary from 33 to 1270 bank-years. This paper covered Six years data (2017-2022) and 17 banks with a total of 102 bank-year observations. At the time of writing this paper, the 2023 fiscal year bank data were not publicly available and, hence, not included in the study.

4.2 Variable Definitions

The different variables used in the VAIC Ranking model are described below.

Company Value Added (VA)
Company Value Added is the result of the difference between outputs and inputs in bank operations (Majumder et al., 2023; Akkas & Asutay, 2022). Outputs encompass all income or revenues generated during the period. The input, on the other hand, includes all operating and non-operating expenses without including the human investment cost.

Human Capital (HC)
Human Capital is associated with employees' tacit or explicit knowledge (Buallay et al., 2019, p. 675). The total costs invested on employees such as wages, salary, and benefits are used as a proxy for Human Capital.

Structural Capital (SC)
Structural Capital is defined as explicit knowledge that has been internalized by the firm. According to Pulic (2004), the total IC of a firm is divided into HC and SC. If firm value is generated from the sum of HC and SC, then the difference between VA and HC will result in SC. Thus, SC=VA-HC.

Capital Employed (CE)
Capital Employed or Capital used or Internal Capital or Relational Capital includes the physical and human capital of a firm (Wisetsri et al., 2021). The book value total assets is used as a proxy.

Valued Added Intellectual Coefficient (VAIC^{TM})
Valued Added Intellectual Coefficient is, therefore, the total of coefficients of its components: HC, SC, and CE. To this end, individual coefficients can be computed in the following manner:

$$\text{HCE (Human Capital Coefficient)} = \frac{VA}{HC}$$

$$\text{CEE (Capital Employed Coefficient)} = \frac{CE}{VA}$$

$$\text{SCE (Structural Capital Coefficient)} = \frac{SC}{VA}$$

Thus, VAIC = HCE + SCE + CEE

5. IC Performance of Commercial Banks

The main problem with measuring banking performance is that it is difficult to define performance as there are many factors involved. Bank performance is also affected by the type of efficiency considered such as scale efficiency, scope efficiency, and X-efficiency (Chatzoglou et al., 2010). The approach of looking a bank operation does also affect performance measurements. That is, one may look at the bank from production perspective, where only the operating costs are measured for performance. Or, by considering the intermediation roles of banks. The academic literature documented measurements from experiential statistical to econometrics approaches. As outlined above, a value-added approach is followed considering both the input and outputs of banks.

5.1 VAIC Ranking

According to Soewarno & Tjahjadi (2020), intellectual capital increases the value of a firm. That is, the greater the value of intellectual capital, leads to more efficient the use of capital (Appuhami, 2007). In order to substantiate this argument, the yearly VAIC is computed using six years of financial data, and a yearly ranking is made. Table 3 depicts the bank performance ranking.

Table 3- Annual and Average VAIC Ranking

Name	2017	2018	2019	2020	2021	2022	Average
Abay Bank	11	5	5	6	4	8	6
Addis International Bank	5	8	6	3	3	4	4
Awash Bank	6	6	4	5	5	5	5
Berhan Bank	7	16	14	14	16	15	16
Bank of Abyssinia	13	17	13	16	14	10	15
Buna Bank	12	10	8	12	6	12	10
Commercial Bank of Ethiopia	3	12	7	15	9	3	9
Cooperative Bank of Oromia	16	15	16	7	11	7	13
Dashen Bank	9	13	15	13	8	6	12
Debub Global Bank	17	4	3	4	13	14	7
Enat Bank	4	3	9	8	10	11	8
Hibret Bank	14	14	12	10	7	9	11
Lion International Bank	10	11	10	9	15	16	14
Nib International Bank	1	1	2	2	2	2	2
Oromia (Int) Bank	15	9	11	11	12	13	3
Wegagen Bank	8	7	17	17	17	17	17
Zemen Bank	2	2	1	1	1	1	1

As can be observed from Table 3, Zemen bank stood first almost in all years and in the average ranking. Nib International bank took the second position in the ranking. In the first two years, Nib was leading the bank ranking. In later years, its position was taken by Zemen bank. In recent years, Addis International bank has shown an improvement in ranking. On the other hand, Berhan bank, Bank of Abyssinia and Lion International bank's ranking is declining over the last three years. The last three years were marked with instability in some parts of the country. And the impact of this instability was observed more in the performances of Wegagen and Lion International banks. Although the past instability was raised as major reason, these banks were also having two-digit ranking performance in earlier years, too. This result show the need for further research on the human resource composition and the method of talent-hunting in these banks. However, it can be argued that those who invest in quality human capital can earn the benefits in their performance.

In order to observe the performance variations, traditional rankings is compared with VAIC taking the 2022 data.

Table 4-VAIC, Total Asset & Total Equity Ranking (2022)

Bank	Total Assets	Total Equity	VAIC
Abay Bank	10	9	8
Addis International Bank	17	17	4
Awash Bank	2	2	5
Bank of Abyssinia	3	4	15
Berhan Bank	13	12	10
Buna Bank	12	11	12
Commercial Bank of Ethiopia	1	1	3
Cooperative Bank of Oromia	5	5	7
Dashen Bank	4	3	6
Debub Global Bank	16	16	14
Enat Bank	15	15	11
Hibret Bank	6	7	9
Lion International Bank	14	14	16
Nib International Bank	7	6	2
Oromia (Int'l) Bank	8	13	13
Wegagen Bank	9	10	17
Zemen Bank	11	8	1

As can be inferred from Table 4, the value-added intellectual coefficient ranking does not align with that of traditional rankings which is in line with earlier studies (Joshi et al., 2010). Further, those large banks in terms of asset or equity value are not those banks with the highest VAIC. That is, the value-addition of banks may not be the result of the size of equity capital or the magnitude of assets they own.

On the other hand, VAIC is a composite figure of its components. The degree of impact of each component varies from bank to bank and from year to year. Figure 1 and 2 below depicts the magnitude of the components of VAIC for the year 2022.


Figure 1. VAIC and its Components-2022 (1)
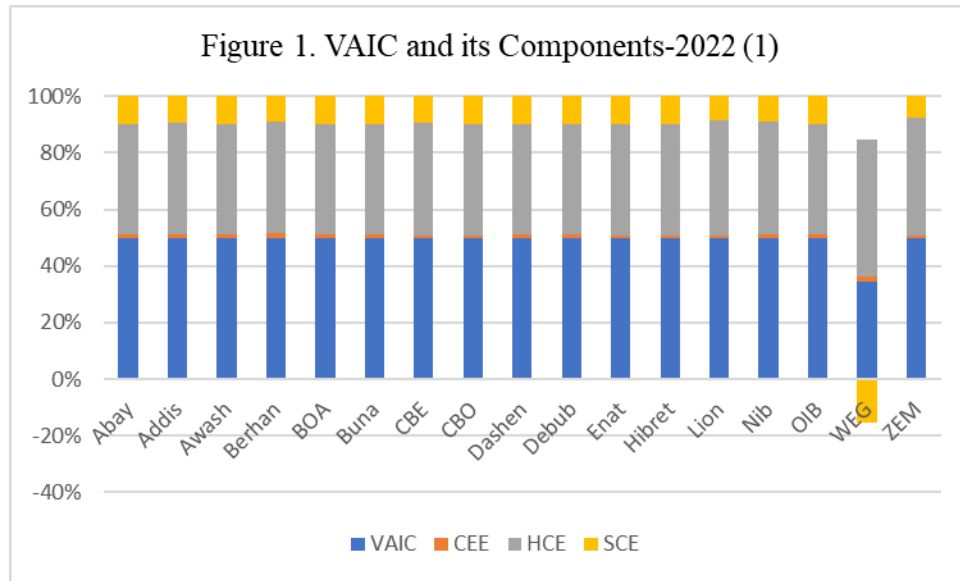
As can be observed from Figures 1 and 2, those banks with the highest ranking, had higher HCE indexes confirming the results of similar studies by Yao et al., (2019) and Oppong & Pattanayak, (2019). And those with low SCE were generating very low VAIC. As seen below, over the last six years, the critical driver of bank performance was found to be HCE followed by SCE and CEE (see Fig. 2).

Figure 2. VAIC and its Components-2022 (2)
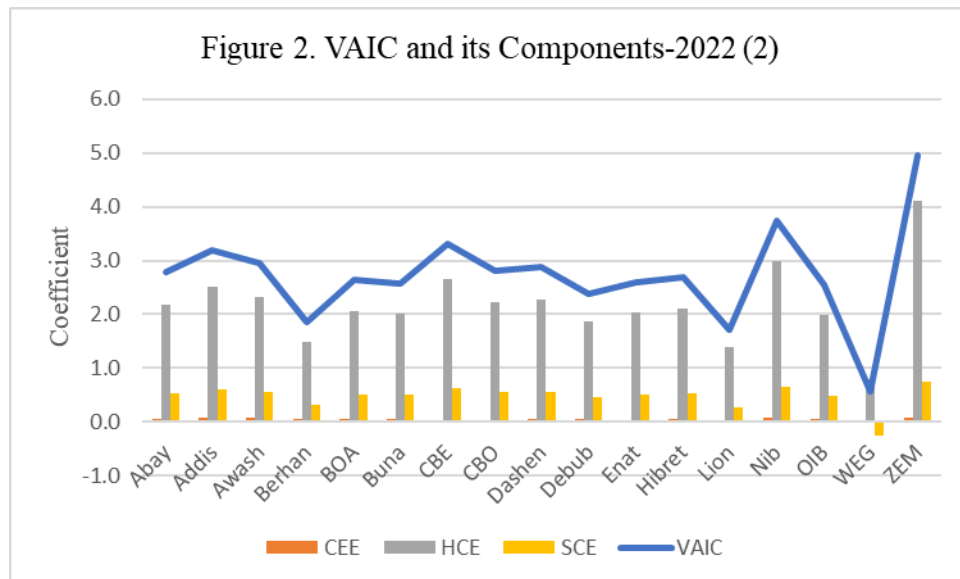
5.2 VAIC in Box and Whisker Chart

A box and whisker chart shows the distribution of quartile data including the median and outliers. The lines extending vertically, called 'whiskers', indicate variability outside the upper and lower quartiles. We can analyze the movement of VAIC over the sample period using a box and whisker chart as shown in Figure 3.

Figure 3. VAIC Quartile Distributions (2017-2022)
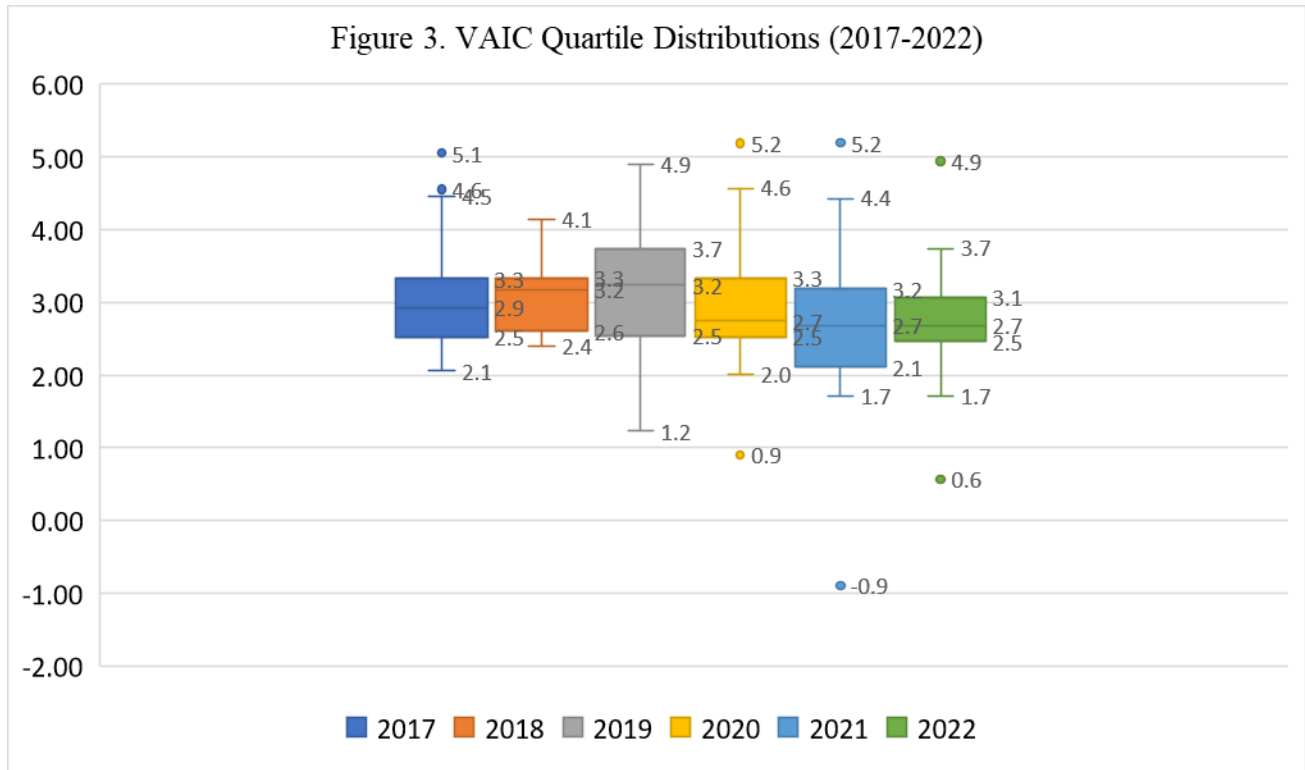
Looking at the box and whisker chart, the yearly aggregate mean of VAIC is declining as we go from 2017 to 2022. That is, the mean of the VAIC index was 3.1 in 2017 and declined to 2.7 in 2022 indicating the presence of less value addition trend in succeeding years of the study.

The quartile distribution of the box and whisker chart can also help us to classify above and below benchmark performances. The upper quartile (3rd quartile or Q3) and the lower quartile (1st quartile or Q1) are the upper and lower bounds of the quartile distribution. It is possible to set up a performance class between the middle quartile (2nd quartile or Q2) and upper quartile; and between the middle quartile (2nd quartile or Q2) and lower quartile. Best performers are "above Q3" while lower performers are "below Q1" category. The following Table shows box and whisker VAIC performance category distribution.

Table 5- Performance Category Distribution

	Above Q3		Between Q3 & Q2		Between Q2 & Q1		Below Q1	
	2017	2022	2017	2022	2017	2022	2017	2022
Abay Bank				X	X			
Addis International Bank		X	X					
Awash Bank			X	X				
Berhan Bank			X					X
Bank of Abyssinia					X	X		
Buna Bank					X	X		
Commercial Bank of Ethiopia	X	X						
Cooperative Bank of Oromia				X			X	
Dashen Bank			X	X				
Debub Global Bank							X	X
Enat Bank	X					X		
Hibret Bank				X			X	
Lion International Bank					X			X
Nib International Bank	X	X						
Oromia Bank						X	X	
Wegagen Bank			X					X
Zemen Bank	X	X						

As can be observed from the above performance categorization, some banks (CBE, Nib, Zemen, Awash, Dashen, Abyssinia, Buna, and Debub Global) retain their previous performance category if one takes the beginning and the ending years of the study as points of reference. Other banks (Addis International, Abay, Cooperative, Hibret, and Oromia) were improving their previous performance category. But, Berhan, Enat, Lion, and Wegagen banks show a declining position from the 2017 performances.

6. Conclusions

The performance of the Ethiopian banking industry is evaluated using the VAIC ranking with a data set containing 17 banks and 6 years of performance. The bank's performance is ranked based on VAIC and its component indices. Generally, over the last six years, the critical driver of bank performance was found to be human resource investment, followed by structural capital and bank relations. According to the research result, the size of a bank does not align with value addition of banks. Further, the absolute value addition trend of the industry is declining over the sample period. Of all the VAIC components, the investment in human resources was found to be the critical driver of value addition in banks.

The study has the following implications. First, intellectual capital should be considered a critical strategic asset for Ethiopian banks. This was identified early by the National Bank of Ethiopia's earlier circular, instructing banks to spend 2% of their operating expenses on human resource development (Ali, 2020). Thus, to boost bank performance, investment in human capital is becoming critical.

Second, this study contributes to the empirical literature by exploring the impact of VAIC dimensions (HCE, SCE, and CCE) on performance in the protected banking industry. Thus, the study will be used as a benchmark for future VAIC studies where both foreign and domestic banks are operating in Ethiopia.

Finally, this research opens a venue for further research on the Ethiopian Banks human capital. We observed those banks with relatively lower assets and equity got the higher VAIC performance. But, the research does not answer the query as why these banks are best performers compared to others. It is the proposal of the author to investigate the composition of the human talent in tis banks the methods of talent hunting and developing.

References

Akkas, E., & Asutay, M. (2022). The impact of intellectual capital formation and knowledge economy on banking performance: a case study of GCC's conventional and Islamic banks. *Journal of Financial Reporting and Accounting*, 21(5), 1149-1170. *https://doi.org/10.1108/jfra-08-2021-0251*

Ali, K. (2020). Financial Institutions Delving into the Surge in Training. *Ethiopian Business Review, 9th Year No 85).https://ethiopianbusinessreview.net/financial-institutions-delving-into-the-surge-in-*trainings/#:~:text=In%20the%20current%20dynamic%20business, efficiency%20and%20meet%20customer%20expectations.

Albulescu, C. (2015). Banks' profitability and financial soundness indicators: a macro-level investigation in emerging countries. *Procedia Economics and Finance*, 23, 203-209.*https://doi.org/10.1016/S2212-5671(15)00551-1*

Alhassan, A., & Asare, N. (2016). Intellectual capital and bank productivity in emerging markets: evidence from Ghana. *Management Decision,* 54(3), 589-609.*https://doi.org/10.1108/MD-01-2015-0025*

Andriessen, D. (2004). *Making Sense of Intellectual Capital: Designing a Method for theValuation of Intangibles.* Elsevier Butterworth-Heinemann, Oxford.

Angrist, N., Djankov, S., Goldberg, P., & Patrinos, H. (2019). Measuring Human Capital. *World Bank Policy Research Working Paper*, 8742, February. https://documents1.worldbank.org/curated/en/540801550153933986/pdf/Measuring-Human-Capital.pdf

Appuhami, R. (2007). The Impact of intellectual capital on investors' capital gains on shares: an empirical investigation of Thai banking, finance & insurance sector. *International Management Review*, 3(2), 14-25. http://americanscholarspress.us/journals/IMR/pdf/IMR-2-2007/v3n207-art2.pdf

Bellucci, M., Marzi, G., Orlando, B., & Ciampi, F. (2021). Journal of Intellectual Capital: a review of emerging themes and future trends. *Journal of Intellectual Capital,* 22(4), 744-767.DOI 10.1108/JIC-10-2019-0239

Berzkalnea, I., & Zelgalve, E. (2014). Intellectual capital and company value. *Procedia - Social and Behavioral Sciences*, 110, 887– 896. DOI:10.1016/j.sbspro.2013.12.934

Birindelli, G., Ferretti, P., Chiappini, H., & Cosentino, A. (2020). Intellectual Capital Disclosure: Some Evidence from Healthy and Distressed Banks in Italy. *Sustainability*, 12(8), 1-20. DOI:10.3390/su12083174

Bontis, N. (2002). There is a price on your head: managing intellectual capital strategically. *Business Quarterly*, 60(4), 40-47. https://www.proquest.com/docview/225366671

Bontis, N. (1998). Intellectual capital: an exploratory study that develops measures and models. *Management Decision*, 36(2), 63-76. https://doi.org/10.1108/00251749810204142

Buallay, A., Cummings, R., & Hamdan, A. (2019). Intellectual capital efficiency and bank's performance -A comparative study after the global financial crisis. *Pacific Accounting Review*, 31(4), 672-694.https://doi.org/10.1108/PAR-04-2019-0039

Buallay, A., Hamdan, A., Reyad, S., Badawi, S., & Madbouly, A. (2020). The efficiency of GCC banks: the role of intellectual capital. *European Business Review*, 32(3), 383-404. https://doi.org/10.1108/ebr-04-2019-0053

Cabrita, M., & Vaz, J. (2006). Intellectual capital and value creation: evidence from the Portuguese banking industry. *The Electronic Journal of Knowledge Management*, 4 (1), 1120.https://www.academia.edu/838722/Intellectual_Capital_and_Value_Creation_Evidence_from_the_Por_tuguese_Banking_Industry

Chan, K. (2009). Impact of intellectual capital on organizational performance: an empirical study of companies in the Hang Seng Index (Part 1). *The Learning Organization*, 16(1), 4-21. DOI:10.1108/09696470910927641

Chatzoglou, P., Diamantidis, A., Vraimaki, E., Polychrou, E., & Chatzitheodorou, K. (2010). Banking productivity: an overview of the Greek banking system. *Managerial Finance,* 36, 1007-1027. DOI: 10.1108/03074351011088423

Chen, M., Cheng, S., & Hwang, Y. (2005). An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance. *Journal of Intellectual Capital*, 6(2), 159–176. https://doi.org/10.1108/14691930510592771

Choong, K. (2008). Intellectual capital: definitions, categorization, and reporting models. *Journal of Intellectual Capital*, 9(4), 609-638. https://doi.org/10.1108/14691930810913186

Chouaibi, J., & Kouaib, A. (2015). Impact of shareholders' identity on intellectual capital performance: Evidence from Tunisian manufacturing companies. *International Journal of Managerial & Financial Accounting*, 7(3-4), 246-267. https://doi.org/10.1504/IJMFA.2015.074903

Chu, W., Chan, H., Yu, Y., Ng, T., & Wong, K. (2011). An Empirical Study of the Impact of Intellectual Capital on Business Performance. *Journal of Information & Knowledge Management*, 10(1), 11-21. http://dx.doi.org/10.1142/S0219649211002791

Daum, H. (2003). *Intangible Assets and Value Creation.* John Wiley & Sons, New York

Drucker, F. (1969). *The Age of Discontinuity: Guidelines to our Changing Society.* William Heinemann Ltd, London.

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. https://doi.org/10.1108/14013381211272626

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.https://doi.org/10.1108/14691930810892045

Edvinsson, L., & Malone, S. (1997). *Intellectual Capital: Revealing Your Company's True Value by Finding its Hidden Roats.* Harper-Collins, New York, NY.

Edvinsson, L. (1997). Measuring intellectual capital at Skandia. *Long Range Planning*, 30(3), 266-373. https://doi.org/10.1016/S0024-6301(97)90248-X

Faraji, O., Asiaeib, K., Rezaeec, Z., Bontisd, N., & Dolatzareie, E. (2022). Mapping the conceptual structure of intellectual capital research: A co-word analysis. *Journal of Innovation & Knowledge*, 7, 1-19. http://dx.doi.org/10.1016/j.jik.2022.100202

Firer, S., & Williams, M. (2003). Intellectual capital and traditional measures of corporate performance. *Journal of Intellectual Capital*, 4(3), 348-360.https://doi.org/10.1108/14691930310487806

Foray, D. (2004). *Economics of knowledge.* MIT Press, Massachusetts.

Galbraith, K. (1967). *The New Industrial State.* Hamish Hamilton, London.

Githaiga, P. (2022). Intellectual capital and bank performance: the moderating role of income diversification. *Asia-Pacific Journal of Business Administration*, 15(4), 509-526.https://doi.org/10.1108/APJBA-06-2021-0259

Goh, P. (2005). Intellectual capital performance of commercial banks in Malaysia. *Journal of Intellectual Capital*, 6(3), 385-396. https://doi.org/10.1108/14691930510611120

Graff, M. (2003). Financial development and economic growth in corporate and liberal market Economies. *Emerging Markets Finance and Trade*, 39(2), 47-69.https://www.jstor.org/stable/27750333

Groth, A., Ghil, M., Hallegatte, H., and Dumas, P. (2013). Identification and reconstruction of oscillatory modes in U.S. business cycles using multivariate singular spectrum analysis. Availableat:https://www.researchgate.net/publication/266493843_Identification_and_reconstruction_of_oscillatory_modes_in_us_business_cycles_using_multivariate_singular_spectrum_analysis/ (accessed 6 June 2024)

GSMA Report (2023). Mobile Money in Ethiopia: Advancing financial inclusion. Available at:https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2023/06/GSMA_Mobile-money-in-Ethiopia-Advancing-financial-inclusion-and-driving-growth-report.pdf (accessed 15 July 2023).

Hanif, H., Rakhman, A., & Nurkholis, M. (2019). Intellectual capital: extended VAIC model and building of a new HCE concept: the case of Padang Restaurant Indonesia. *African Journal of Hospitality, Tourism, and Leisure*, Special Issue, 1-15. https://www.ajhtl.com/uploads/7/1/6/3/7163688/article_23_se_gbcss_2019.pdf

Hasan, R. Mohammad, N., & Alam, M.F. (2017). Impact of IC on profitability: conventional versus Islamic banks. *Journal of Accounting, Finance and Auditing Studies,* 3(2), 64-80.https://www.researchgate.net/publication/315769324_Impact_of_Intellectual_Capital_on_Profitability-Conventional_versus_Islamic_Banks#fullTextFileContent

Iazzolino, G., Laise, D., & Migliano, G. (2014). Measuring value creation: VAIC and EVA. *Measuring Business Excellence,* 18(1), 8-21. https://doi.org/10.1108/MBE-10-2013-0052

Jin, J., & Wang, W.(2020). Determinants and Consequences of Intellectual Capital Efficiency in the U.S. Banking Industry. *Theoretical Economics Letters*, 10, 384-408. https://doi.org/10.4236/tel.2020.102026

Joshi, M., Cahill, D., & Sidhu, J. (2010). Intellectual capital performance in the banking sector: an assessment of Australian-owned banks. *Journal of Human Resource Costing & Accounting*, 14(2), 151-170. https://doi.org/10.1108/14013381011062649

Kamath, B. (2007). The intellectual capital performance of the Indian banking sector. *Journal of Intellectual Capital*, 8(1), 96–123. https://doi.org/10.1108/14691930710715088

Khalique, M., Shaari, N., Isa, H., & Samad, N. (2013). Impact of intellectual capital on the organizational performance of Islamic banking sector in Malaysia. *Asian Journal of Finance & Accounting*, 5(2), 75-83. http://dx.doi.org/10.5296/ajfa.v5i2.4005

Khalique, M., Shaari, N., Isa, H., & Ageel, A. (2011). Role of Intellectual Capital on the Organizational Performance of Electrical and Electronic SMEs in Pakistan. *International Journal of Business and Management,* 6(9), 253-257. http://dx.doi.org/10.5539/ijbm.v6n9p253

Kujansivu, P. (2005). Intellectual capital performance in Finnish companies. In *3rd Conference on Performance Measurement and Management Control (EIASM), Nice, France, September 22-23, 2005.*

Kujansivu, P. (2009). Is there something wrong with intellectual capital management models? *Knowledge Management Research & Practice*, 7(4), 300-307. http://dx.doi.org/10.1057/kmrp.2009.23

Kujansivu, P., & Lonnqvist, A. (2007). Investigation the value and efficiency of intellectual capital. *Journal of Intellectual Capital*, 8(2), 272-87. https://doi.org/10.1108/14691930710742844

Kamukama, N. (2013). Intellectual capital: company's invisible source of competitive advantage. *Competitiveness Review,* 23(3), 260-283. https://doi.org/10.1108/10595421311319834

Lajili, K., & Zeghal, D. (2005). A content analysis of risk management disclosure in Canadian annual reports. *Canadian Journal of Administrative Sciences*, 22(2), 125-142.http://dx.doi.org/10.1111/j.1936-4490.2005.tb00714.x

Latif, M., Malik, S., & Aslam, S. (2012). IC efficiency and corporate performance in developing countries: a comparison between Islamic and conventional banks of Pakistan. *Interdisciplinary Journal of Contemporary Research in Business*, 4(1), 405-420.https://www.researchgate.net/publication/261031515_Intellectual_capital_efficiency_and_corporate_performance_in_developing_countries_A_comparison_between_Islamic_and_conventional_banks_of_Pakistan#fullTextFileContent

Lev, B. (2004). Sharpening the Intangible edge. *Harvard Business Review*, 82(6), 109-116, 138.https://hbr.org/2004/06/sharpening-the-intangibles-edge

Lev, B. (2001). *Intangibles: Management, Measurement and Reporting.* Brooking Institute Press: Washington, DC, USA.

Majumder, T., Ruma, I., & Akter, A. (2023). Does intellectual capital affect bank performance? Evidence from Bangladesh. *LBS Journal of Management & Research*, 21(2), 17-185. https://doi.org/10.1108/LBSJMR-05-2022-0016

Matinfard, M., & Khavaria, M. (2015). The impact of intellectual capital on firm performance: Evidence from Tehran Stock Exchange. *International Journal of industrial engineering & computations*, 5(11), 1005-1016. http://dx.doi.org/10.5267/j.msl.2015.8.011

Mavridis, D. (2004). The intellectual capital performance of the Japanese banking sector. *Journal of Intellectual Capital*, 5(1), 92-115. http://dx.doi.org/10.1108/14691930410512941

Mavridis, D., & Kyrmizoglou, P. (2005). Intellectual capital performance drivers in the Greek banking sectors. *Management Research News*, 28(5), 43-62. https://doi.org/10.1108/01409170510629032

Maditinos, D., Chatzoudes, D., & Tsairidis, C. (2011). The impact of intellectual capital on firms' market value and financial performance. *Journal of Intellectual Capital*, 12(1), 132-151.https://doi.org/10.1108/14691931111097944

Maji, S., & Hussain, F. (2021).Technical efficiency, intellectual capital efficiency, and bank performance in emerging markets: the case of India. *Journal of Advances in Management Research*, 18(5), 708-737. DOI: 10.1108/JAMR-09-2020-0218

Mollah, S., & Rouf, A. (2022). The impact of intellectual capital on commercial banks' performance: evidence from Bangladesh. *Journal of Money and Business*, 2(1), 82-93. https://doi.org/10.1108/JMB-07-2021-0024

Nadeem, M., Dumay, J., & Massaro, M. (2018). If you can measure it, you can manage it: a case of Intellectual Capital. *Australian Accounting Review,* 29(2), 395-407.https://doi.org/10.1111/auar.12227

National Bank of Ethiopia, NBE, (2022). *Annual Report.* Addis Ababa, Ethiopia. Available at https://nbebank.com/wp-content/uploads/pdf/annualbulletin/Annual%20Report%202020-2021/2021-22%20Annual%20report.pdf (accessed 15 June 2023).

National Bank of Ethiopia, NBE, (2023). *Financial Stability Report April 2004.* Addis Ababa, Ethiopia. https://nbe.gov.et/fsr/ (accessed 7 June 2024).

Nassar, S. (2018). The Impact of Intellectual Capital on Firm Performance of the Turkish Real Estate Companies before and after the Crisis. *European Scientific Journal,* 14(1), 29-45. http://dx.doi.org/10.19044/esj.2018.v14n1p29

OECD (1996). *The Knowledge-based Economy, Organization for Economic Co-operation and Development.* Paris, France.

Oko, J., Onodi, B., & Tapang, A. (2018). Effect of Intellectual Capital Management on Revenue Generation of Listed Commercial Banks in Nigeria. *Journal of Accounting and Financial Management*, 4(6), 56-81. https://www.researchgate.net/publication/337771966_Effect_of_Intellectual_Capital_Management_on_Revenue_Generation_of_Listed_Commercial_Banks_in_Nigeria#fullTextFileContent

Oppong, G., & Pattanayak, J. (2019). Does investing in intellectual capital improve productivity? Panel evidence from commercial banks in India. *Borsa Istanbul Review*, 19(3), 219-227.https://doi.org/10.1016/j.bir.2019.03.001

Ousama, A., Hammami, H., & Abdulkarim, M. (2020). The association between intellectual capital and financial performance in the Islamic banking industry: An analysis of the GCC banks. *International Journal of Islamic and Middle Eastern Finance and Management*, 13(1), 75-93.https://doi.org/10.1108/IMEFM-05-2016-0073

Ovechkin, D., Boldyreva, N. and Davydenko, V. (2021). Intellectual capital and value: testing new IC measures in Russia. *Journal of Economic Studies*, 48(6), 1111-1127.https://doi.org/10.1108/JES-05-2020-0226

Petty, R., & Guthrie, J. (2000). Intellectual capital literature review: measurement, reporting and management. *Journal of Intellectual Capital*, 1(2), 155-176. . https://doi.org/10.1108/14691930010348731

Pike, S., & Ross, G. (2004). Mathematics and modern business management. A paper presented at the 25th McMaster World Congress Managing Intellectual Capital, January 14-16, Hamilton, Ontario, Canada, available at: https://www.researchgate.net/publication/274387351_Mathematics_and_Modern_Business_Management (accessed 10 June 2023).

Pohl, B. (2010). Foreign Banks in Sub-Saharan Africa - Do North-South and South-South Banks Induce Different Effects on Domestic Banks? Proceedings of the German Development Economics Conference, Hanover, No. 10, Vereinfür Socialpolitik, Ausschussfür Entwicklungsländer, Göttingen. https://www.econstor.eu/bitstream/10419/39983/1/271_pohl.pdf

Powell, W., & Snellman, K. (2004). The knowledge Economy. *Annual Review of Sociology*, 30, 199–220. https://doi.org/10.1146/annurev.soc.29.010202.100037

Pulic, A. (2004). Intellectual capital–does it create or destroy value? *Measuring Business Excellence*, 8(1), 62-68. https://doi.org/10.1108/13683040410524757

Pulic, A. (2001). Value creation efficiency analysis of Croatian Banks 1996-2000. Available at: www.vaic-on.net/start.htm (accessed June 5, 2023).

Pulic, A. (2000). VAIC™: an accounting tool for IC management. *International Journal of Technology Management*, 20(5-8), 702-714. http://dx.doi.org/10.1504/IJTM.2000.002891

Rechberg, I., & Syed, J. (2013). Ethical issues in knowledge management: conflict of knowledge ownership. *Journal of Knowledge Management*, 17(6), 828-847. https://doi.org/10.1108/JKM-06-2013-0232

Rehman, U., Sheikh, L., & Jalil, F. (2021). Revisiting the Nexus Between Intellectual Capital and Performance of BRICS Financial Sector. *Pakistan Social Sciences Review*, 5(1), 516-534. https://pssr.org.pk/issues/v5/1/revisiting-the-nexus-between-intellectual-capital-and-performance-of-brics-financial-sector.pdf

Reuters. (3 May 2023). *Ethiopia to offer up to five banking licenses to foreign investors*. Retrieved from https://www.reuters.com/business/finance/ethiopia-offer-up-five-banking-licenses-foreign-investors-2023-05-03.

Riahi-Belkaoui, A. (2003). Intellectual Capital and firm performance of US multinational firms: a study of the resource-based and stakeholder views. *Journal of Intellectual Capital*, 4(2), 215-226. https://doi.org/10.1108/14691930310472839

Roslender, R., & Fincham, R. (2004). Intellectual capital accounting in the UK. *Accounting, Auditing & Accountability Journal*, 17(2), 178–209. https://doi.org/10.1108/09513570410532429

Ruta, C. (2009). HR portal alignment for the creation and development of intellectual capital. *The International Journal of Human Resource Management*, 20(3), 562-577. https://doi.org/10.1080/09585190802707318

Shahzad, F. Baig, M., Rehman, I., Saeed, A., & Asim, A. (2022). Does intellectual capital efficiency explain corporate social responsibility engagement-firm performance relationship? Evidence from environmental, social and governance performance of US-listed firms. *Borsa Istanbul Review,* 22(2), 295-305. https://doi.org/10.1016/j.bir.2021.05.003

Soewarno, N., & Tjahjadi, B. (2020). Measures that matter: an empirical investigation of intellectual capital and financial performance of banking firms in Indonesia. *Journal of Intellectual Capital*, 21(6), 1085-1106. https://doi.org/10.1108/JIC-09-2019-0225

Stewart, T.(1997). *Intellectual Capital: The New Wealth of Organizations*, Doubleday, New York, NY.

Vera-Gilces, P., Mogro, S., Rodriguez, X., & Marcos, G. (2020). A look inside banking profitability: evidence from a dollarized emerging country. *The Quarterly Review of Economics and Finance*, 75, 147-166. DOI: 10.1016/j.qref.2019.05.002

Wang, M. (2011). Measuring intellectual capital and its effect on financial performance: evidence from the Capital Market in Taiwan. *Frontiers of Business Research in China*, 5(2), 243-265. DOI 10.1007/s11782-011-0130-7

Wasim-ul-Rehman, A., Rehman, U., & Hafeez. (2013). Intellectual capital efficiency and financial performance of insurance sector in Pakistan: A panel data analysis. *Middle East Journal of Scientific Research*, 17(9), 1251–1259. http://dx.doi.org/10.5829/idosi.mejsr.2013.17.09.12285

Wisetsri, W., Johal, R., Hoque, A., & Ngo-Hoang, D. (2021). Nexus between Intellectual Capital and Performance of a Financial Institution. *Indian Journal of Economics and Business,* 20(4), 1919-1938. https://www.researchgate.net/publication/362091433_Nexus_between_Intellectual_Capital_and_Performance_of_a_Financial_Institution#fullTextFileContent

World Bank (1999). *World Development Report- Knowledge for Development.* Oxford University Press, Oxford. https://elibrary.worldbank.org/doi/abs/10.1596/978-0-1952-1118-4

Xu, J., Haris, M., & Irfan, M. (2022). The Impact of Intellectual Capital on Bank Profitability during COVID-19: A Comparison with China and Pakistan. *Complexity*, 1-10. https://doi.org/10.1155/2022/2112519

Yang, C., & Lin, C.(2009). Does intellectual Capital mediate the relationship between HRM and organizational performance? The perspective of the healthcare industry in Taiwan. *The International Journal of Human Resource Management*, 20(9), 1965-1984. https://psycnet.apa.org/doi/10.1080/09585190903142415

Yao, H., Haris, M., Tariq, G., Javaid, H., & Khan, M. (2019). Intellectual capital, profitability, and productivity: evidence from Pakistani financial institutions. *Sustainability*, 11(14), 1-30. https://doi.org/10.3390/su11143842

Zou, X., & Huan, T. (2011). A study of the intellectual capital's impact on listed banks' performance in China. *African Journal of Business Management*, 5(12), 5001-5009. https://doi.org/10.5897/AJBM11.132